

**MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD****De Beers Snap Lake Technical Sessions****November 25, 2002** (De Beers)**Yellowknife, Northwest Territories**

**MR. GORDON WRAY:** English is on channel 1, Chippewyan is on channel 2 and Dogrib is on channel 3. If you just wish to hear whoever is speaking clearly, you can leave your little transceiver on 0, which would allow you to hear the room. I would ask, when you are speaking, to as much as possible given the issues that you are going to be dealing with, to keep it simple and try and talk clearly and slowly for the translators, please. It is a very difficult job to begin with, particularly dealing with technical issues, the translators need to clearly understand what is being said.

With that, prior to opening I would call on Sarah to do an opening prayer.

-- Prayer

**MR. GORDON WRAY:** Thank you. There is a slight change to the agenda this morning. After my opening remarks, De Beers has some opening remarks of their own and then we will take a break, which will allow De Beers time to set up for their main presentation. My name is Gordon Wray. For the purposes of Snap Lake, I will be chairing the Mackenzie Valley Environmental Impact Review Board environmental assessment process. Beside me is Louie Azzolini, who is the environmental assessment officer in charge of the De Beers file. For these sessions, the board has hired Howe Mills and Mike Bell as facilitators. Bill Clausen from the Yukon will also be facilitating, but I believe he won't be in until later on this week or early next week. They have with them their assistant Lisa. She is the one who is going to be making a note of your commitments.

We have translating for us Bertha Catholique, Sarah Bazo, Margaret Mackenzie and Violet Mackenzie. We have prepared a package of relevant background materials for each of the parties that includes the agenda and a summary of the technical issues you provided the board over the last few weeks. Please make sure you have a copy of this, and if you are the spokesperson for one of the parties in the environmental assessment process.

There is nothing new in the package, it has been provided for your convenience and all the materials in the package have already been circulated in preparation for the technical sessions.

Now before we go any further, I would like to, starting on my immediate left, to go around the table and just ask people to identify themselves and just indicate which organization they will be with.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** My name is Rachel Crapeau with the Yellowknives Dene First Nation.

**MR. FRASER FAIRMAN (DIAND):** Fraser Fairman, Indian and Northern Affairs, environment and conservation division.

**MR. SEVN BOHNET (DIAND):** Sevn Bohnet, water resources division, DIAND.

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** Alexandre Desbarats, geological survey, Natural Resources Canada.

**MS. MARGO BURGESS (Natural Resources Canada):** Margo Burgess, geological survey, Natural Resources Canada. Alex and I are here for three days this week and two of our colleagues will be here next week for two days.

**MR. MARK DAHL (Environment Canada):** Mark Dawe, Environment Canada.

**MR. DAVE BALINT (Fisheries and Oceans):** Dave Balint, representing Fisheries and Oceans.

**MR. MARK LANGE (Fisheries and Oceans):** Mark Lange, with DFO.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, De Beers Canada.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada.

**MR. DENNIS THOMAS (De Beers Canada)** Dennis Thomas, I am regulatory and legal counsel for De Beers. I am with the law firm Fraser, Milner Casgreen.

**MR. GARTH WALLBRIDGE (Rae-Edzo Metis Nation):** Garth Wallbridge, legal counsel for the Rae Edzo Metis Nation.

**MR. GAVIN MORE (GNWT):** Gavin More, Government of the Northwest Territories.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews, Wildlife and Fisheries, RWED, GNWT.

**MR. BOB TURNER (NSMA):** Bob Turner, North Slave Metis Alliance.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, legal counsel for the North Slave Metis Alliance.

**MR. GORDON WRAY:** Thank you. Given the number of empty spots, I imagine we will probably have to do this every morning because there will be new faces at the table. One point too is, you must press the white button in order to speak or else your comments will not be recorded. So make sure when you are speaking the little white button is pushed and the red light is on.

First of all, I would like to welcome you and thank you in advance for the assistance and the cooperation so far in the work that has been accomplished. As you know, the review board is responsible for part 5 of the Mackenzie Valley Resource Management Act, or MVRMA. That part establishes the Mackenzie Valley Environmental Impact Review Board. The Minister of Indian Affairs appoints board members from nominations made from First Nations and government. Half the board members are First Nations nominations, and the other half are government nominations.

The review board, generally speaking, is responsible for protecting the environment from significant adverse impacts of proposed projects and for protecting -- one more comment, would everyone please switch their cell phones off? I hope it's not mine.

-- Laughter

The review board is responsible for overseeing the environmental assessment process and for protecting the social, cultural and economic well being of residents and communities of the Mackenzie Valley. It is also required to carry out its work in as efficient and timely manner as is possible.

The board utilizes several tools including preliminary screening, environmental assessment and environmental impact review processes created by the MVRMA. De Beers is in an environmental assessment. When the board has finished its work it will prepare its report of the EA for the Minister of DIAND. He will consider the board's decisions, recommendations and reasons. He can agree or disagree with them. When the board and Minister conclude their consultations on the report of the EA, the Minister signs off and the EA is officially completed, at which point in time it usually proceeds to regulatory.

I want to take a few minutes to quickly go over the Snap Lake process so far. The environmental assessment began in May of 2001 when Snap Lake project was referred to the board for environmental assessment. By February of 2002 De Beers submitted its environmental assessment report to the board. There has now been six months to ask questions using the information request process.

Judging by the number of questions that have been asked, there should be no doubt that you have all read the report.

We appreciate the considerable efforts and recognize that we can improve the efficiency of the IR process and we will look forward to doing that together, now and in the future. These technical sessions and the technical reports scheduled for submission to the public record in mid-February will prepare the public for the board's public hearings that are scheduled for March 24<sup>th</sup> to 28<sup>th</sup>.

After the public hearing, the board will take about a month before closing the public record and to write and issue its decision on the project in June of 2003. These technical sessions are not the last chance to discuss technical issues, but we are hoping that people will take advantage of this particular step in the process to clarify and perhaps conclude as many of the technical issues as is possible.

After you are finished here, technical reports will be prepared and then they can be presented at the board at its public hearings. The technical sessions are an important step in focusing and resolving technical issues, but they are not the last step.

A word of caution to members of the legal profession. While this is a quasi-judicial hearing, it is not an adversarial process and the purpose of these hearings is to clarify, to resolve and to hopefully provide the board with the information it needs to make a decision. It is not Law and Order, it is not The Practice, so put that side of yourselves away.

These technical workshops are new steps in this process for the review board and this is the first time we have included steps like this in a review board environmental assessment proceeding. We've included this step because we want to bring together people to exchange information and ideas on previously identified technical issues and to find out if the technical issues have been satisfactorily addressed by De Beers and our regulators.

The exchange in this session should assist the parties to understand the evidence on the record; to refine or formulate their positions; and if possible, to eliminate any environmental or socioeconomic issues which have been resolved by the evidence filed to date.

I strongly encourage you to have an open and informal exchange and to work your way through the agenda in a focused and efficient manner. There have been some questions about the legal status of these sessions. We've been asked if they are formal hearings or if they legally bind people to what they say and commit to.

As you know, we are a quasi-judicial board and what that basically means is that we have to provide reasons for our decisions and we can only use information that is on the public record to make those decisions. These technical sessions are not hearings, but the board is recording and transcribing these sessions and we will put that on the public record.

So the board can use whatever is said in these sessions in its decision-making process. Lisa, up in the corner there, is responsible for recording what people agree to and disagree to and what commitments are made. We will try to get this information back to all of you as quickly as possible after these sessions. What the board wants is transparency and accountability. So if you commit to something, we want to make sure that commitment is put on the public record for the board to consider when we make our ultimate decision.

We have hired a number of facilitators to prepare the agenda and to help us move through it efficiently and effectively. The board provided the facilitators, the technical issues, and they have worked with Louie and the parties to the EA to prepare the agenda. There is a lot of material to cover over the next ten days and we have tried to structure the sessions so that you can get the most from them. Each morning we will begin with introductions, a recap of the previous day's work and a review of the day's agenda.

De Beers provides two general presentations a day, one in the morning and one in the afternoon. The rest of the time is for discussion and exploration of the technical issues.

This is the board's EA process and the board wants people to engage in constructive, productive discussions that helps you, the board and De Beers. I know De Beers will limit itself to brief presentations in the times allotted in the agenda, and we ask that everyone respect the agenda outlined and the efforts of the facilitators to maintain the agenda schedule.

That concludes my opening remarks, I was going to have John Donahee to make a few comments about procedure, but I believe that John is in court this morning and so he will not be here until this afternoon. However, we will attempt to answer any questions that you may have and if not we can always defer them to the afternoon when John is here.

In the meantime now, I would turn over the microphone to De Beers who have a few opening remarks and then we will take a break which will allow De Beers to set up its presentation and for people to get coffee and get settled for the next ten days. Thank you very much.

**MR. DENNIS THOMAS (De Beers Canada):** Thank you, Mr. Chairman. Ladies and gentlemen, I have been asked to make the statement for De Beers at this time.

**MR. GORDON WRAY:** Could I just -- one process. When you speak to the microphone, could you give your name and identify your organization, because when it is transcribed we need that so we know who is speaking. Thank you.

**MR. DENNIS THOMAS (De Beers Canada):** Thank you. Let me begin by saying I certainly acknowledge your remarks about the role of the legal profession in this process and hopefully this is the last you will hear of me for the next two weeks. The other thing I wanted to say, having listened, Mr. Chairman, to your opening remarks, is that De Beers certainly accepts everything that you have just said in terms of a description of the process that we hope will be followed.

If I might go then to my prepared points, the first thing I wanted to say on behalf of De Beers was to say how pleased is that these technical sessions are now underway, and to acknowledge that they will form an important part of the overall environmental assessment review process.

I next wanted to note the significant investment that has been made to date by De Beers in both financial and human resources to bring the assessment to this point in time. In addition to that, De Beers will be making further investment in participating fully in these technical sessions and has prepared accordingly to make these as effective as can possibly be.

Arising from that significant investment to date and future investment, arise a number of expectations and commitments by De Beers and I just wanted to quickly review De Beers' expectations as to what may come out of these sessions.

The first one is that in the course of the technical review sessions, the approved terms of reference for this assessment will be respected, and issues beyond those terms of reference -- while they may be raised, it is our expectation that they will not stray from the terms of reference.

Secondly, that in the course of the technical review sessions, information requests which have been refused by the board cannot be resurrected again.

Thirdly, that new issues will not be raised, unless they are relevant, of course, to issues which are on the agenda on a day-to-day basis, and it is hoped that the discussions will stick to the issues defined in those daily agendas.

The fourth expectation I wanted to make or state, Mr. Chairman, really relates somewhat more to the media than to the board, although certainly I hope

everybody listens to this comment. Clearly it is the expectation of De Beers that all parties participating in this process will be respectful and tolerant of other views, but a concern has been expressed to me that personal attacks might be reported by the media.

I am sure the facilitators will not allow such remarks to be made, but I wish to make it clear that on behalf of De Beers that if any statements which are defamatory in nature are made, they will not be tolerated by De Beers. I remind the media that these technical review sessions are not like a courtroom, the chairman has made that observation and I completely agree with it. This is not like a courtroom where there is some degree of privilege. There is no such privilege attached to these proceedings, in my view, and the media must be careful to report fairly and accurately, and not publish statements about others that could be construed as defamatory. Now, we are certainly hoping that, as I say, everyone is respectful and tolerant and we expect that will be the case, but we did want to put that on the record, Mr. Chairman.

The next expectation was that the sessions will have useful outcomes. You have certainly spoken to that, Mr. Chairman. These sessions appear to have been well-organized with reputable local facilitators, experienced facilitators. Therefore, De Beers does have an expectation that to the greatest extent possible, issues will be resolved in these sessions and that the facilitators will drive to find a consensus on as many issues as can be reasonably pursued here.

Finally, that the reduction of the number of issues and the focusing on the specific issues should be important goals for everyone participating in these sessions.

The final expectation, Mr. Chairman, of De Beers is that the outputs of these technical sessions will go forward to the board and will serve as an important basis for the board in defining the project issues which will go forward from this group of sessions to the pre-hearing and the formal review hearings to be held by the board next year.

I would like to repeat and stress the importance to De Beers of the recording and communicating of a resolution of issues. That is, given the amount of effort that everyone has put into this, certainly I think we all would hope that there would be successful resolution of many of the technical issues that have arisen as part of the assessment of this project.

With that, Mr. Chairman, I would like to thank you and everyone else for listening to me for those few minutes, and as I said, I hope that is the last you have to hear from me until we get into the pre-hearing later next year. Thank you, Mr. Chairman.

**MR. GORDON WRAY:** Mr. McConnell, how much time do you need for set up, 15 minutes? Okay, we will take a 15-minute break, after which the facilitators will take over chairing the meeting and we will be starting after coffee with De Beers' presentation.

-- Break

**MR. HAL MILLS:** Welcome back then. My name is Hal Mills. We have the rest of the morning now for the presentation from De Beers and any discussion you might want to have in particular on their presentation, obviously, but as well in terms of the opening remarks that you heard from Gordon Wray and from De Beers.

And so with that, I will turn things over to John McConnell who is going to lead the presentation on behalf of De Beers. John.

**MR. JOHN MCCONNELL (De Beers Canada):** Thank you. Good morning again, everyone. We have prepared a number of presentations for the next week, or two weeks. Some are aimed at hopefully reviewing some of the issues that are brought forward. There are some areas where there are issues that we haven't prepared presentations before and are looking for questions and dialogue related to those issues.

The presentation I will put forward here this morning is a bit of an overview on the project. I wasn't at the meeting, the pre-hearing conference on November 8<sup>th</sup>, but Robin tells me there was one poor fellow there who had three binders of our EA plunked on his desk the day before and was told to go to the meeting.

So what I thought I'd do is just back up and start with a presentation that we gave at our technical session back in April which just provides a bit of an overview of the project. And then I am just going to go on and briefly go through some of the things that we have been carrying on with since that technical session. I think everybody realizes that once we have submitted the EA and we are into the information requests, there was still a lot of other work going on in terms of refining the project and I would just like to bring people up to date on some of those things.

What I am going to cover is I am going to introduce you to the team, or at least to the companies that have been working on the project with us for the past three years. I am going to talk about the design considerations for this project, and I will cover the project description. I will just go through the geology, the site infrastructure, how we intend to conduct the mining and then go through the project economics.



I know Chris from the Dene Nation was so impressed with the mining animation in April, I thought I'd also play that again so that people get a better understanding of how we intend to mine this deposit.

As I mentioned, I will go through some of the ongoing activities on the project. The engineering, where we are with impact benefit agreements with the aboriginal communities; socioeconomic agreement with the GNWT and the aboriginal communities; some of our thoughts on an environmental agreement. In our EA, we talk about the fact that we will be putting in place an environmental management system, of which the basis is ISO 14001. I will just update you on where we are with that. Then, I will spend a little bit of time on I think one of the key areas related to the socioeconomic which is, how we intend to staff the mine. We've put a plan in place that will hopefully result in northerners and aboriginals getting maximum benefit from Snap Lake through employment. We will talk about those plans a little bit.

In terms of the team, you have the De Beers people here. I think most of you know Robin and myself. Then there is a whole host of people behind us that are doing bits and pieces. As well as them we have the AMEC, which is an engineering firm. We use their offices out of Vancouver, but they are one of the largest engineering firms in the world and have offices around the world. They have a great deal of northern experience, both with Ekati and the Red Dog Mines in Alaska. They have been involved with us at Snap Lake since 1988 and were the EPCM contractors during the bulk sampling program in 2000 and 2001.

Golder and Associates, you will see a lot of those folks here over the next couple of weeks. They have really been our consultants on the environmental assessment side. Again, an international group of engineers and scientists. They have done extensive work in the north related to diamond work, as they were responsible for the Diavik environmental assessment. They have been involved up in Fort McMurray on Suncor's Millennium project, and they continue to do the wildlife monitoring for both BHP and Diavik. They have also been involved with Snap Lake since 1998.

We also use a company called IER. They have worked with us on the socio-economic impacts of the project. They are based out of Toronto. They as well participated in Diavik in a peer review role and have worked on SCIA's right across the country and have a lot of northern experience. They have been involved on the project since 1999.

Points West Heritage, I think many Northerners know Jean Bussie, and she has done all of our archaeological work, and she as well has been involved in the project since the early baseline data collection going back to 1999.

One of the local firms we've used, primarily in putting our human resource development plan together is Genesis, based here in Yellowknife. It is a company that is founded and run by long-time northern educators, Deb and John Simpson, and John will be participating in some of our socio explanations late next week. They have been involved with us since the year 2000.

I think most of you met Dennis Thomas this morning, he is our legal counsel for the environmental assessment process with a company called Fraser Milner Casegrain. He has just recently joined the team, but has extensive experience both in the north, but primarily in Alberta.

Now I will just move onto the project description. I always like to start with the geology, because Snap Lake is a unique deposit. There is not a deposit like this mine around the world. I think most people are familiar with the Ekati type deposit, which is a pipe. Snap Lake is more like a sheet. I will just have a little animation here that will show you how we feel the Snap Lake deposit was formed. At the end of that I can answer any questions, but I think it is fairly self-explanatory.

There you see Snap Lake, certainly the major diamond exploration in this country is in those two creations. If we sort of stand away and have a look inside the earth here...

This process that you are seeing sort of a narration of is really how they feel pipes are formed as well. One difference is that a pipe is really an explosion when it reaches the crust of the earth. You will see what we suspect happens in the case of a dyke like Snap Lake. When a pipe, you would have seen an explosion right through to surface. Snap Lake, you see the magma hits cracks in the crust and slowly works its way to surface. That would represent the Snap Lake dyke there.

Over time, most people know this area was covered in glaciers -- Deb Archibald probably knows better than me, but miles thick. And we are left with what we see today with the top scratched off, and the Snap Lake dyke which right now we estimate has delineated over an area about 2.5 kilometres by 2.5 kilometres, and it dips at about 15 degrees and is about 2.5 metres thick.

Before I move on, I am not a geologist, but I can attempt to answer any questions on the geology if anyone has any. Okay, either everyone is bored to death or you are all geologists.

In terms of the design considerations, I think number one on the list is always making sure we adhere to the laws and regulations. I guess added to that, where there are no laws and regulations, we look at best practices around the world and

we apply those. In terms of the biophysical environment, one of the things we wanted to make sure of, or things we felt would least impact the environment is by minimizing the project footprint. We think we've done that. The impact area is about 550 hectares. I guess in comparison to Diavik, Diavik is at about 1,800 and I estimated Ekati at about 3,500. I think, Bob, you had a different number. You figured it was a lot higher than that.

The next thing, we sat through the BHP hearings and the Diavik hearings and we saw the problems they had with trying to show that there was no impact by damming water ways and draining lakes, so certainly in our design, although there was economic benefit to a small open pit that would extend into Snap Lake, we threw that idea out very early on in the project and looked at minimizing damming or dyking of waterways.

We also wanted to minimize the amount of waste rock stored on surface, as most granite rock in the NWT does have limited potential acid generating characteristics, and we wanted to minimize the dust and noise. Now we think we've addressed most of those criteria by committing to a solely underground diamond mine, that allows us to minimize the impact on surface. A very small amount of waste rock would be stored on surface and we'd have all the crushing and drilling operations underground which would minimize the dust and noise.

In terms of socioeconomic, I am going to talk a little later about employment and the steps we have put in place to try and ensure we have a maximum number of aboriginal and northern workers. We wanted to make sure that in terms of contracts for construction and operation that we sized them accordingly, so that northern businesses would be able to bid on contracts for the mine.

We considered the health and wellness of the communities. We are looking at a rotating workforce in and out with direct flights back and forth between the mine site and the communities, not taking people through Yellowknife, which seems to be getting the reputation as the Detroit of the North. So we tried to avoid Yellowknife in our rotation schedule.

We want to try and help protect the culture of the people in the region through cross-cultural training, both at site and in the communities. Another big step was we feel it is time that aboriginals had direct participation in projects in the north. We have put forward the idea of the aboriginal community actually having equity participation and being part of a joint venture to operate and manage the mine.

In terms of sustainability, we wanted to ensure that this was a long-life mine. We feel we have a resource there that is plus 25 million tons. We came up with a mining method that we think is appropriate for this deposit and a mining

production rate that we think is appropriate at about 3,000 tons per day, or a million tons per year. It would give us a long-life mine at plus 25 years.

Also, there is a lot of exploration potential in the area, so in our plans and cash flows we have put aside money each year for ongoing exploration, to again ensure longer life to the project.

Now I will just run you quickly through the site. This is an aerial view of the site looking from the southwest to the northeast. You can see the airstrip there, the north pile and then the main plant site. Now we will just focus in on the main plant site. The process plant, a conveyor coming from underground into a storage building. Here is the portal here and the north pile.

In terms of waste rock and processed kimberlite, that is the north pile, it is really the only area onsite where waste rock or processed kimberlite will be stored. Water management, before being discharged to Snap Lake, all water on the plant site will be collected and run through a treatment facility and then discharged. There will be another presentation, I think it is next week, discussing the water treatment facility and some of the issues that have been raised related to that facility.

Service or accommodation unit. If anyone has been up to Diavik, this would be a similar type of accommodation unit with rooms for about 250 persons. Then it would have also the related catering facilities and recreation facilities.

Service complex has the offices for the administration as well as the shops for equipment maintenance. Our present camp is right in this area here, and that will be extended and used during the construction period.

Consumable storage, a couple of quite large lay down areas. Everyone knows we are reliant on winter roads in the north, and so we don't want those trucks sitting on the ice in the winter or unloading the supplies on the ice, so we made room for two large lay down areas, so when those trucks are coming in they can be unloaded and the major consumables stored there.

Explosives storage is off the map here, about halfway between the main site and the air strip. We will also have a large area for cement storage. We will use cement mixed with processed kimberlite that is pumped back underground, and then the large fuel tank farm with capacity of plus 30 million litres. Now I will stop talking for a minute and we will start this mining narration which takes you through the proposed mining method for Snap Lake.

-- Audiovisual Presentation

Finally, on the project description, I would just like to talk about some of the key economic parameters at Snap Lake. As reported in the EA, our mineable resource at Snap Lake is about 22.8 million tons. You have heard me today talk about 25 million tons. There is certainly potential for 25 and some people have speculated as much as 50, but what we know now is that there is a minimum of 22.8 of economically mineable tons. This material is at a grade of about 1.6 carats per ton. That is a diluted grade. That is what, when we are mining, will actually go through the plant. The value of the diamonds at Snap Lake is approximately US\$76 per carat, and that is the U.S. value.

Production rate, as I mentioned, 3,000 tons per day, or just over 1 million tons per year, which would give us a carat output of just over 1.5 million carats per year. Capital costs to build the mine are estimated at about \$490 million, and annual operating costs are estimated at just over \$100 million. The annual revenues as a result of those numbers would be about \$180 million per year.

Just to put that in perspective of the two diamond mines before us, you can see the comparison in the numbers there. Diavik, with a mineable resource of 25.7, extremely high grade deposit at 4.33 carats per ton and a little lower diamond value. Because of the high grade, you can see when you go down to the revenues that they are orders of magnitude greater than what we will see at Snap Lake.

Ekati is the big grandfather of them all with a reserve of 77 million tons. They are also operating at a much higher production throughput rate. These numbers are based on what we saw in the press during the construction period, and their feasibility was based on 9,000 tons per day. I think Bob Turner told me last week that Ekati is running at well over 12,000 tons per day presently. I don't think I need to go through the numbers, you can see the comparisons there.

Just in terms of area where we are still carrying out work over and above the environmental assessment, the first area is engineering. I talked about the fact that we use AMEC out of Vancouver for our engineering, and I would say that about 99.9 percent of our work there has been shut down and won't start up until at least the fall of 2003 when we begin the detailed engineering. That is really just to conserve money at this time. There is no sense taking it any further until we have a little more clarity on the permitting timelines.

Now there are a couple of exceptions. We do continue to modify the mining plans, looking at equipment sizes and some of the rock mechanics related to the mine, trying to optimize the mining method.

We are also looking at an optical sorter, which would be able to take some of the waste out of the ore before it goes into the process plant. Then, the other related

to an environmental agreement is we are presently doing engineering on detailed closure and reclamation plans and coming up with related costs so that when we go into the environmental agreement we could put forward a proposal on a security deposit that would be appropriate for a mine the size of Snap Lake.

We are also working on impact benefit agreements. We are dealing with the Dogrib Treaty 11 Council which is made up of the four communities of Rae-Edzo, Wekweti, Gameti and Wha Ti. Working with the Yellowknives Dene, made up of the communities of N'Dilo and Dettah. And Lutselk'e Dene First Nation and the North Slave Metis Alliance.

Things we are talking about there include employment, skills registries where those communities would provide us with a registry of who is available and what skills they have. Liaison personnel to act as coordinators in the communities. Apprenticeship programs, trades training programs, and as Snap Lake will be an underground mine about 50 percent of the employees will actually work underground, so we are going to need a very large training program to train miners. We are proposing a miner common core training program similar to what has been established in Ontario.

We are discussing business opportunities. We have already hired a business development coordinator to work with the aboriginal communities, assist them with business plans, make sure they know what contracts will be let in terms of construction and operation, and really act as the liaison between De Beers and all the aboriginal and northern businesses.

Again, as I mentioned earlier we will be sizing contracts for aboriginal businesses, making sure they are of appropriate size, and in the IBAs we are guaranteeing minimum dollar value of business opportunities.

Also discussing training and education. We have put forward that we will be having a site training centre. We have also talked about community training centres. In terms of higher education, we've talked about scholarship programs that both De Beers and the aboriginal communities would contribute to.

There is also financial considerations, and to date we have put forward the idea of the aboriginal groups having a small equity participation in the project that would give them real, meaningful joint venture opportunity in Snap Lake. It includes things like if they have a small percentage they would also be able to take their share of rough and use them in local facilities in the NWT. It would also give the communities participation in management, because we envision some form of joint venture committee or board that management from the mine would report to.

In terms of where we are with agreements, with the Dogrib and the North Slave Metis, in both cases we have MOUs in place that spell out a framework for negotiation and a schedule. In both these cases negotiations are fairly well-advanced and they are both looking at the equity participation and have hired independent consultants to review the project. We want them to understand what they are getting involved with and make sure they are happy that Snap Lake is a good and economic project before they actually buy in.

Lutselk'e, we have finalized an MOU and the only thing left is for both parties to find a date to get together to sign it. That is presently scheduled a couple of weeks from now. Yellowknives Dene, we haven't progressed to an MOU but we have had numerous discussions revolving around employment opportunities, training and business opportunities at the project.

In terms of a socioeconomic agreement, we had our meeting with the GNWT and the various aboriginal groups last week, or a couple of weeks ago. So discussions have been initiated. Some of the things that we are looking at including in the socioeconomic agreement are things so the GNWT ensures benefits are maximized for northerners, both in terms of business and employment opportunities.

The GNWT has established a secondary diamond industry here in the north, and they want to ensure that that business is sustainable through the provision of rough through the various mines in the GNWT, so we are having discussions on that.

Training, we want to ensure that the GNWT comes to the table as a partner. We feel that government has a role in training and education. It has been pointed out to us by the aboriginal communities that this agreement is really a way to hold the GNWT's feet to the fire in terms of long-term commitments in education and training. The same goes for community health and wellness. The communities all feel that they have been ignored to date and they want some assurances that the GNWT is going to live up to their role in terms of community health and wellness.

In terms of the agreement we have looked at the Diavik model. I think it is generally acknowledged that this is the way to go. One thing that we haven't discussed is that there is presently a Diavik monitoring agency for their socioeconomic agreement, and it may make sense to combine our efforts and have a single monitoring agency.

On the environmental agreement we have only have very informal discussions with INAC to date. We did participate a couple of weeks ago in the workshop initiated by DIAND on moving towards a single independent monitoring agency. We concur with their thoughts that there are a lot of advantages to doing that, but

we are a little concerned about the timeframe that may be required to bring the various parties to the table.

So we see in parallel to working with INAC to move towards a single monitoring agency, we are also going to have to work on a Snap Lake specific agreement. Again, we have thrown it back at people, should we use Diavik or the Ekati model. I think generally people feel that the Diavik model is the better. Probably what we want is something in between. Ekati seems to be very much focused on the academic side and research, whereas Diavik is very much focussed on community participation. We probably want something in-between those two models.

In our EA we talk about our environmental management system certainly as a means of monitoring site-specific environmental related activities. We have put forward that we will use the ISO 14001 standard. This has a number of phases, this standard, starting with an environmental policy. Then there is the planning and looking...

#### -- No Overlap Between Tapes

...environmental policy. Then there's the planning and looking at the regulatory requirements and the objectives that are set out in the environmental policy. Implementation and operation under that policy calls for annual auditing to correct outstanding items, and then there's annual management reviews.

Why an EMS? Well, I think that's pretty easy. We want to make sure that there are no disasters on the site. We want to make sure we're striving to continually improve our environmental compliance. This is an independent audit of the system. It wouldn't be a De Beers audit or an INAC audit, so, you know, a couple of weeks ago, we heard a lot of talk about watchdogs and the need to have watchdogs watching both proponent as well as the regulator. This provides for that.

Along with this process, there's legal due diligence. Built into it is risk management, so that we have to assess the risks annually and focus on trying to mitigate and reduce those risks.

Through the annual audit, there's public reporting and people would be aware of our performance. I guess for De Beers, this has become standard, ISO registration, so we think we're showing corporate responsibility and certainly leadership amongst the mining community and taking this various onerous program and applying it at all our mines around the world.



In terms of the steps, I won't run through them, but it doesn't quite show up there, but the only outstanding item we have left is the registration audit. We've had a team... a dedicated team working very hard over the past 12 months. They've completed all of the steps and our registration audit is actually next Thursday and Friday, so we would anticipate being ISO registered by the end of the year. And this is something we'll keep up through construction and into operation of the mine.

Again, I talked earlier about our human resource development plan. We've done a lot of work in this area over the past year. I think everybody realizes that with Ekati and Diavik ahead of us, the capacity of employable people in the communities has become very limited, and this map just shows the areas we're primarily looking on for employees.

In terms of assessing the human resources, we went into the communities. We talked to people. We interviewed them. We asked them what we should be doing differently from government attempts, different from Ekati, different from Diavik, and we asked about problems in the communities. I think what we learned as a result of those surveys was that there is very limited capacity. In the communities, there's low levels of education and literacy. Many of the training programs that have been carried out in the past, we've been told were inappropriate, not designed for, to provide meaningful employment in the future.

There's been minimal career development support from the communities. There's a number... you know, FAS is a problem in the communities, so there are many learning disabilities. There's mobility issues. There's a number of single parents in the communities and working out of Snap Lake or Ekati with rotating work schedule is difficult. Job skills are low, and one thing that we kept hearing is that, you know, don't let government run this, because you know, there programs are always short term and they're poorly coordinated, so make sure that somebody responsible is running any programs and that they're long term with goals and objectives.

So our conclusion from being in the communities was that, you know, we had a lot of work to do, and that there are people there, but it's going to be up to us, through participation with other stakeholders, to train and educate the people that are in the communities so they can take advantage of jobs at Snap Lake.

So our goals, you know, if we're going to have a plan, we need goals. It's to develop a competent aboriginal and northern workforce that is ready, willing, and able to work. To support each employee in their efforts to reach their maximum employment potential. And to assist and support employees and their families to live happily and well.

So the outcome of all this is that we do have a plan now. We've published a booklet that's called developing human resources for Snap Lake. And we do have a number of copies of that here today, and they'll be available at the back if anybody's interested in reviewing them.

We're presently taking these into the communities and talking to the communities about them, and we will modify this plan as required moving into the future.

Some of the critical details is, you know, we've tried to look long term. We've put together a five-year plan. We can't do it by ourselves. We don't think we should have to fund it by ourselves. We feel there's a role for government in this as well. So we see partnering with the aboriginal communities themselves, government organizations like HRDC, ECE, DIAND and Aurora College. This program would be managed by, or guided by, a partnership committee. And I say guided because we want to take control of the management of this five-year plan. We're proposing quarterly meetings with the partnership committee so we can adjust the plan as needed.

One of the components is a major training centre at Snap Lake, and permanent community adult education facilities and educators in the community. There are education facilities in a number of communities, but there's no funding for adult educators. Again, it comes back to commitment by government has been short-term. They built these facilities but never set aside the money to actually put an educator in them. And again, you know, we're a mining company and we want to train people for our site, but we're certainly not going to exclude people that want to use these facilities and better themselves to become a nurse or a teacher or things like that, so these facilities will be public and the educators will be open to the public and any educational materials we provide will be open to the public.

Some of the areas we've identified for pre-employment is really just basic education, you know, reading, writing, math. We've got stay in school projects that we're proposing, achievement awards, and scholarships, trades training program, summer student employment, talked about the adult career centres, information sessions regularly in the communities, as well as accessible on our website.

We're presently going around the high schools now. We see that as an area, because we've got a few years before we start production, we need to start working with kids in high school now, ensure they stay in school, and make sure they know they have an opportunity to work for us when they graduate. Also, you know, a very small number of women in mining, so we also want to promote getting women involved in the mining business. Community programs, literacy programs, adult education, advanced independent study programs supported by websites, trades training, and career counselling.

Some of the wellness initiatives, and again, you know, this is, we feel, very much a role of government, but perhaps just needs a little bit of a kick-start. I know Mark Lange used a term there a couple of weeks ago that people sometimes need a good kick in the ribs. Well, we hope to fulfill that role and give government a kick in the ribs and get them into the communities carrying out these wellness programs.

I think that covered what we intend at the mine training centre.

We've also developed this poster that talks about careers we see at Snap Lake. Again, it's of course aimed at the high school students and elementary school students and a sample is on the back wall there if at the break you want to have a look at it and ask any questions.

Again, we have the... oh, over and above the posters, we also have a career guide book that identifies each position we see at the mine site, gives a description of the job and what that job entitles, and also talks about the education and training that's required to get to that job, so that people in the schools can look at it and say "Well, I want to be a truck driver. What do I have to do to become a truck driver?" Or "I want to be an engineer. What do I have to do to become an engineer?"

That's it for my presentation this morning, so I guess it's back to you, Hal.

**MR. HAL MILLS:** Okay, John, this is Hal Mills. Thank you for the presentation. You covered a lot of material there, and hopefully there are going to be some questions. I'm tempted to ask Robin to lead us through an aerobic exercise here and warm everybody in the room up, but...

-- Interjection

... I understand that that has just happened, that they've just tried to turn things up a bit here.

Okay, hopefully there are lots of questions. I'll remind you that in order that we get things on the transcript, if you would move to a mike, turn the mike on and then identify yourself before asking a question, please. The floor is open.

I know John did a good job, but he needs some questions.

**MR. JOHN MCCONNELL (De Beers Canada):** Hal, I'm not really sure questions are appropriate on a general presentation like that, because the number of the areas that I covered sort of broadly are certainly covered over the next two weeks, specifically. And as I mentioned earlier, in some of those areas, we will have fairly detailed presentations that may generate questions. I think, you know,

this group is a technical group and I wouldn't have expected too many questions on a broad overview of the project.

**MR. CHRIS PRATTS (Dene Nation):** I'm Chris Pratts with De Beers... with De Beers...

-- Laughter

with the Dene Nation. I hope that doesn't mean I've been indoctrinated already. Again, I liked the presentation. As always, the animation always helps me. I guess I just have one question. Attawapiskat and Fort à la Corne are a couple of other spots that De Beers is doing some diamond work. Can you comment at all on your experience here in Denendeh working with aboriginal first nations compared to what you've done in Ontario and Saskatchewan?

**MR. JOHN MCCONNELL (De Beers Canada):** It's probably not appropriate for me to comment too much, because my focus is entirely on the Northwest Territories. I can tell you a little bit about the levels of activity at those projects. Fort à la Corne in Saskatchewan is really an early stage and exploration project, so you know, it's kind of where we were back in 1998. Victor is moving from pre-feasibility to feasibility study next year, and so it's probably about a year behind Snap Lake in terms of development.

In Saskatchewan, I'm totally unaware of our work with the aboriginal community, but in Ontario, there's one community, Attawapiskat, and certainly we are in... they've been very involved in terms of the development on the project there to date.

**MR. HAL MILLS:** Any other questions or comments? Are there any questions or comments that you'd like to make with respect to the earlier, the opening remarks from Gordon Wray and the comments from Dennis from De Beers? Everyone feel they have a good understanding as to what we're about here and how this fits into the overall process that the board is following?

**MR. GAVIN MORE (GNWT):** Gavin More, Government of the Northwest Territories. I'd just like to make one comment on one of the positions that De Beers was taking as a non-negotiable. That relates to the IRs that the... I think the phrasing was that the board turned down. And it's my understanding that some of the IRs were turned down because the board felt they weren't relevant. It was also my understanding that some were turned down because they were submitted late. And there was some confusion about which IRs were turned down because they were late versus which ones were turned down because they were outside of the terms of reference.

In actual fact, around the table, I don't think anybody's received information from the board as to the reason why some IRs weren't advanced. Therefore, it's unknown to us, and I'm not sure if De Beers actually knows which ones weren't advanced for what reason. Therefore, I don't think that's a particularly fair statement for the group to accept that not all IRs that were turned down by the board or weren't advanced shouldn't be talked about.

It's my hope that many of the groups around the table have kind of reinforced certain information requests that were turned in late from the departments of the Government of the Northwest Territories. So I'm hoping that a lot of those will be picked up in one way, shape, or form, but my impression is that it would be easier for the participants to believe that this is a chance for good dialog rather than that certain kinds of questions will not be discussed at this particular forum. Thank you.

**MR. HAL MILLS:** I'm not sure if De Beers wants to respond to that, but it might be appropriate to have Louie Azzolini respond. Louie, I think perhaps it would be helpful if you could at least just talk to the process that the board went through with respect to the information requests.

**MR. LOUIE AZZOLINI (MVEIRB):** I appreciate the comments that were brought forward here by Gavin and some of the other individuals which approached me in between the sessions. The reasons for the board's not issuing a number of IRs has not been placed on the public record. I can assure you there are reasons. I drafted the first draft of those and have provided them to legal counsel. I can't speak to the legal areas about what can be included in the discussion, what De Beers has suggested in terms of what the board has refused is fully refused and cannot be entered into this discussion. I'm going to save that for John when he comes this afternoon.

I think we have to go back to what Mr. Gordon Wray said, that really we don't want to start beating each other up on the legal side of it. Let's talk technical stuff. Let's get to the heart of the matter. Let's deal with significant technical issues. This is your meeting. This is not the board's meeting. The board is not here. Try and make it as productive as you can. And if there are issues that need some resolution, please work with the facilitators in break-out sessions, if you have to, together outside of this room, in another area, but just to strongly encourage you to deal with the issues that we can deal with effectively, and when John comes this afternoon, I'll see about getting some clarification from him. I'm just, you know, what the legal component is.

But again, I want to underscore, bold and underline, let's not turn this into a legal, procedural wrangling. Mr. Gordon Wray would not like that and neither would the board.

**MR. HAL MILLS:** Okay, thank you, Louie. Any other comments on that point?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I guess we go back to Gordon's comments, and it's certainly our desire to have an open exchange of technical information here, but we certainly don't want to open things up again beyond the terms of reference, and clearly there were a number of information requests which were outside the terms of reference, and appropriately so, the board rejected those. And I guess those would be the areas in particular that we would hope that the facilitator wouldn't allow the technical session to get hijacked and move in that direction.

In terms of the GNWT being late with submissions, you know, I think that most of their questions fall within... if they fall within the terms of reference, they're going to be able to phrase them during this discussion and ask the questions. And I think that was actually the board's advice to the GNWT, that because they were late, they would have the opportunity to discuss those items at the technical sessions.

**MR. HAL MILLS:** Okay. Thank you, John. Any other questions or comments? Okay, it's Hal Mills again for the benefit of the transcripts here. One of the commitments that the facilitators made in terms of entering into this is that we would do our best to stick to the agenda, to the schedule by day and the agenda in terms of time slots, because we know that some people are just coming in for particular things and aren't going to be here throughout. So with that in mind, rather than trying to move to the next item on the agenda, I suggest and I'm open for counter-suggestions, that we break for lunch and resume here at 1:30. Is everyone okay with that?

And I've just got a note that for those of you interested in lunch, that apparently the Smokehouse Café is open for lunch today if anyone wants to go there for lunch. Okay, thank you then. Please try to be back here so that we can get started promptly at 1:30. Thank you.

-- Break

**MR. HAL MILLS:** We have a few new people in the room, but I think what we'll do is plan to do a round of introductions at the start of each morning, so I'm suggesting not doing another one now. Even this morning, we only did introductions to the people who were at the table rather than everyone in the room. So if you want a round of introductions, more complete right now, we could do that, but what I'm saying is I think at the start of each day, since we'll have a somewhat shifting cast of characters, that we'll start off each day with a round of introductions. Would you like to have a more complete round of introductions

right now? Would that be helpful? Okay. I'll start off and we'll go this way. I'm Hal Mills with GeoNorth. I'm one of the facilitators here.

**MR. MIKE BELL:** I'm Mike Bell from Inukshuk Management Consultants, one of the other facilitators here.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** I'm Rachel Crapeau, Yellowknives Dene First Nation, land environment committee chair.

**MS. TAMARA HAMILTON (DIAND):** Tamara Hamilton, DIAND.

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** Alexander Desbarats, Natural Resources Canada, GSC.

**MS. MARGO BURGESS (Natural Resources Canada):** Margo Burgess, Natural Resources Canada, geological survey.

**MR. MARK DAHL (Environment Canada):** Mark Dawe, Environment Canada.

**MR. DAVE BALINT (Fisheries and Oceans):** Dave Balint, Fisheries and Oceans.

**MR. MARK LANGE (Fisheries and Oceans):** Mark Lange, Fisheries and Oceans.

**MR. DAVE LEVY (Fisheries and Oceans):** Dave Levy, consultant to Fisheries and Oceans.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, De Beers Canada.

**MR. CHRIS PRATT (Dene Nation):** Chris Pratt, manager of lands and environment at Dene Nation.

**MR. GARTH WALLBRIDGE:** Garth Wallbridge, legal counsel, Rae-Edzo Metis Nation.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Steve Wilbur, Dogrib Treaty 11.

**MR. GAVIN MORE (GNWT):** Gavin More, Government of the Northwest Territories.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews, wildlife and fisheries, RWED, GNWT.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini with the review board.

**MR. HAL MILLS:** Okay, and for the people who aren't at the table, could you make your way up to a mike and introduce yourselves, and we'll go around again this way?

**MR. SEVN BOHNET (DIAND):** Sevn Bohnet Water, Resources, DIAND.

**MR. BUDDY WILLIAMS (DIAND):** Buddy Williams, land administration, DIAND.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, De Beers Canada.

**MS. PAT THOMAS (Golder Associates):** Pat Thomas, Golder Associates.

**MR. RICK SCHRYER (Golder Associates):** Rick Schryer, Golder Associates.

**MR. DANNY THOMAS:** Danny Thomas, Fraser, Milner, Casgrane, legal counsel for De Beers.

**MS. LISA BEST (GeoNorth):** Lisa Best, notetaker for GeoNorth.

**MR. LEE ATKINSON (Hydrologic Consultants Inc.):** Mr. Lee Atkinson, Hydrologic Consultants Inc.

**MR. GREG ORYALL (AMEC):** Greg Oryall with AMEC.

**MR. MARK DIGEL (Golder Associates):** Mark Digel, Golder Associates.

**MR. KEVIN HIMBEAULT (Golder Associates):** Kevin Himbeault, Golder Associates.

**MR. ANDREW PRESTON (Harvard University):** Andrew Preston, Harvard University.

**MS. GLENDA FRATTON (Gartner Lee):** Glenda Fratton, Gartner Lee.

**MR. JASON MCNEILL (RWED):** Jason Neill, policy, legislation, communications, RWED, GNWT.

**MS. DEBRA ARCHIBALD (RWED):** Debra Archibald, industrial initiatives, RWED, GNWT.



**MR. CLAY BUCHANAN (RWED):** Clay Buchanan, RWED, GNWT.

**MR. P ETRO D E B ASTIANI ( RWED):** P etro D e B astiani, energy s ecretariat, RWED, GNWT.

**MR. LIONEL MARCINKOSKI (RWED):** Lionel Marcinkoski, GNWT, environmental protection.

**MR. TOM HIGGS (AMEC):** Tom Higgs, AMEC.

**MR. KEN DAHL (DIAND):** Ken Dahl, DIAND.

**MR. FRANCIS JACKSON (DIAND):** Francis Jackson, DIAND.

**MR. FRASER FAIRMAN (DIAND):** Fraser Firman, DIAND.

**MS. ANNE GUNN (RWED):** Ann Gunn, GNWT.

**MR. RAYMOND BOURGET (RWED):** Raymond Bourget, RWED, North Slave region.

**MS. JANE HOWE (BHP Billiton):** Jane Howe, BHP Billiton.

**MR. HAL MILLS:** Okay, great. Quite a... quite a crew, and that was almost like a bit of musical chairs, too. Okay, for this afternoon then, we're going to review the schedule and agenda first, and basically to make sure you have a good understanding. If there's serious problems with the schedule and agenda, why, please let us know. If there somewhat less than serious, why, please try to live with it, because for the schedule in particular, which was laid out some time ago by the review board, a lot of people have seen this in advance and they've used that to determine what days they have to have particular experts here and so on, so if one party feels they need to change the schedule, it would likely inconvenience most of the other parties, so we should try to resist that as much as possible.

And as well as the agenda. When the facilitators got involved with this not too long ago and were given a pile of information on issues and invited to come up with an agenda that would make this flow and work, it was a little challenging. So we've done our best. I'm sure it's far from perfect, but basically once again, my message is if you have a serious problem with any aspect of the agenda, let us know. If it looks like something that you could live with, why, please try to do so.

Now, just a general comment on the agenda is that we've obviously gone away from trying to list specific issues, and we tried to group them by topic. This was I guess especially important and crucial with respect to water quality, by far and

away the largest number of issues were in the two days that are listed for water quality.

It's not our intent to take any issue off the table. It is simply that it was difficult to organize the agenda by listing each of the issues, some of which we presume may no longer be issues. They may have already been resolved. Some of them may not be very important issues, so we wanted to go by topic so that you could tell us what you think are the most important issues within that topic that you feel still need to be discussed and addressed.

Now, this not being a legal hearing, the main purpose of it, at least I feel the main purpose, is for you to get what you can out of this in terms of exchanging ideas, getting more information, so that you have a better understanding of the things that are of concern to you and coming out of this, can have a better handle on what you may do or may need to do to draw your issue to the attention of the board.

Now, the deliberations from this, at least the commitments and whatever consensus we have on dealing with things, will be documented. That information will be available to the board. But you still have other opportunities for directly dealing with the board in terms of the things that you feel are important through the report that you can get in and through the public hearings that will be taking place in March.

So, all that is background then to basically what we tried to do with the agenda, and I'd like to go to day two of the agenda, the Thursday, November 26<sup>th</sup>. Now I should say because there were so many water quality issues for tomorrow and for Wednesday is that we're trying to get you to come and be ready to go for an 8:30 start on each of those two days. For all the other days, we're going for a nine o'clock start.

And basically then on the Tuesday, we'll be covering water, the issues related to water management plan in the morning and to the water management system in the afternoon. We had a number of discussions with people from De Beers in particular, I guess, in terms of presentations related to those issues, and what we've come down to is that for starting off the morning, and starting off the morning for the... or starting off the afternoon for the different water quality issues, that they will give a presentation covering what they see as the main things on the agenda for that morning, and trying to give you a picture as to where your particular issue may fit in.

As well, we'll have Louie Azzolini, of course, from the board and the facilitators, to the extent that we can, trying to interact with you, and you're saying "Well, I don't see where my issue's gonna fit" so that we'll... we'll hopefully be able to

satisfy you and say this fits, or we thought it would fit within this particular topic on the agenda.

So we'll have the presentations then from De Beers early in the morning. We'll then get into the different issues related to the water management plan and a similar format for the afternoon with respect to the water management system issues.

Any questions as to the general way we're structuring this and the particulars of Tuesday, November 26<sup>th</sup>? Everyone has the agenda, to start with, I guess? Anyone need a copy of the agenda? Good.

Now, as we've already mentioned, the facilitators are going to try to keep you to the time blocks indicated here. If we save time at any point, then we can interact with you to see how to best make use of the time that we saved, but unless and until we save time, we'll be intervening to cut off discussion on that particular topic so that we can move on to the next one and give everything a fair shake.

Okay, on Wednesday, November 27<sup>th</sup> then, still on water quality, still having a presentation from De Beers in the morning, and another at the start of the afternoon. And basically dealing with Snap Lake issues in the morning and North Lake issues in the afternoon, and winding up with a discussion on cumulative impacts, which I guess leads me to another point I should be making, is that we'll be addressing cumulative impacts at specific topic areas through the agenda, such as water quality, such as wildlife and so on, and socio-economic. And then on the final day, we'll be trying to have a global session on cumulative impacts where we'll try to draw in the different elements of the discussions that have come up under these specific topics. So we'll end up the water quality session then with the discussion on cumulative impacts. Any questions or comments on Wednesday, November 27<sup>th</sup>?

Okay, Thursday, November 28<sup>th</sup>, once again a presentation from De Beers and then getting into the various aquatic habitat, aquatic organism issues through the day and winding up with a discussion on cumulative impacts. Any questions or comments on the agenda for November 28<sup>th</sup>?

Friday, November 29<sup>th</sup> then, this may not be too convenient to a number of people, but we have wildlife on Friday and Monday. So a presentation from De Beers to kick things off. If I could add a bit of a comment there in terms of the De Beers presentations, the... I think that each of the presentations will be somewhat general and there are more specific things that they'll be able to refer to in what could have been a longer, more detailed presentation, if and when particular issues come up.

So they'll have the general presentation early in the morning. There may be other things that will require short presentations later in the day, depending on what issues are being discussed. Is that a fair way to describe that, Robin?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada. It depends, Hal. In general, what we've... our focus, as stated at the November 8<sup>th</sup> pre-hearing conference meeting was... would really be providing very focused presentations to address specific issues that, recognizing the number of some of the issues, we have broadened that to include some general presentations, but essentially would have general presentations and we're anticipating that most of the discussion will come around from those presentations.

**MR. HAL MILLS:** Okay, thank you. So on Friday then, we'll be going through things related to wildlife study design, some of the particular species, the impact ratings, and winding up with a discussion on traditional knowledge of wildlife. Any questions or comments on Friday, November 29<sup>th</sup>?

Okay, on Monday, December 2<sup>nd</sup>, once again an opening presentation, then getting into the monitoring program, mitigation and adaptive management, and winding up with cumulative impacts. By the way, we'll... through the different drafts of the agenda, we somehow lost biodiversity, which is to be added in on the... as part of the 3:00 p.m. slot.

-- Interjection

Yeah, it's on Monday, December 2<sup>nd</sup>. We somehow lost biodiversity, which will be added back in.

Okay, on Tuesday, December 3<sup>rd</sup> then, getting into geotechnical, another presentation in the morning, then getting into northpile related issues, some of the operational issues and the thermal regime. Any questions or comments on Tuesday, December 3<sup>rd</sup>?

Okay, on Wednesday, December 4<sup>th</sup> then, completing the geotechnical, another presentation in the morning, getting into the permafrost issues, thing related to reclamation and closure, re-vegetation and so on, and from this afternoon's agenda, one of the things that's been identified under the 2:15 time slot is production rates, which I think De Beers may want to say a few words about, but this is a change from one of the earlier versions of the agenda, and some of the experts who want to speak to the production rates aren't here today and so we're slotting that in right after lunch on Wednesday, December 4<sup>th</sup>. We'll be putting production rates in. I'm not sure... I guess I'm not sure how much time is required for most of the things on the agenda here, but I'm not sure that's going to require

a major slot of time or not, but we will kick off after lunch on Wednesday, December 4<sup>th</sup> with a discussion on production rates. And we have not built in a discussion on cumulative impacts related to geotechnical issues. Any questions or comments on Wednesday, December 4<sup>th</sup>?

Okay, on Thursday, December 5<sup>th</sup>, starting off with a presentation, going through some of the LCIA, approach and methodology things, effects of mitigation, and sustainable economic development. This almost goes back to my previous comment, and I'm not sure how much any of the things or how much time is required for virtually any of the things here. It seems to me that for the two days devoted to socio-economic that the agenda is perhaps fairly loose, but we may not need all that time, but we'll have to see. Any questions or comments on Thursday, December 5<sup>th</sup>?

Okay, and the final day, we've not scheduled a presentation there because my understanding -- and Robin, please correct me if I'm wrong, is that De Beers is just going to kick the total socio-economic section off with a presentation. But if there's any need or desire for a presentation at the start of the final day, we can build that back in.

And we may not be getting into socio-economic cumulative impacts and then moving into a discussion of the global cumulative impacts where we try to bring the different things from wildlife and water quality and so on into an overall discussion.

And we may very well be able to wrap up earlier than five o'clock on the final afternoon. Any questions or comments on that day in particular? Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** Rachel Crapeau for the Yellowknives Dene. I'm wondering why they couldn't find somebody to do a presentation for Friday the 6<sup>th</sup> on the socio-economic and cultural aspect.

**MR. HAL MILLS:** I'll let De Beers respond. I don't think it was a matter of they couldn't find any. My understanding was they felt a presentation on all the socio-economic and cultural things could be handled through the one presentation, but Robin, do you want to counter that or add to it?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Throughout the proceeding days, we'll going to be covering cumulative effects on essentially every topic area, and so we hadn't identified a need for a presentation for socio-economic, cumulative impacts that these will be discussed in previous, on the tally in a previous presentations, Rachel, so there will be an opportunity to ask those questions and we'll ensure that you get the information you require, rather than having a PowerPoint presentation.

**MR. HAL MILLS:** The other thing that I could add is that we're open to other people making presentations as well. De Beers obviously has, you know, as part of their response to the issues that have been raised, has been working on these things and they're in a good position to bring people up to date as to where they are on them, but on any of these topics, if the rest of you have presentations, and I think you know when you have something you want to say, you'll have a chance to say it, but if you have presentations that you've prepared or that you think would be valuable to the rest of the audience here, why, we'll certainly accommodate that so that it's just a matter of you letting us know what you have and what you need and where you think it would fit in best.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Steve Wilbur, Dogrib. I have a question regarding the time lines. You mentioned you weren't sure how long each was going to take. Are you going to keep strict adherence to these time lines, or will you go over when topics are still being discussed, or move forward when a topic is already finished? And will you go past five o'clock?

**MR. HAL MILLS:** We've been asked to and we intend to stick strictly to the time lines in here, except as I mention where we... if we happen to save time somewhere, then we can look at how to best make use of that time, but if on day 2, if it's coming close to now and we're still discussing water management plan issues, I'll be giving you warning that we've only got 20 more minutes or whatever to discuss this topic, so let's focus in on the major things and whatever position statements you want to make, and then after lunch, we'll be starting on the next topic.

As to whether or not we stay after five o'clock, that's the call of the room. If people have the inclination and the energy to stay to pursue a particular topic, then fine. If we... this is just my own thinking here now. If we have a topic where fairly clearly there hasn't been enough time that we're able to address to it, then we can look at options as to whether or not there is a time slot coming up later on where we could reschedule a further discussion on that. One of the obvious difficulties in that is that with changing...(inaudible)... to characters by some of the people who were in on the initial discussion might say "I'm not going to be here on Thursday." So there may be some difficulties, but if it's the feeling or the sense of the room that they want to make some adjustments, then adjustments will be made.

But aside from that, we intend to be ruthless.

**MR. DAVE LEVY:** Dave Levy. I'd like to know whether the participants will get a chance to comment on the draft facilitators report before it goes to the board.

**MR. LOUIE AZZOLINI (MVEIRB):** I'm Louie Azzolini. When you say the draft facilitators report, you're speaking to the summation of all the issues, the conclusions, the outcomes of the discussions? That will be put on the public record, and anyone can add to or recommend changes to that.

**MR. DAVE LEVY:** What I'd like to know is will we get a chance to check the accuracy of the contents of that material before it's posted?

**MR. LOUIE AZZOLINI (MVEIRB):** It will be posted and then you can correct it.

**MR. HAL MILLS:** On behalf of the facilitators and on behalf of Lisa who's taking the notes and works with me, we are not producing a report in terms of minutes of these sessions. They are being taped, so there's a transcript, but I just want to make it clear that what Lisa's doing is going to be recording the things that we have agreement or disagreement on, any priorities that might be identified for whatever, and any commitments that anyone may happen to make, and that is what Louie is referring to that will be available. But we're not doing a detailed report or minutes.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, North Slave Métis Alliance. Will there be anything going to the board as a result of the technical sessions other than what is posted on the public registry?

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini here. Basically what's going to come out of this is obviously the transcripts that are prepared, tapes that are recorded and the summary agreements prepared by Lisa. The board is not going to get anything from me or anyone else outside of the information that we are going to put on the public record that comes out of this. So that's it.

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** I would like to know who and how you determine whether there is an agreement or consensus on a technical issue?

**MR. HAL MILLS:** We have no plan to do it in a legal way or even by motion. If you people have suggestions or particular needs in that regard, let us know. We will be trying to, through the feeling of the discussion, to say well we think we have consensus on a particular point, and seeing if there is any disagreement with that. If there is, we will simply record it as something that was discussed. We will maybe be able to describe the pros and cons a little bit and say that the room was not able to reach agreement.

**MS. MARGO BURGESS (Natural Resources Canada):** In that context, will you indicate where the disagreement has come from, which parties? Similarly, if there

is agreement, because you have a changing cast of characters, will you indicate who was present for that agreement?

**MR. HAL MILLS:** I might have to call in Louie to give his opinion on this, but my opinion would be, I think it would be no to both cases. I wouldn't see documenting that participant X had one position and participant Y had another. I think we would simply record it as an issue that was discussed that there was no agreement on. And the other question?

**MS. MARGO BURGESS (Natural Resources Canada):** Well even when there was agreement, there may not be everyone present.

**MR. HAL MILLS:** And I don't think there is any intent for us to record who was present for any particular agreement or disagreement.

**MR. LOUIE AZZOLINI (MVEIRB):** From the review board standpoint, the reason that information is put on the public record is -- and because, I mean we have tried to be quite transparent in this process, albeit probably more legal than some people like it -- is because we want everyone to be able to see what is going on. So there are going to be transcripts on the record, so you will know who spoke to the issue, you will know what they said. You will have our abbreviated version of that in terms of outcomes.

The intent is to provide you that information as soon as we can. The reason we want to have these commitments documented, if you want to call it that, or outcomes, the work that Lisa is doing, is so that we can provide some reasonably fast feedback to all the participants. Then, because the transcription may take a but longer.

In terms of wanting to know who was there, we have an attendance list that the facilitators suggested that we have on a daily basis so that we have a sense of who was here as well, so that will be put on the record as well. I hope that answers your question.

**MR. HAL MILLS:** Are there any other questions or comments?

**MR. ROBIN JOHNSTONE (De Beers Canada):** If I could just comment on the final day of the technical session, it is our understanding that discipline specific questions related to cumulative effects should be addressed directly to the appropriate technical expert in the proceeding days and not saved up until Friday of next week when we wanted to have every single expert available. In our mind, global cumulative impacts really gets to general approach.

**MR. HAL MILLS:** Thank you for that. That was a tricky thing in terms of scheduling. on the one hand it made sense to have a session like that at the end,



on the other hand we knew that some of the people with a great interest in cumulative impacts from a particular discipline may not be there on the final afternoon, so I agree with what Robin is saying.

Just one final comment from me, and I may be infringing on what Mike is going to say next in terms of procedures here, but it is obviously not up to the facilitators to either identify issues or to speak to the substance of them. So in cases where we have the facilitators listed on the right hand column, that is just to indicate that we will guide the discussion. It is definitely not up to us to have an opinion on the issues or to be speaking to the substance of them.

Having said that then, I will turn things over to Mike with respect to talking about the procedures that we hope to follow through the next while.

**MR. MIKE BELL:** Thank you. I am glad you made that last point. As I keep looking down through the agenda and I see things like past operational issues that would seem to indicate that the facilitator knows something about past operational issues. I don't even know what past operational issues are. That is not a real big problem, it is only a big problem if you don't know what past operational issues are.

I use that example to help clarify what I think the role of the facilitators are. I don't like the word facilitator, it comes from the word *faci* lease, which means in Latin "to make easy". I think if you take a look at the agenda for the next two weeks and there is not very much in here that is very easy.

I much prefer what our colleagues in Quebec sometimes refer to themselves as *Animator De Groupe*, Group Animators. *Animator* comes from the Latin *anima*, which means spirit, and I think it is the role of the Animator to reach out and try and touch the spirit of the room. So it is something like an acupuncturist, where basically we are trying to keep things moving and move along.

The other equivalency we have in English to Animator is Cartoonist. It is someone who shows the progress of movement. I think that is basically what our role is. That is the role I think we will be trying to fulfill.

I would like to explain the set of procedures that we have worked out and that we are going to use. I will give you a copy of this afterwards. But I think the purpose of this set of procedures is to help us to review the issues and determine their status. Have they been resolved, or must they be referred to the board for resolution?

To make this determination, we have to do two things. First, we have to make sure the issue or issues are properly defined and understood. At this point, we

may provide participants with more information to better understand the issues. So the first thing we have to understand is, is this the issue?

The second thing we have to do is determine the status of the issue. If, after discussion, there is no longer an issue, it drops off the table. This will be recorded. If after discussion it is still an issue, we will try and summarize why it is an issue and refer the matter to the board.

It is not our purpose during these hearings to resolve these issues. That will be a matter for the board to deal with. I think we have to be very clear at this point. If we see things getting bogged down and it is obvious we are having trouble with consensus or things aren't that clear, we are going to move on, because we are trying to stick to a schedule.

We have outlined a six-step process that we would like you to consider. First, the facilitator will identify the area of issues. For example, water management system. Second, the participants will then identify their issues that fall into this area. To the extent possible, these will be listed. Third, De Beers will be asked then to address the issues. Fourth, there will be a brief discussion. Fifth, the facilitators will try and summarize the status of the issue. Sixth, the groups will determine whether as a result of discussion the issue has been resolved and can therefore be put to the side, or whether it is still unresolved and should be referred to the board.

Just a couple of additional comments: The discussion of issues will be limited to the scope already agreed upon. I can see you saying, "what happens if we have a disagreement there?" If we've got a disagreement in relation to the scope, we will ask De Beers whether they think this falls into the scope of the terms of reference for what we are dealing with, and then we will turn to our man Louie over here, who is the court of last resort or first resort. Court of first resort. He will basically at that point say, we think its on the issue. I think the scope issue has already come up and I think we have to have a way to deal with it, so that is the way we are going to try to deal with it.

As facilitators we will keep to the schedule. We have a lot of areas to cover so we ask that you be as brief and precise as possible. Lastly, we will do our very best to make sure that everyone gets a chance to speak. We will stick to the agenda and the schedule. So if we have to interrupt, we hope you will understand. I think the last thing, going back to my first point is, if it is apparent as we are trying to discuss these things that the facilitators don't have a clear grasp of what the issue is because it is technical, we would very much appreciate someone enlightening us, so we can facilitate or animate appropriately. Questions?

**MR. GARTH WALLBRIDGE (Rae-Edzo Metis):** Your last point there, number 6, I think it is to put it down that there is agreement or whatever. I want to get back to the comments earlier on that. I think this is a very useful process. I think ten days is a long time for people to necessarily be expected to be here, depending upon most important, financial and personnel resources. I think that anything that does go forward, it needs to be recognized -- of course, that is why I am wanting this on the transcript -- that if someone is not here, and therefore doesn't have some input into a particular consensus, if we want to call it that, that does not necessarily mean that they are presumed to have agreed to that because they didn't need to be here.

I think that is important. I will close by saying that I think this is useful and I am glad we are doing it.

**MR. MIKE BELL:** Just on that point I think it is important to indicate what happens after this on some of these issues. Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** Many people from government here will recall that before the workplan was amended the technical sessions, the technical reports were going to be prepared before this session. There were several recommendations that came forward to the board that said, "Listen. It would be a lot more productive for all of us if we could have technical sessions before preparing summary technical reports." Technical reports are essentially a regulators, expert's, views of the conclusion. We've read it, we've reviewed it, this is what we think and so on. A typical technical report that you would have seen in a number of environmental assessments.

That's what has happened. The board has amended its work plan and people will be submitting technical reports in the new year, mid-February. We hope that the discussions, the dialog, the learning that happens in this room over the next two weeks helps you prepare better, more refined technical reports with more precise sets of conditions or recommendations and helps you work internally within your own organizations to do the work that is necessary as the project moves forward towards whatever eventuality it reaches, whether it be regulatory or otherwise.

So, after the technical reports there is going to be some time to digest those reports. They will be put on the record and they will become the point to which the board will set some of the discussion around in this public hearing. This is what I would call the technical phase of the environmental assessment. At the conclusion of the technical phase, with the submissions of your technical reports in mid-February, for lack of a better word, beginning the public process where the board prepares for its public hearing and your technical reports become very public and people will again provide opinions and views on them.

So, it is not the end and certainly I think it will help the board a lot to understand your views and your recommendations coming from here, and your forthcoming technical reports.

**MR. MIKE BELL:** Garth, are you happy with...

**MR. GARTH WALLBRIDGE (Rae-Edzo Metis):** Yes, thank you.

**MR. LOUIE AZZOLINI (MVEIRB):** If he is happy, I shouldn't add anything, but I was going to make the point that even if you are part of the discussion where we document that there is agreement on something, which hopefully will be somewhat useful information to the board, that doesn't bind you to that. You can still, through your report or at the public hearings, you can still say, "well, okay, I might have been there for that discussion, but what I really think is this." So even if you are in the room when something is agreed to, that is not at all legally binding on you in terms of any position you want to take afterwards. Thank you.

**MR. MIKE BELL:** I think that is an important distinction because of the concerns expressed by Natural Resources Canada. This is an informal information sharing process. It is not a legal process where everyone has to stand up and vote, or anything like that. We are trying to keep it as informal as possible. That has strengths and weaknesses, but I think the point is really the point that Hal has already made. You may feel that you were part of a consensus here, you might go outside and start thinking about it a little more and decide you want to put in a technical report. That is perfectly acceptable.

Ultimately it is the board's role, not our role here, to determine what is acceptable and what is not acceptable. So when in doubt, write a report.

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** Just on the same matter, there is really no need to achieve any consensus. All you really have to do is stop at item 5 in your 6 step process and summarize the status of the issue. I think that would be sufficient.

**MR. MIKE BELL:** We have been asked to try and take it a step further to find out to what extent we have consensus. So if it doesn't work, it doesn't make sense... You know, I have a problem myself. Full consensus, partial consensus, a little bit of consensus, it's problematic. So basically we will take it as far as we can do and just try to go with what works. Other questions.

**MR. MARK LANGE (Fisheries and Oceans):** Relating to this information and the summary that will emerge from these discussions over the next ten days and the information that will be provided to the board, we still have an issue that remains unresolved with this summary, and that is that the summary is being

produced, if I understood it correctly, by the board or board staff for the board and I think the board would go a long way to establishing a very transparent process by allowing participants in these meetings to see a draft version of the report before it is submitted to the public registry.

**MR. LOUIE AZZOLINI (MVEIRB):** If I can legally do that, I will. If that is what the people that I work for, and that is ultimately you and the board, if you say that is what you want, I am perfectly happy to do that. My only concern is that we don't try to recreate history. I know there is a tendency afterwards to maybe be cautious and say, "well I didn't quite say that" so that is why I like to put things on the record, and have people tell me that its wrong... but I am perfectly happy. If it is legally fine, sure.

**MR. MARK LANGE (Fisheries and Oceans):** That is all that I ask, that board staff consider that option of submitting a draft. Thank you.

**MR. MIKE BELL:** Further questions?

**MS. JANET HUTCHINSON (NSMA):** Just a further comment about how rigid or flexible we will be with issues. I think it is important for the facilitators to be aware that the parties were told that they would receive a draft list of issues and the notes of the prehearing conference in advance of this proceeding in order to comment on that and add to it if necessary. That hasn't occurred just because of the timelines that were available, and I think it does speak to if there are parties indicating that they need another issue or a different aspect of the issue raised, it is certainly a point that can be considered towards flexibility.

**MR. MIKE BELL:** Other comments? Garth.

**MR. GARTH WALLBRIDGE (Rae-Edzo Metis):** I want to go a couple of steps back. The gentleman from NRC, I heard him ask if we shouldn't just drop number 6 off the process and I fail to capture what the decision was on that. Perhaps a decision was made and I missed it, I am sorry.

**MR. MIKE BELL:** I indicated that basically we have been asked to try and take it to the next step. If it becomes obvious that the next step is not useful or we can't get to the next step, then probably we will abandon it. What we are trying to do is give the board some kind of idea of whether we are almost finished this issue or we are close or there is still a broad area of disagreement.

So if people turn around and say, "we disagree. We think more has to be done on this issue." I think it is logical to say if that is the case, why is this an issue? We will just document that the group said this was an issue for the following

reasons, and that's it. We leave it to the board, we are not going to decide it. The board is going to decide it.

**MS. JANET HUTCHINSON (NSMA):** Just a question, Mike. That request to take it to the next step, has that come from the parties, the board staff, the board itself?

**MR. MIKE BELL:** That, as I understand it, was the request that came from the board.

**MR. LOUIE AZZOLINI (MVEIRB):** Basically as Gordon Wray said this morning, it is from the board in that his hope is that you can resolve issues or at least come to some understanding of where you are on them so that when you prepare your technical reports you can be more precise, more clear on what you are saying or the outcome. So yes, essentially it will be up to you to finally bring those issues that remain unresolved in your technical reports forward. I can't do that for you, but this is an opportunity to identify those issues that you also feel should not be brought forward where there is resolution.

**MR. MIKE BELL:** Further questions. Garth.

**MR. GARTH WALLBRIDGE (Rae-Edzo Metis):** Looking at the explanation of the procedures, which I think is helpful, I am going to put forward to you if I might just a couple of minor changes that would relieve some of the concern I have about everyone not necessarily being here all the time, and also that the issue of stuff being dropped off the table just because of who was here decided that it was okay.

If I can take you down to item 6 again, and the sub number in there, number 1, it says "the issue has been resolved." I am not certain that this technical session has the ability, the legal authority if you will, to make that decisions.

A couple of qualifying words in front of that would certainly satisfy me, and I am asking you and the other people to consider them. Simply, after the number 1, if you put "it is likely that the issues..." Then they are still going to go forward. They are going to be documented and I think that is important.

**MR. MIKE BELL:** I don't have a problem with that, I don't think anybody else has a problem with that, but I am not speaking for the group. Any great problems with that? Next point.

**MR. GARTH WALLBRIDGE (Rae-Edzo Metis):** Thank you, Mike. On a similar point, just to finish that. Up at the top of the page there is a second bullet point, "Determine the status of the issues" and then under that, "if, after discussion this is no longer an issue, it drops off the table." Just after that comma, if you were to

say "It is documented and it is dropped off the table." again, I would be pretty happy with that and I ask you to consider it, please.

**MR. MIKE BELL:** I don't have any problems with that. Does anybody else have any problems with that? "It is documented, and it drops off the table." What do you do for a living? Okay, can we move on? One question here.

**MR. RAYMOND BOURGET (RWED):** If an issue is on the list, for example if we look at the wildlife parks, one issue, one hour, there are three different sections to it. If, because of time one of those sections is not addressed, what happens with it? If it is not addressed, it falls off the table, it is unresolved, or is there another venue where we bring it up again and try to get that resolved?

**MR. MIKE BELL:** I will give you my sense, and I will stand to my consultant for the board to see what he says. There is a possibility that there are far more issues than we have time to deal with them. But part of the reality that we are facing in each one of these areas is, we can't keep going into water quality on day 1, day 2, day 3 and day 4 because there are people coming from other areas to try and deal with these things.

I guess the best we can say is, we are going to do and handle as much of a workload under these categories as we possibly can. If there are still issues to be resolved or there are still issues to be discussed, we will note in the proceedings that this is the case and I think at that point it will be the board's determination of how it wants to deal with these.

Since we haven't had a discussion on this, I want to hear from Louie on that.

**MR. LOUIE AZZOLINI (MVEIRB):** The entire environmental assessment forces people to prioritize their resources and their time. This situation is no different. We have a fixed amount of time, 10 days, and a pretty fixed agenda. You will notice in the agenda that the specific issues are not listed for you.

-- No Overlap Between Tapes

**MR. LOUIE AZZOLINI (MVEIRB):** ...talking to another party over the next month and a half. There's nothing stopping anyone from calling De Beers and having a chat with them. But at the end of the day, you will be submitting, if you want, a technical report. Essentially, a technical report would have to identify the issue that you are not satisfied with as a regulator, technical expert, and provide some suggestion or recommendation to the board how it, how you believe that issue could be addressed. I hope that answers that question.

**MR. HAL MILLS:** I'd like to add to that a bit, if I could. And this is where I think the facilitators have a responsibility. If you take a topic that's on the agenda for

Monday, December 2<sup>nd</sup>, 10:30, the wildlife monitoring program. Under that there are three different bullets – the ...(inaudible)... species, the regional monitoring initiatives, and collaborative efforts. I think the facilitators have responsibility to make sure that some time is allocated to each of those three bullets. If we get a huge discussion on ...(inaudible)... species, I think we've got a responsibility to cut that off at a certain stage and move on to the other bullets. Under each of the bullets then, exactly what Louie says comes into play. It's going to be up to you guys to try to focus in on the particular issues related to that bullet that you think are the highest priority and to get them out on the table for discussion. Thank you.

**MR. MIKE BELL:** Anymore questions?

**MS. MARGO BURGESS (Natural Resources Canada):** Margo Burgess, Natural Resources. My question is just on a technical aspect. Are you proceeding sort of going around the table, you're asking people to bring forward their issues? Is it a free for all, open to questions or do you work your way around?

Again, it gets to the question of time, but is there an attempt to try to go around?

**MR. HAL MILLS:** My inclination is to be nowhere near that systematic, and I think in terms of opening presentations from De Beers, we'll get an idea as to whether some of the major issues that they think are going to fall out in the different topics for the agenda for that morning, for instance, and then we're going to open it up for discussion for you to chime in with what you think are the more important ones that need or could benefit from further discussion here with this group of people.

**MR. MIKE BELL:** I'd like to make one point on this. On one occasion, somebody asked Marshal McLune what is art? And Marshal answered "Art is anything you can get away with." I think in this particular situation, we're trying to figure out what's going to work. And it raises the issue, if you think that something that we're trying to do is not working, then let us now and we'll try and adapt or change to the reality. But we're really trying to be as flexible as possible and move along at a reasonable pace, so that's the rule of thumb that we've got. There was another question down here.

-- Interjection

Okay. Well thanks a lot. The record should record that we had an obtuse response to that last... okay, anymore? Good. If I could, Hal, back to you.

**MR. HAL MILLS:** Okay. We have the next item on the agenda list is scope and methodology, which we pretty well just worked through anything that I could think



of there. Perhaps to just add in terms of scope, where it's been suggested that – not suggested, it's been mentioned that we need to stick within the terms of reference for this. We have to have some recognition of things that the board is already dismissed, for whatever reason, and we've been encouraged to make it clear that we're dealing with issues that have already been identified. Now, for all of these, to the extent that the facilitators know those things, which is pretty small, then we may say well, we don't think that that should be discussed here because, but that's unlikely to happen very often. It's going to be up to the parties here to remind us or to inform us of those things, so if something goes beyond De Beers terms of reference, why, we will expect De Beers to point that out to us and things of that nature.

If it's something that is already, that the board has already dealt with, we'll expect Louie to remind us of that or whatever. If it's a new issue, and here's where I don't feel any need to be firm on this, if it is not something that is not a pre-identified issue, I'm not sure that we need to say "can't talk about that." I'd be quite happy to entertain a discussion on that. We may not be able to take it as far as we can with some of the other issues. It may be that, you know, if DFO raises a new issue, that De Beers may say, well, we haven't had a chance to look at that yet, so we can't comment. You know, there may be circumstances like that, or we'll need to wait until we have a particular expert here or things of that nature. But if it is something that will help everybody along by having a discussion, we probably should do it.

**MS. JANET HUTCHISON (NSMA):** Hal, Janet Hutchison. Just a question, if there's a differing perception around the table about what falls within the TOR and what does not, do the facilitators have a proposed process for trying to deal with disputes of that nature?

**MR. HAL MILLS:** Janet, I think the only thing we can do is try to, you know, help the discussion along to see if the discussion itself will address that, and if it remains something that the participants or the parties cannot agree on here, I think it would have to be referred to the board.

**MR. MIKE BELL:** I think we have already indicated a process for those things that may fall outside. The first part is I'm going to look down there at De Beers and say what do you think, is this within what you understood to be the terms of reference, and the second thing we're going to do is go to the guru over here and we're going to say Louie, you're the first step in this particular process, what's the feeling of the board on this? That's why we've insisted, and I don't think we even had to insist, that somebody from the board be here at all times, and he's assured me that he is going to be here at all times, so that's the way we would deal with the issue, with the process we've outlined.

**MR. HAL MILLS:** Anymore questions? Okay, I think we can move on then. The supposedly 2:15, we're not doing a very good job of keeping you on schedule here. Okay, this is Hal Mills speaking. Mike has just asked if we should perhaps take a break before getting into this. I wonder if we could hear from De Beers as to, since they'll be saying at least a few words to the three bullets that are under topics regarding scope and methodology. Is that likely to take a while and should we break now, or would you rather proceed with the discussion?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers Canada. We have a brief presentation on monitoring. Otherwise, we are willing to entertain questions on the other two agenda items.

**MR. HAL MILLS:** So would it be best if we took a fifteen-minute break now?

**MR. JOHN MCCONNELL (De Beers Canada):** It's your choice. We're ready to go when you are.

**MR. HAL MILLS:** Break, I here. Okay, let's take a fifteen-minute break. Thank you.

-- Break

**MR. HAL MILLS:** Under the scope and methodology, we had three topics that were put in for some discussion at least today, and the first of those is production rates. As we've already mentioned, at least a part of the discussion on this is going to be referred to the second day under geotechnical, which is I believe December 4<sup>th</sup>, leading off the afternoon. But are there some comments that either De Beers or the other parties want to make regarding production rates at this point?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers does not.

**MR. HAL MILLS:** Anyone have anything they want to say about production rates now, or are you happy with simply having it on December 4<sup>th</sup>? Okay, December 4<sup>th</sup> it is. The second bullet then is on alternatives, in particular, hydro. John.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I guess we'd like to hear what the issue is.

**MR. GAVIN MORE (GNWT):** Gavin More, GNWT. We're prepared to speak to that issue. I'll turn it over to one of our experts, Pietro De Bastiani, and Pietro will lead the discussion.

**MR. PIETRO DE BASTIANI (RWED):** Pietro De Bastiani, Energy Secretariat, RWED. The issue is the Government of the Northwest Territories, on behalf of

communities, aboriginal governments, is interested in the sustainable development of energy systems in the Northwest Territories, particularly the hydroelectric system, which has been developed to some point to develop mining development in the North to date. In reviewing the initial project description, certainly the conclusion appears to be very quickly arrived at, that a diesel system to meet transportation, heating and electrical generating needs is the most economic alternative to the mine's energy needs. There is mention that there have been some preliminary discussions about hydro opportunities with our agency, the Power Corporation, a Crown corporation.

So at this stage, we're very interested, of course, in looking at every opportunity, along with communities and aboriginal governments, for the opportunities to position the development of sustainable hydroelectric power in the Northwest Territories to meet growing need, especially in the industry and community sectors.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. You know, we're in favour of the development of hydroelectric power in the north as well, and we have had several meetings with the NWT Power Corporation and the Dogrib Power Corporation, and given them the size or amounts of power we'd require on the site. And to date, we're I guess we had a meeting with them I guess as recently as maybe four or five weeks ago, to again suggest that we're interested in working with those two groups to promote that agenda, but we haven't had any concrete proposals back from either of those two groups.

**MR. HAL MILLS:** Any further comments on that? Pietro.

**MR. PIETRO DE BASTIANI (RWED):** Pietro De Bastiani, Energy Secretariat, RWED. So the company, of course, is very interested in continuing to work with all parties in that particular area?

**MR. JOHN MCCONNELL (De Beers Canada):** No question. It's for everyone's good.

**MR. HAL MILLS:** Have we resolved that by consensus? Okay, thank you. Okay, the third then is monitoring, and I believe that Robin has a presentation to make.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Thank you very much for the opportunity for this brief presentation. The purpose of this brief presentation is really to provide clarification regarding De Beers' plans for monitoring bio-physical and socio-economic environmental effects.

One observation from the EA process to date is that there's been an expressed desire for detailed monitoring plans up-front. Here we essentially briefly outline De Beers' approach to the development of those detailed monitoring plans.

In the environmental assessment report, De Beers committed to developing monitoring plans that meet the requirements of the results of the environmental assessment and regulatory review processes, and are developed in consultation with communities, elders and governments.

Further, traditional knowledge would be incorporated into monitoring plans. And obviously, it's implicit to the permitting process that we'll also have to develop a detail monitoring plan as required by law.

In general, monitoring needs are identified in several ways. Firstly, they're identified during compilation and completion of the environmental assessment report, and that is essentially De Beers' and their consultants' view of areas which we consider should be monitored. And monitoring needs were outlined for most disciplines covered in the environmental assessment, including the likes of socio-economic, heritage resources, air quality, hydrogeology, hydrology, water quality, aquatic organisms and habitat, vegetation, wildlife, cumulative effects and environmental management. So basically the list of chapters in the EA.

In general, details to monitoring plans were not given as De Beers firmly believes that they should be developed in consultation with governments and communities.

Secondly, monitoring needs are also identified by interveners during the EA process, through the likes of technical reports, public hearings, and culminating in the IRB's decision to the Minister, which may include specific recommendations or suggestions, including monitoring needs. Overall, the EA process makes a substantial contribution to identify monitoring needs.

Thirdly, as stated previously, De Beers considers that consultation is a critical way by which to identify monitoring needs and priorities. It's certainly De Beers' intent to strive to develop monitoring plans that reflect the priorities and concerns of Northerners.

Fourthly, the water licensing and land use permits that De Beers needs to build and operate a mine include specific requirements for detailed monitoring plans related to the likes of mine site and development, mine infrastructure, geotechnical, geochemical, water quality, hazardous waste management and disposal, aquatic effects, and reclamation. De Beers will be required to provide detailed plans during this process to satisfy legal requirements.

It should be noted that there's one major exception in this, or one of the major exceptions in this regulatory process is that it doesn't explicitly include wildlife monitoring plans.

Finally, monitoring plans may also be identified under discussion around an environmental agreement. To date, it's certainly a common expectation that the Snap Lake diamond project will require an environmental agreement which may include waters monitored and how monitoring is implemented. De Beers has recently participated in a workshop for a single regional monitoring agency for the Slave Geological Province. And certainly, we appreciate the advantages associated with a single agency, consider that as discussed briefly by John McConnell earlier, that a community orientated monitoring agencies along the lines of EMAD, provides a model close to the version that we see advantages to, rather than that of the independent environmental monitoring agency for BHP Billiton.

However, we also think that it should include both socio-economic and biophysical, an area which was not addressed at the single regional monitoring agency discussion.

As stated, you know, we've all heard and expressed desire for detailed monitoring plans up front. But De Beers considers that in many cases, such detail is inappropriate to the stage of the permitting process where the project presently lies. But where does that leave us?

We see that the next steps in the process to develop comprehensive and detailed plans are first of all, to use the outcome of EA milestone, such as technical reports or public hearings to identify monitoring needs and priorities to assist in developing draft plans. But De Beers considers it critical to consult with communities and regulators. De Beers has received several suggestions from communities to date as to the way that they would like to develop their ideas, including developing and providing monitoring plans directly to De Beers. For consideration.

Bob Turner of the North Slave Metis Alliance, at the pre-hearing conference, suggested that a get-together of representatives from the primary communities would be useful to discuss monitoring needs.

Now, in this process, the next step is for De Beers to contact communities and we'll do so prior to Christmas to discuss their preferences, how to gain their input, and intend to start the consultation process in the year, so that progress has been made prior to the public hearings.

Now, where specific plans, requirements for monitoring exist in the regulatory process, the detail plans will be provided at that stage.

Finally, recent discussions around the single monitoring agency will basically further the process of identifying the how to, the monitoring question and the overall framework under which it sits.

In terms of comments, certainly we're interested in hearing comments, and general. If there are specific questions about monitoring around specific disciplines, then I'd ask you to leave those to the appropriate agenda item in the next coming days, but I'm certainly happy to address general issues now.

**MR. HAL MILLS:** Okay, Hal Mills speaking. Thank you, Robin. Any general comments or questions of a general nature?

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. Robin, I'm just wondering if monitoring programs are not described in detail at this point in the process, how does De Beers propose that the parties and the board in fact be able to determine whether or not there is actually adequate mitigation of the impact of this project? If we don't know what the monitoring programs are, how they will be designed, and whether they will be effective, how can we determine whether or not there will be adequate mitigation?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. I guess the critical difference is monitoring this is mitigation, Janet, and that in general, we are identifying monitoring needs that will reduce uncertainty in the impact predictions, or they will contribute to refining those impact predictions. Obviously the aspect that monitoring will be used to refine mitigation techniques as well. Now, the key issue is monitoring has been done before in the Slave Geological Province. There are two projects which precede us that have established performance indicators, if you like. That can be used on this project, but in general, the question is can monitoring, appropriate monitoring be developed? And De Beers is confident that it can be, and that there is nothing new that essentially we're proposing.

**MR. GAVIN MORE (GNWT):** Gavin More, GNWT. Robin, I had a couple of questions to do with the hypotheticals. You're kind of caught between the timing of, as your project goes forward, when you have to start making decisions, but then there's these other uncertainties about joining forces with the other monitoring agencies of the other two mines. What kind of steps are you taking at this point in time to either work on a voluntary basis with those groups, for example, if there's some kind of studies where it's useful to be... doing monitoring using the same methodology, same timing, same staff, for example. Are you doing anything along those lines? And then, the second question, and I

think this came out quite strongly at the Slave Geological Province meeting, was many people assumed that because the MVRMA requires or defines the word environment as including people, are there some steps taken right now to start looking at that kind of a social and economic monitoring? And again, are you doing that in conjunction with the other mines, if it's at all possible?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. Maybe I'll just start out. I mean, I don't think that's our role, to try to bring the other proponents together. You know, you've identified the other two mining operations, and they're probably two models there to choose from, but there are other developers in the North that need to be brought into this. So I think, you know, as identified in that workshop, it's really a role for INAC to take the lead on and to try to bring the various groups together for those kinds of discussions. You know, we indicated during the workshop that we were quite prepared to participate in the smaller working group to try and achieve that end, but also, as I indicated this morning, you know, nothing moves too fast when you involve those many groups, so we do see a need to begin discussions on an environmental agreement and socio-economic agreement in parallel to those other discussions. Now, I'm not sure if I fully answered your question, and Robin may want to add, certainly on the environmental side.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Thanks, John. Robin Johnstone from De Beers. With regard to your first question, if I got it right, Gavin, on whether we're using the same timing and the same staff and that sort of thing, remember we don't have a mine, so monitoring is difficult to put in place for a mine without a mine. Having said that, we have an advanced exploration program, and that our approach to monitoring for the advanced exploration program, you know, we have monitoring requirements under our land use permit and water license, and we are implementing those. We have, as required, we have gone beyond that in some areas. We have been continuing wildlife monitoring since completion of the EA to further contribute to baseline data for the project, and to provide information on a regional basis, so as RWED I'm sure knows, that we have discussed the methods that we've used in those disciplines to ensure that they are consistent with what's being used on a regional basis, so the techniques that you see at BHP, for instance, in general the techniques that you are seeing in the selection of ECs are the same for ongoing monitoring at Snap Lake.

So your answer is yes, we have provide careful consideration around the way in which we collect data.

**MR. GAVIN MORE (GNWT):** Gavin More, GNWT. I guess as a comment, I see great difficulties in trying to work the two streams, and I guess I would feel more comfortable if I knew that the companies were really working very strongly

together at that idea of a single monitoring agency, versus knowing that really, you are going to be doing separate negotiations during the next year or two, with the idea that that other idea might come much, sort of the mid-term, sort of four or five years from now.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Was there a question there, or a directive to INAC?

**MR. GAVIN MORE (GNWT):** Gavin More, GNWT. Actually, I suppose it is a question because I do hear people saying well, we're going to be considering some of these new ideas, but my question is which process are you really following in this next six months to a year? Are you following the go it alone, working on socio-economic environmental agreements versus this potential that's been raised that we might work with the other mines to come and look at developing a single monitoring agency. And I think at this stage, the way I look at the timing, we need to know which is the procedure or the process that De Beers is following most strongly.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I don't think we're following either more strongly. I think we see a need to move towards our own agreements so that it does not hold up the permitting process, but we're willing to put the same amount of effort into developing a single monitoring agency.

I know we have some representation here from INAC. You know, perhaps they could shed some light on what the schedule is that they see in terms of moving forward.

**MR. HAL MILLS:** Anyone care to bite on that one?

**MS. TAMARA HAMILTON (DIAND):** I guess I can just say, I'll let David sit at the monitoring... oh, sorry. Tamara Hamilton, DIAND – is that he is committed to providing funding and to work with others on this issue to create a single monitoring agency. And around the environmental agreement, that's still up in the air right now. That has not been decided yet, but more than likely, yes, an agreement would be required.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison. Robin, just another question. Some of the comments about it being too early in the process to finalize some of the methodologies for monitoring, I'm just wondering, is it De Beers intention to have those methodologies finalized by the time of the hearing in March of 2003?



**MR. ROBIN JOHNSTONE (De Beers Canada):** In general, Janet, it largely relies on community consultation, so a lot of that will depend on the speed at which we are able to get input back from the communities. Robin Johnstone from De Beers.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Steve Wilbur, Dogrib. One of the issues, Robin, that you raised was this monitoring as kind of a transition, or to continue baseline gathering that you've been working on. I guess one of my concerns is that in order to develop adequate monitoring programs, we have sufficient baseline data. I don't know if this is really a baseline question or a monitoring question, but it begs a question with respect to can we at the end of the EA process, have sufficient information to put a sufficient monitoring program together, and if we don't, should we have, or if we have some idea of a more detail, maybe not a really fine level of detail of monitoring programs, but some level of concept of what De Beers is considering putting into these monitoring programs in order to evaluate whether they've actually, you've gotten sufficient baseline to carry through this with the monitoring.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada. Steve, I think in general, I think the issue around baseline should probably be left to the appropriate area. I think the key question comes down to do we have enough information to adequately identify what monitoring is required and a general framework under which we would achieve that, whether we have eight thermistors or 14 thermistors. We regard that as a detail that is best worked out once we have our whole list of monitoring priorities, and to work with governments, communities and regulators to basically detail the flesh around those, and develop those in conjunction. So the key really is, can we monitor what we're proposing? And areas where we think we may have environmental effects and we've predicted, we've made predictions, and De Beers' answer to that is yes, we can, that there's many examples of monitoring that have been well-established within the Slave Geological Province or within southern Canada, so on that basis, we have the information and we can proceed.

**MR. HAL MILLS:** Okay, are we all in, all done on that?

**MR. BOB TURNER (NSMA):** Bob Turner with North Slave Metis Alliance. I'm just thinking about monitoring protocols, I guess. Our experience with the other two mines, BHP and Diavik, some of the monitoring methods that I guess they were using weren't all that consistent, and I guess after a lot of review and comments back and forth, BHP and Diavik are starting to work a little close together in developing more common, I guess, methods of doing their monitoring in regards to caribou movements and such, so I'm wondering if this project or if De Beers is going to consider, I guess, developing a working relationship or a relationship with other mines in the area where monitoring methods are

consistent, so that the data eventually can be useful data in determining cumulative effects in a regional setting.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada. Thanks for your comment and question, Bob. You raised the issue of whether De Beers is prepared to basically develop a relationship and work with BHP and Diavik in developing consistent monitoring methods. We are. And we have already been. Our consultant that sits here, Golder Associates, essentially works for both Diavik and BHP, certainly on their wildlife monitoring programs, so we have started that relationship, we have started using essentially from day one, similar monitoring methods and we look forward to continuing that, because we think that it makes good sense. In the absence of being given clear direction from other parties about how to monitor, I think that that relationship is critical to developing cohesive monitoring plans and methods.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Rachel Crapeau, Yellowknives Dene, land and environment. You mentioned the elders and TK, traditional knowledge use. Could you explain further about how you are going to be using the elders and using the traditional knowledge?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. Rachel, the answer to your question is around how we would use elders and traditional knowledge with respect to monitoring is that we follow their lead. It's not up to us to define what their traditional knowledge is, what contributions they can feel that they can make. It is us to sit down and talk with our respective organizations and elders to basically work through how they would like their information and the things that they can contribute to basically develop that. So it's very much dependent on what the elders think they can contribute and would feel comfortable with doing so.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Rachel Crapeau, Yellowknives Dene. My following question to that is if you're going to be using elders and their knowledge, would you be also willing to put TK as in a panel forum as part of the EA agreement?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Are you getting at essentially having elder participation in a monitoring agreement, environmental agreement, Rachel?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Rachel Crapeau, Yellowknives Dene. I want to say do you have a place in the environmental agreement. I hopefully see a panel of elders or use of elders from the communities in the future, so this would ensure that monitoring would be continued.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. We're interested in cooperating and the information and experience that elders can pass to us. We do not yet know what form that will take. We have examples of where we have used that information to identify environmental impacts and to identify monitoring means to date from communities such as Lutselk'e. Going forward from that to an environmental agreement, we really need to have a lot of discussion, Rachel, so I think it's very dependent on what the interests of the communities are, so we look forward to hearing that.

**MR. HAL MILLS:** Hal Mills speaking. Just as part of that, I just wanted to note that we do have that topic on the agenda, the general heading of traditional knowledge and specifically the use of traditional knowledge in mitigation and monitoring on the agenda for three o'clock this Friday afternoon.

That wasn't intended to cut off discussion now, but just to point out that we have another slot where we can return to that.

Okay, Hal Mills again. I'm sensing that we've perhaps reached the end of the discussion on this point on monitoring. Is that correct? Okay, next was just a general discussion. Anything related to today that you've heard that you want to return to, any concerns you've got for the next nine days coming up. I'll just open the floor to you, if there's anything related to this general technical session that you would like to raise, now's your opportunity.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. I'm actually just wondering if De Beers will be able to provide us with copies of some of their presentations.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada. I was going to propose that the presentations would directly go to the board staff for submission onto the public registry.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison. That would be excellent. Thank you, Robin.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Rachel Crapeau, Yellowknives Dene. Are we going to be getting this information every day? The presentation items?

**MR. HAL MILLS:** I take it that De Beers is going to submit them and that they're going to appear on the MVEIRB website. Is that correct?

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini. If I could get some clarification, Rachel. Do you want the copies, the digital copies of the material everyday as it's prepared is what you're saying?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Yes I do because I'm going to be here at 8:30 in the morning and I'll be here until we finish and I'm not going to be able to run back to Dettah to go check my email.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini. In all honesty, I hadn't exactly thought of that. So I don't have an answer off the top of my head. If you bear with me, in part, it's dependent on De Beers' ability to do that as well, so I don't, I can't speak for them so I'll look down the way here.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I don't think it's going to be possible to turn them around that quickly, but I think the presentations that we make on the day, we could probably make a few hard copies available the next morning, and then I'm not sure how quickly, Louie, you can post them on the website.

With respect to the presentations and the graphic presentations you had as well, we can load them basically within a matter of minutes once we get them, so putting them on the website isn't an issue. And what I'm hearing it's really the individuals would like the CD-Rom, would like some digital copy of the material when it becomes available when we do it.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Steve Wilbur, Dogrib. I guess I need clarification on what you mean by the presentation. Is it just the slide or is it going to be text, and if there's text and figures and so forth. I mean, I don't... I guess these are going to be small presentations, so I don't imagine that there's a lot of text if you did do that.

**MR. JOHN MCCONNELL (De Beers Canada):** I would envision just making copies of the presentations available.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Excuse me, Steve again. The picture of the slide or... what do you mean by presentation, I guess that's my question.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess you should say what you're looking for, but a photocopy of the presentation and Louie says they can put the presentation itself up on their website.

**MR. HAL MILLS:** I think what he's asking is it going to be more than what is used and I believe what I'm hearing from you is that it's going to be the PowerPoint presentation as you see it on the screen, period.

**MR. JOHN MCCONNELL (De Beers Canada):** That's correct.

**MR. HAL MILLS:** Just like in that TV ad, eh?

**MR. JOHN MCCONNELL (De Beers Canada):** Well, I mean the board is going to make transcripts available at a later date. I mean, you can't expect us to turn around a transcript. That's not our job. That's the EIRB's job.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Steve Wilbur again. No, what I was wondering is if you had a text to back up what you were talking prior to it, and if you don't and we're just looking at the slides, that's fine. We can wait for the transcripts. I was just curious.

**MR. HAL MILLS:** Is there anything else that anyone would like to say? Okay, thank you very much then. That's it for today. I'll remind you that because we've got a lot on the agenda for the next couple of days, that we're starting at 8:30 in the morning. Please be here ready to go at 8:30. Thank you. Have a good evening.

-- ADJOURNMENT

**MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD****De Beers Snap Lake Technical Sessions****November 26, 2002****Yellowknife, Northwest Territories**

**MR. HAL MILLS:** ... discussions and take a seat please. We will start off with another round of introductions. We will do that every day because we expect there will be a somewhat different cast of characters with us every day. My name is Hal Mills, I am with GeoNorth, one of the facilitators and in terms of facilitator assignments I guess I will be the lead facilitator for today, and the gentleman on my left who will introduce himself now will be supporting me, and I will probably need lots of support.

**MR. MIKE BELL:** My name is Mike Bell. I am one of the other facilitators and I am going to give him lots of support.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** Good day. My name is Don MacDonald, with MacDonald Environmental Sciences Limited in Nanaimo, British Columbia, representing Indian and Northern Affairs Canada.

**MR. SEVN BOHNET (DIAND):** Sevn Bohnet with Water Resources Division, DIAND.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** Alexander Desbarats with the Geological Survey of Canada, Natural Resources Canada.

**MS. MARGO BURGESS (Geological Survey of Canada):** Margo Burgess, Geological Survey of Canada, Natural Resources Canada.

**MS. ANN WILSON (Environment Canada):** Ann Wilson with Environment Canada's Environmental Protection Branch.

**MR. MARK DAHL (Environment Canada):** Mark Dahl with Environment Canada.

**MR. DAVE BALINT (Fisheries & Oceans):** Dave Balint with Fisheries & Oceans.

**MR. MARC LANGE (Fisheries & Oceans):** Marc Lange with Fisheries & Oceans.

**MR. DAVID LEVY (Levy Research Services):** David Levy with Levy Research Services, working with DFO.

**MS. PAT TONES (Golder Associates):** Pat Tones with Golder Associates working for De Beers.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, De Beers Canada.

**MR. NEIL HUTCHINSON (Gartner Lee):** Mr. Neil Hutchinson with Gartner Lee, Mackenzie Valley Environmental Impact Review Board.

**MR. ROB DICKEN (Gartner Lee):** Rob Dicken, Gartner Lee.

**MR. GARTH WALLBRIDGE (Rae Edzo Metis Nation):** Garth Wallbridge, legal counsel, Rae Edzo Metis Nation.

**MR. STEVE WILBUR (Dogrib):** Steve Wilbur for the Dogrib.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchinson, legal counsel to the North Slave Metis Alliance.

**MR. JOHN KEEPER (NSMA):** John Keeper with [inaudible] with NSMA.

**MR. LOUIS AZZOLINI (Review Board):** I am Louis Azzolini with the Review Board.

**MR. FRASER FAIRMAN (DIAND):** Fraser Fairman with Indian and Northern Affairs.

**MR. KEN DAHL (DIAND):** Ken Dahl with DIAND.

**MR. LIONEL MARCINKOSKI (RWED):** Lionel Marcinkoski with RWED.

**MR. GAVIN MORE (GNWT):** Gavin More, Government of the Northwest Territories.

**MS. GLENDA FRATTON (Gartner Lee):** Glenda Fratton, Gartner Lee.

**MR. TOM HIGGS (AMEC):** Tom Higgs, AMEC.

**MR. GREG ORYALL (AMEC):** Greg Oryall, AMEC.

**MS. LISA BEST (GeoNorth):** Lisa Best, GeoNorth.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, De Beers Canada.

**MR. RICK SCHRYER (Golder Associates):** Rich Schryer, Golder Associates.

**MR. LEE ATKINSON (Hydrologic Consultants):** Lee Atkinson, Hydrologic Consultants.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos, Golder Associates.

**MR. DON CHORLEY (Golder Associates):** Don Chorley, Golder Associates, representing De Beers.

**MR. KEVIN HIMBEAULT (Golder Associates):** Kevin Himbeault, Golder Associates.

**MR. STEVE HARVEY (Environment Canada):** Steve Harvey, Environment Canada.

**MR. JOHN DONIHEE (Review Board):** John Donihee, counsel to the MVEIRB,

**MR. CHRIS SPENCE (Environment Canada):** Chris Spence, Environment Canada.

**MR. DOUG HALLIWELL (Environment Canada):** Doug Halliwell, Environment Canada.

**MR. BOB TURNER (NSMA):** Bob Turner, North Slave Metis Alliance.

**MR. HAL MILLS:** Okay, welcome to all. I would like to turn to Mike then to give a brief recap of what we did on day one of the technical sessions.

**MR. MIKE BELL:** Good morning. I would just like to remind everyone again to turn on their mics when you are speaking and mention your name because we have transcripts and we need the name to know who is doing the speaking so that they are properly recorded in the transcripts. It is a little onerous but it is the only system that seems to work.

Yesterday we started in the morning with Gordon Wray's opening comments. He talked a little bit about the nature of what this exercise is. It is not adversarial, it is the first experience that the Board has had with this type of format and I think he mentioned that after this if there are unresolved issues or concerns there are technical sessions and people certainly can put forward their ideas. Then I guess Dennis Thomas outlined some of the basic expectations of De Beers in terms of this workshop. I am not going to wend my way through all of those again because I think they were fairly clear and they will be appearing in the transcripts.

Then we had basically a general discussion and finally I guess we had De Beers' opening presentation as I remember giving an overview of what the Snap Lake project was basically about. We had a brief discussion after that. We had lunch and in the afternoon we had a review of the procedures that we were basically going to put in place. We had some clarification by one of our people in terms of



some amendments to those, and we appreciate the clarification to the procedures.

Once again, just for today, if I can remind people about the procedures. The facilitators will indicate the general area. The participants will then identify the issues that they think are of concern and these will be listed. De Beers will then address the issues. There will be a brief discussion and the facilitators will try and summarize the status of the issue.

There was some discussion about the six points that the groups will determine whether as a result of discussion the issue has been resolved, or whether it is still unresolved and should be referred to the Board.

One of the things we did discuss is whether the issues coming up were within the terms of reference of the project, and we indicated at that point that we would consult with De Beers in terms of what their understanding was with the terms of reference, and then we would turn to Louis to give the viewpoint of the Board in terms of whether the issues were there or not.

Finally in the afternoon after we went through those procedures we also at that time clarified the agenda. The subject basically came up and we had a brief presentation from De Beers in terms of monitoring procedures. There was a general discussion about that, and I think the day ended around 4:00 p.m. or something like that.

Are there any questions about what happened yesterday as we were setting out the ground work for these sessions, or any unresolved issues that related to things that were discussed yesterday?

**MR. HAL MILLS:** Yesterday was just as clear as a bell. Thank you. Today then we start looking at the detailed issues, and the next two days in fact will be spent on water quality and quantity issues. As mentioned yesterday, De Beers will start off each morning and each afternoon with a presentation that generally relates to the issue topics for that particular session. I understand that the presentations are probably fairly lengthy although somewhat general trying to cover the waterfront. What I would ask is that if you have questions related to an explanation of a plan or diagram that is on the screen by all means ask it. If something occurs to you that is really related to an issue that is on the agenda for later, then please see if you can let that go until we get to that part of the agenda.

With that then just as an opening concept as to how things will go, I will turn things over to John and Robin from De Beers to make the morning presentation.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess just a housekeeping item from yesterday, I think there was discussion about how the facilitator's report to the Board would be handled and I think the comment was that we needed to wait until the MVEIRB's legal counsel was here to give us some direction on that. I wonder if we could take care of that issue now.

**MR. HAL MILLS:** If the legal counsel is prepared to do so, sure. I think the proposal from the Board originally was that the presenters would prepare a report following this technical session. It would be posted on the public record and on the web site, and individuals would have the opportunity to go in, have a look at it and send in their comments if they felt their positions hadn't been fairly represented by the facilitators here today. Then the question was raised, instead of doing that could the report be sent out to everybody as a draft before it is actually put on the public record. I think we need some direction from counsel on how the report is going to be handled.

**MR. JOHN DONIHEE (Review Board):** I don't see any reason why we can't put it on the web site in draft. I think the point is to try and get through the process whereby everyone can look at what they are alleged to have been saying, or was taken down on the transcript, and if they feel that that doesn't accurately reflect what they said certainly they should have the opportunity to respond to that and correct it. But we would like to have that process work as quickly as possible. I think the whole purpose of putting it up on the web site or faxing it to those who may not have access to the Internet, or may not be able to sit on the Internet all that long. That process is intended to try and get this done quickly so that we can move on to the next stage here.

My suggestion simply is that what goes up on the web site will be identified as being draft until the comment period is over. Hopefully that way we can do it quickly and efficiently.

**MR. HAL MILLS:** Okay, thank you, John. With that clarification back to De Beers for the morning presentation.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks Hal. As Hal said, we do have a number of short presentations that cover a number of areas. The agenda is up there. Our first speaker is Pat Tones with Golder Associates. I should emphasize Dr. Pat Tones, although she doesn't like that reference. Pat has over 20 years experience assessing water quality and environmental impacts. She has been working on projects in the North for some 10 years and was the senior reviewer for Golder on the Diavik environmental assessment. I won't go into all her other experience in southern Canada although I am sure a lot of it is applicable. Over to you, Pat.

**MS. PAT TONES (Golder Associates):** I would like to just act as your tour guide for a few minutes because I think it would be helpful to us all if we were able to orient ourselves to where we are in the process, to where we are geographically as the different speakers get up and give their talks. They usually go straight into a very narrow geographic frame, so perhaps if we all have a broad picture first that would solve, and also then to go back and talk a little bit about the day. There are two days devoted to water, and I think it is helpful to know what issues are coming up on the second day and what issues are coming

up this morning and this afternoon. I would like to just quickly do an overview of some of these things.

Starting first of all with the process. De Beers has been involved in this process for a long time now beginning in 1999 when they began the community consultation. On the water side we also began base line work, which has continued right through to this year, this summer. The first time that this information was written up in a technical appendix was to accompany the application for the land use permit and also a water licence application. This was submitted to the Land & Water Board and they decided that the project should go for environmental assessment, so at that point it was referred to the Environmental Impact Review Board.

Following that, De Beers and their consultants went to work to prepare the EA and that was submitted in February of this year, so 2002 has been a very busy year for everyone concerned in this process. After the report was submitted there was a whole week of information sessions to help people understand what was written in these documents. There has also been a number of very specific workshops related to different topics. The most recent one occurred in October and it was related to the north lakes.

There have been information requests responded to by De Beers, five rounds in total, and they began in the spring and they just completed very recently this month. De Beers also passed the conformity check indicating that the EA had met the terms of reference.

So we arrive now at this week and next, the technical sessions. Louis in a pre-hearing conference described this process as a funneling down, so that gradually we would work down to the issues that people considered the most important and we would be able to spend time and have our people come together to discuss that. This is, of course, just one point in the process and the last three bullets on my slide point out that there will be reports in February, and then all of this of course leading towards the hearings and eventually the submission to the Minister.

Now I would like to do just a quick orientation related to the geography of the area. We have the Great Slave Lake at this position and we are all sitting here in Yellowknife. The project is Northeast of Yellowknife at this location, approximately 220 kilometers Northeast of where we are sitting right now. You will notice that we are often thinking in terms of the other diamond mines when we think of the Snap Lake project. The other diamond mines are located north of Snap Lake so that Ekati mine is about 100 kilometers north. Given that we are mostly interested in water today, there is a divide between Snap Lake and the mines to the north. So Snap Lake drainage is in the Lockhart River water shed, and the Lockhart River water shed flows downwards and empties into Great Slave Lake, where the other two mines are in the Coppermine River water shed which flows north emptying to the north.

Let's now look exactly at Snap Lake and some of the key features around the lake. People will be talking about a number of points there, so I would like to just give you an idea of where they are all located. This is the main body of Snap Lake, the outlet is to the Northeast. You will notice that there is a north arm of the lake that extends quite a ways to the west, and an area here which we have called the Northwest Peninsula is the area of the disturbance from the mine site and the various activities. One of De Beers' goals was to keep that area as small as possible so everything is concentrated on that Northwest Peninsula.

The portal to the mine, as well as the mill buildings, are at the end of the peninsula, and the black areas out on the lake and on the north shore are the underground workings located under the mine since it is only an underground mine.

Later on tomorrow we are going to be talking about the north lakes and the north lakes are here, Northeast Lake and North Lake. There is no surface water connection between Snap Lake and the lakes to the north, but there is a deep groundwater connection. So we will be talking about this land mass between the Snap Lake and the North and the Northeast Lakes because groundwater can flow under that land mass.

That is the geographic orientation and then also coming back to these two days devoted to water. We have this morning two presentations that are just intended to help people orient themselves, mine first of all and also a description of how the water flows at the site so that we all have a common understanding of that. The main technical session this morning is going to be related to groundwater, and there will be four short presentations following, Ken and I, all related to groundwater. In the afternoon we are looking at the water management system and in particular the two types of treatment, the sewage treatment plant and the water treatment plant, the water treatment plant being primarily mine water treatment.

I think we will just on and mention what is happening tomorrow because you might have an issue and you are not sure whether to bring it up today or whether there is a particular session tomorrow, and so I just want to point out that tomorrow we are going to be looking in the morning at Snap Lake itself, looking at the water quality within Snap Lake and the various predictions related to that; also related to the sediments in Snap Lake. In the afternoon we will look at the north lakes and both groundwater and surface water, both quantity and quality related to the north lakes. That is a quick tour then to just orient yourselves to what is about to come.

As I mentioned, we are just going to move on now to a description of how the water flows through the site and Ken DeVos will come up and just give you a sneak preview of that.

**MR. JOHN MCCONNELL (De Beers Canada):** Just by way of introduction, Ken DeVos will be making the next presentation. Ken is a hydro geochemist and asset mine drainage specialist with Golder Associates. He has been active in academia and consulting on mine related issues since the late 1980s. His northern experience includes the NWT, Alaska and Northern Russia. It is over to you, Ken.

**MR. KEN DEVOS (Golder Associates):** Thanks, John. Good morning everyone. I am just going to carry on from where Pat left off. Pat described the overall geography on a broader context, and the purpose of this presentation is to narrow that down a little bit and look at the site itself, the water interactions and the different areas on site that affect those interactions; and just to take a quick look at water quality and some of the treatment systems and requirements on site. Just to give you an overview of what we will be talking about later.

This topic has been addressed in the project description section 3.6 of the environmental assessment report. There is also a good overview of the different site interactions provided in appendix 9.1 of the environmental assessment. We look at a very simplified schematic of the Snap Lake water management system, or the Snap Lake flow system. Of course the main feature that everyone is concerned about is Snap Lake. We have water flowing downwards into the mine from Snap Lake during operations and pumping. We also have a component of water flowing into the mine from the groundwater system. This water reports to treatment and we also have site runoff and site considerations from the north pile. We have runoff from the north pile that also report to treatment, and then this water is pumped back into Snap Lake. Of course we also have some natural inflow and lake discharge.

Now we focus in further on the site itself. This is an aerial photograph of the north-west peninsula, and on to this we have transposed or put on some of the different areas of the site. I am going to talk about some of the surface interactions here in this particular slide, and some of the areas on surface that will affect groundwater quality. I think the largest component -- we have natural runoff of course but the largest man-made component on the site that will contribute to runoff is the north pile. Water will drain off of the north pile and be collected in sumps and ditches around the outside of the north pile and will report to the water treatment plant.

We will also collect the runoff from the lay-down areas, and we will collect the runoff from the mine site itself -- the majority of the runoff from the mine site itself will also be reporting to the water treatment plant, as well as the mine water, the water pumped up from the mine, will report to the water treatment plant.

I think it is important to point out here that we have two different systems, two different treatment systems for the site. You will see on here we have a water treatment plant and a sewage treatment plant. The water treatment plant deals with water from the mine, deals with water from the north pile and deals with

water from the site runoff. The intake here and the camp are on a completely separate system. We have a separate sewage treatment plant that deals with water from the camp and sewage from the camp, etc. We also have a water management pond on site that provides capacity with respect to runoff from the site and water pumped out of the mine. This will be discussed in some of the later presentations this afternoon.

We focus a little bit more on the mine water. The mine water is a key component in understanding the site and understanding what is required for this site. Flow from the mine will make up more than 90 percent of the overall flows to the water treatment plant on site, so the surface runoff component is very small relative to the water that we are going to be pumping from the mine. This chart shows the expected water inflows and pumping from the mine and the different components that make up this water from the mine. The top curve on the graph shows the total mine water expected to be pumped from the mine at any given time. That is the expected value. Of this, initially, the water is composed primarily of the deeper more saline connate groundwater, and connate here just refers to that deeper saline groundwater.

As we start pumping the mine we get infiltration from the lake through the rock mass, and this lake water then enters the mine, so we get a contribution of lake water that increases over the initial periods of mining, as the mine gets opened up. Then all of these kind of reach somewhat of a steady state or a steady value as mining progresses and different areas of the mine are opened up. So in total, what makes up this total mine water inflow, we have about two-thirds lake water contribution and about one-third deeper saline groundwater contribution. This has an affect on the water quality that we expect to be pumped from the mine.

If we then look at what are the main sources of water to be treated, and I touched on this in the previous slide. In the water treatment plant we are looking at mine water primarily, runoff from the north pile and site runoff. In that sewage treatment plant we are dealing with the camp water and the water from the camp system specifically. It is important to separate out these two systems.

One of the key points that I want to make in this presentation of the broader overviews that affect the interpretation overall of site water quality is that the mine water represents over 90 percent of the treatment flows during operations. It is the main source of treatment. When you look at the mine water there are different components that affect the mine water quality. The key component that affects mine water quality is the amount of suspended solids or solid matter that gets incorporated into that mine water as you pump it to the surface. As you run your equipment down in the mine, as you blast, you release fine particulate matter which ends up in the mine water and gets pumped to the surface. The main chemistry, the main chemical components that need to be treated are in that solid phase. If we remove the solid phase material, all we are left with are dissolved components which are lower than the targets that will be discussed in

presentations later on in the week. So it is key that these suspended solids be removed.

Another component, and this relates to the amount of deeper groundwater versus the surface water runoff, is the chloride component. We look at dissolved chloride in relation to what is coming into the mine, and although chloride is a large component of the mine water inflow it also meets the targets that will be discussed later on in the week.

If we switch over to the camp treatment system, the key component here is phosphate and that will be discussed by Tom Higgs later on today. There are essentially two different systems, the mine water and the camp water, and those are the key components of those systems. That was what most of the information requests and the IRs related to.

In conclusion, there is also some conservativeness. When we looked at the chemistry for the site and the overall site interactions, we incorporated a degree of uncertainty analysis in there. We did that by using some conservative values when we did our estimates, and that is incorporated into the overall assessment. Specifically what is important with respect to these parameters that I have talked about -- each chemical parameter in the solid phase which is the key chemical component, or the key component of the treatment -- each chemical parameter in that phase that was assigned based on the amount of rock that we were mining through was assigned the average solid phase concentration of the rock multiplied by the proportion of that rock we were going to be mining through, or that the site ran off, or that the site runoff crossed over. We added one standard deviation to that particular component -- so about a 33 percent increase on the high side.

In the same way the dissolved chloride was assessed at the equivalent, it wasn't exactly one standard deviation. I will discuss this a little bit later. It was assessed at the equivalent of one standard deviation above the expected value. That is it. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** Thank you, Ken. Now we will move into the more detailed part of this morning's presentation on groundwater. Our first presenter is Don Chorley. Don is a hydro-geologist with Golder Associates. He has been involved in hydro-geologic investigations in Canada and world-wide for the for the past 25 years and has much northern experience including work in the NWT, Nunavut, Alaska, many of the former Russian states and Northern Europe. Over to you, Don.

**MR. DON CHORLEY (Golder Associates):** Thank you. The purpose of this presentation is to provide some information and clarification on the reasonable groundwater flow during all phases of mining, and that includes the base line or present conditions, conditions during mining and also the conditions after mining

or post-closure. This topic has been addressed in the environmental assessment report, chapter 9.2.1, and also in a number of information requests.

What I want to point out here is the unique features of groundwater flow conditions in the Arctic, in continuous permafrost conditions. This is a schematic, it is not necessarily Snap Lake. It is a schematic of groundwater flow conditions in continuous permafrost that occurs in the Arctic. One of the unique features is of course the permafrost. This zone is frozen ground and what it does is that it reduces the ability of that material to move water downwards into the deep groundwater flow system. It reduces it by ranging from a thousand to a million times less than the same material under unfrozen conditions saturated around. So it produces a relatively impregnable zone, almost an impregnable zone. There is some flow.

Another unique feature is that you have this active layer at the surface, a very thin layer. At Snap Lake the maximum depth is about eight metres. This zone is only unfrozen for a portion of the year, usually a couple of months during the later summer. This zone is isolated effectively from the deep groundwater flow by the permafrost.

Another unique feature of this flow is that large lakes have tellicks, they are unfrozen zones underneath them that will extend down to the deep groundwater. But you have smaller lakes that have tellicks but their tellicks don't extend all the way down to the deep groundwater, so effectively they are also isolated from the deep groundwater.

Finally, because you get limited infiltration over this zone, your groundwater flow system largely is -- the driving force for groundwater flow is the hydraulic heads which are defined as the elevation of water above [inaudible]. Effectively it is the same as surface water. Groundwater flows downhill, so you will have flow coming from large lakes and down to the large lakes that have tellicks that extend down to the groundwater. So you have flow from higher elevation lakes to the lower elevation lakes. Pretty simplified, much more simple than it would be in the south.

Here is a bit of animation. This is the map views from the site, and again I just want to point out that this is where the surface facilities are. This is the underground that extends underneath the north land mass. Here is the Northeast Lake, North Lake. The important thing to remember is that Snap Lake at 440 metres elevation is the highest lake in the area because it is a headwater lake, so all the large lakes around there are all at a lower elevation. This just shows the general groundwater flow conditions present, or at base line. You can see that they are all moving regularly outwards, or outwards from Snap Lake. There are some large lakes down here that have lower elevations also. So those are the conditions at present.



During mining, by having this underground mine here, you actually produce a sink, or a lower elevation within the mine, and it draws water from the lakes, and this is what happens. When we are doing the base line we do that on observations. When we go into the groundwater flow conditions during mining and at post-closure, we have to rely on predictions and we do this through a numerical model. So this is what the numerical model tells us, that we have components of groundwater flow from the North Lake and from the Northeast Lake going into the mine workings. There is still a component of water flowing from Snap Lake to the Northeast Lake, but this is at distance from the mine. So those are the general flow conditions in the deep groundwater below the permafrost.

This is at post-closure, or after mining. Basically\* there are some minor differences here just because the mine produces somewhat of a preferred pathway for groundwater flow, a little bit higher impregnability, so groundwater conditions go back to near present conditions with a little bit more flow going to the Northeast Lake. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Don. Our next speaker is Lee Atkinson. Lee is again another hydro-geologist. Lee has over 28 years experience in predicting flows in fractured rock. Lee has worked on more than 100 major mine related projects, including some of the largest mining operations in the world. His northern experience includes Alaska, Northern Ontario and Labrador. **MR. LEE ATKINSON (Hydrologic Consultants):** Don Chorley, the previous speaker, referred to the fact that we have developed a numerical groundwater model to make many of the predictions of what will occur to the groundwater system, both during and after mining. Several of the other speakers will show how that some of that information has been used for the design of water treatment plants.

During the IR process two prevailing questions occurred repeatedly. One had to do with how well we had characterized the nature of the fractures in our groundwater model. The second one is how we addressed the concept of uncertainty, which in that part of the presentation I am actually going to define it and then explain to you how we did it.

The first question -- and these are actually the two IRs that prevailed, I am going to take them sequentially -- had to do with the groundwater characterization specifically the flow in fractured rock. The topic has been addressed in the environmental assessment report, I have indicated the sections, and then in three different IRs. One thing that is very important -- in the appendix IX2 there is about two centimeters of detail of the various tests that we did during the field, and I will show where these were done. During the 2000 and 2001 exploration and drilling program we drilled approximately 2400 metres of rock and conducted about 85 hydraulic tests.

Before we get into the specifics of the site, I would just like to show sort of generically what fractured rock is all about. I would like to define the term right at the beginning because you may hear it again, and that is hydraulic conductivity. Hydraulic conductivity is the property of a rock or a soil to conduct groundwater. It has two very important components. It has a magnitude, an amount. Fractured rock has higher hydraulic conductivity than unfractured rock, but it has a direction associated with it. Typically, as I have shown in this block, because of the processes that occur after rock is formed they fracture, and these fractures are what impart the hydraulic conductivity to it. Very typically you will have three orthogonal, meaning at right angles to each other, three sets of fractures. You will have a horizontal fracture set, you will have a vertical fracture set, and then these can occur in multiple directions.

What is important is that during the testing program, the exploration program to try to determine that we have properly aligned drill holes so that we actually tap these different orientations. Very often in a mining project you are just drilling from the surface, and as a result if you are drilling a vertical hole from the surface you are going to preferentially hit just these horizontal fractures. Because of the access we had underground during the 2000 and 2001 drilling programs we could go underground and we had complete freedom to drill in various directions, which in fact we did so we tried to hit all of the fracture orientations. Again, as you can see in this diagram, the vertical hole is going to pick up these horizontal fractures and then the horizontal holes (depending on the orientation) will pick up one of the vertical components.

One more cartoon or schematic diagram of what we actually did underground. As I mentioned, we did 85 hydraulic tests. The tests involved quarrying the hole (very often in conjunction with exploration that was being done); we had a sealed or cemented casing at the surface to which we screwed on a dial for the pressure gauge. We would run what is called a flow and shut in test. We simply allowed the hole to flow water, then we shut the valve here and watched the pressure gauge build up. The rate at which that pressure builds up is directly in proportion to the hydraulic conductivity of the zone at which you are testing. Several of these holes were many hundred metres long, and we wanted to test sequential intervals, so what we would do if we hit a relatively major water producing zone we would grab it so that we wouldn't see that water again and then we would advance the drill hole and keep going.

The important thing now is that when we define the hydraulic conductivity of the rock from this testing method we, in fact, were looking at the affect of both the hydraulic conductivity of the rock and the fractures. We took this into account again by drilling in different directions, and we could see how that varied.

What I have shown here is the two drilling campaigns that we had. The blue drill holes indicate what was done in the year 2000 -- about 550 metres of drilling -- and then the red holes indicate the drilling that was done 2001 advanced exploration program. That was about 1900 metres of drilling. For example, these

are the horizontal or map traces. Some of these holes are horizontal, some are inclined slightly and some of them are quietly steeply oriented. That is summarized in the table here. Again, we looked at the full three-dimensional nature of this.

The one thing that is I think very significant to point out is that in the pinkish colour here we show the Snap and Crackle fault. These are the two largest structures that have been mapped in this area. We purposely, during the drilling program, advanced poles into and through them. It was quite unremarkable what was encountered. In other words, we did not see any additional water associated with those faults relative to any other areas that we had tested.

I am now going to the next question about uncertainty analysis and this question (and I sort of need to define it as we go), but the specific question was -- okay you had a limited amount of data, how do you cover the uncertainties associated with that for all the future events? This was addressed in the environmental assessment report and then it was responded to in three of the IRs.

This is a schematic diagram and cross-section of the Snap Lake ore body. This is the kimberlite dyke. This is Snap Lake overlying it. What I am showing here is, again very schematically, the different rock types. This would be the meta-volcanics. This would be the granites. There are three primary rock types here -- the kimberlite itself, the granites (which actually comprise the vast majority of the area that will be mined and impacted by mining) and then the meta-volcanics.

In a groundwater model what you do is you take the mine area and you describe it both geometrically and hydraulically. Geometrically you try as accurately as possible to show where the various materials exist, then you apply to them the hydraulic properties. One of the key ones I have already defined as the hydraulic conductivity. Then what you do is an uncertainty analysis; you put in uncertainty in the sense that okay I have measured so many values, my average or mean value is this, but I have a range that I know encompasses all of the values that I have measured. But I have what I will refer to later as an expected value; that is the most likely value that that particular material will have.

In this Snap Lake groundwater model we had 12 factors or parameters that were incorporated into the model. So we did some preliminary what is called sensitivity analysis. I would put a number into the model and I would change it. If the results of the model changed significantly then I would conclude that that was a sensitive factor. Conversely if it didn't I realized that the model wasn't sensitive to it and I eliminated it from further uncertainty analysis. So of the 12 parameters that this model includes, seven of them were judged to have enough sensitivity to include in the uncertainty analysis; and that is associated with the hydraulic conductivity of the granite, it has to do with the lake sediment bottoms and then what is referred to as the leachens factors. In the simulation of the underground openings, what these are in the numerical model it is sort of like a little valve you put on an area that represents the underground opening. If you don't put in some

of that resistance the model predicts just way way too much water. We were able to calibrate the model to the drifting that had been done in 1999, 2000 and 2001, so this is actually a number you can calibrate a model to.

How does uncertainty analysis work then? I am going to make a very simple example here. I don't want to -- there are people in this room that I am sure have done this -- I don't want to insult their intelligence. Conversely there are people that this maybe new to and I just want to go through a very fundamental example. Any time we have a value that is a function of two other factors -- a good example is C is equal to 8 times B -- we very often assume that there is a fixed value to A, a fixed value to B and then the product of those two numbers can be defined without any uncertainty. I just picked a simple example that A is 10, B is 10, so the product of those two, 10 times 10 is 100.

When you assign or incorporate uncertainty what you do, now you say okay I have these same variables but there is an uncertainty. I have an expected value for them, and then there can be a range (both higher and lower). In hydrology we very often define to see hydraulic properties or parameters in terms of orders of magnitude -- something hydraulic conductivity, something is just not as twice as conductive as one zone. It is orders of magnitude.

What I have done, just following through with this very simple example. Now I say that I have a parameter A, this could be the hydraulic conductivity of the granite. Its expected value, its mean value from the field data, is 10 but I am certain that within a 95 percent confidence interval -- now this number is going to appear again. You will often hear the expression "standard deviation". What I am saying is that with 95 percent certainty, which is two standard deviations, that all of the values in this example, the hydraulic conductivity of the granite, are between one and 10. Again they're order of magnitude type ranges.

Similarly maybe B is the hydraulic conductivity of the meta-volcanics. I applied the same logic and reasoning there.

The way uncertainty analysis works is that the expected value is the product of the means, so it is identical to the simple problem of where I have a unique value to each of the input parameters, so the expected value is 10 times 10, or 100. But the important part of uncertainty analysis is recognizing that it is highly improbable that all of the factors will ever occur in combination, or they are all at the low end or all at the high end. Which is just saying that it is virtually impossible to ever have the combination where everything will be -- in this case one times one is one, or in this case 100 times 100, which is 10,000.

This is a real simple example where I am just taking two factors. As I implied in this model we have 13 of these. Incidentally it is not just A times, B times, C times D. They have a lot of less than linear and indirect relationships, but the concept holds true any time something is dependent on multiple parameters.

I told you what it doesn't do, what do we do with this type of analysis? What we do is we express the range of the resultant in terms of uncertainty. In other words, I am going to have an expected value and then I am going to have ranges, both plus and minus, of what I think are the possible occurrences that could be above that, and I am going to express it again in terms of percentages. I am going to express it in terms of 68 percent certainty that I have encompassed all of the possibilities, and 95 percent.

For those of you that have done statistics, again this is the one standard deviation and the two standard deviations. These are the most common numbers used in engineering analysis.

One of the most important questions that come up is how much water is going to flow into the mine? What I have shown here is a graph. On the left-hand side is the predicted inflow to the mine in cubic metres per day over the mine plan. Incidentally what the model does is that the model simulates how this mine will grow, how the back fill will occur, all of the processes that will physically be taking place during the mining. So what we show here, in the very heavy dark blue line in the centre, this is what is referred to as the expected value. In other words, this is what I expect starting in the year 2003 the rate of inflow to that mine to be.

Then, because I do have some uncertainty in the inputs to the model, I have quantified the ranges of those input values. I have then expressed my uncertainty in terms of a 68 percent certainty, or this one standard deviation, and two standard deviations, or 95 percent. For example, in the work that Mr. Oryall is going to explain later, and Mr. Higgs, when they talk about water treatment they will show that they have used the highest predicted value, this 95 percent.

So in conclusion and to reiterate what has been stated in the responses to the IRs, fractures have been in fact incorporated into the calculation of the hydraulic conductivity, the controlling factor for our predictions, both in terms of the magnitude and the direction; and then in fact an appropriate uncertainty analysis has been conducted. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Lee. Our next speaker is Ken DeVos again.

**MR. KEN DEVOS (Golder Associates):** Thanks, John. Thanks, Lee. In this portion the purpose of this brief presentation will be to provide some of the background and the rationale for the chemistry values, in particular the salinity and chloride values that were used in the environmental assessment in determining the groundwater inflow chemistry. In here we just have a sump from Snap Lake in one of the ports that was monitored. The topic has been addressed in several sections of the environmental assessment report, and again in appendix 9.1 of the environmental assessment report, as well as in the IR responses. In this case there are also some relevant external references that are both presented in the appendix and in the IR responses as well.

Looking at the setting again, my very simple cartoon of the site, in this case we are going to be looking at the water flowing into the mine. There are different components in the mine itself, but we are concerned in this particular instance with what makes up this water flowing into the mine. As discussed in the previous presentation, that has a component from the lake, which is about two-thirds of inflow during mining operations -- or later on in mining operations -- and has a component from the deeper groundwater, or the deeper saline groundwater or connate water. We are going to be talking about the values that were used for the connate water or the deeper saline water.

This particular diagram -- in order to determine the values that were used for the deeper more saline or groundwater, the main component of the total dissolved solids at this mine site and that other mine site on the Canadian Shield is the [inaudible] value. There is a fair bit of data available from different mine sites in the Canadian Shield where salinity has been looked at and total dissolved solids has been looked at. This plot shows the data from different mine sites in different locations in the Canadian Shield with depth. In this case we are looking at data from Diavik, this range here. Pumping data from Diavik which is in this range over here. We are looking at data from Lupin Mine, which is quite a bit deeper. We are looking at 1,000 metres here, and quite a bit more saline. You will note that this is a logarithmic scale, which means that this is 10 times, 100, 1,000 times in the [inaudible] metre. And we are looking at data that was collected by a couple of authors, Frappe and Fripp from the Con Mine here in Yellowknife, and from the underground research lab in the White Shell area in Manitoba.

This data is all plotted up here, and what we are doing here -- the depth of the mine for Snap Lake ranges from about zero up to about perhaps 500 metres below the lake sub, so we are looking at a depth range from here to 500 metres. We were able to collect data in the advanced exploration program in this range, and this is the data that was collected from the granite in the Snap Lake exploration program. These are from the several hundreds of metres of drilling that we discussed earlier. The number of samples that we were able to collect in the time frame that we had available to us in the advanced exploration program, from the granite rock in particular -- we have more samples from the meta volcanics but for the granite rock in particular we have about eight samples from several different locations in the mine. This is the range of those samples, so we are looking at approximately from 500 milligrams per litre TDS to about 900 milligrams per litre TDS. This falls right within the range of data that was collected at other sites in the Northwest Territories and within Canada in the Canadian Shield.

Now when we applied these numbers to the groundwater, to the estimate of water quality on site, we applied a factor that allowed for an increase in concentration with depth. We also applied for upwelling of this water into the mine as we pump the mine. We applied essentially the worth -- not the steeply differing but the shallower differing curve which results in higher concentrations, with depth. We slid that curve over and applied that like that in this area, so that

we increased the concentration with depth of mining with what we had expected the depth to be at a given time during the mine. In that way we feel that we have captured the range of possible conditions.

We also used, in this case, a value that was essentially one standard deviation above the average value for the chloride concentration from the granite. We used the granite because the granite will make up the majority of the mine water inflows, and the granites are located at depth in the mine. As I mentioned earlier, the chloride value is the main component of the TDS value. so what I am presenting here is just the expected values versus the assessed values at the treatment discharge for chloride concentration.

I will just briefly point out that these dips in chloride concentration correspond with surface runoff events on an annual basis, so when you have the spring melt you get a lot more fresh water coming into the treatment system than at other times during the year; so you will see a decrease in chloride concentration. This is just the result of dilution from that fresh water coming in.

This top curve represents what was assessed in the environmental assessment with respect to chloride concentration, and the lower light blue curve is what is expected. Even when we account for the increase in chloride concentration with depth that is what we expect based on the mixing of the surface water and groundwater before it reaches the treatment system.

The green curve here are the concentrations that we would expect given the increase in chloride concentrations of about one standard deviation above what we have seen in the mine, and applying the increased concentration with depth curve. The reason that this expected value is higher; you can see that it follows fairly closely along the increase of one standard deviation above the chloride values, is because we had applied in the assessment an incremental increase -- or an addition in the chloride concentration as a function of the area that we were mining. That is not likely going to be the case. The chloride concentrations are not dependent on how much area we are mining other than the amount of water that flows into the workings.

Just because we open up an area in the mine and we are running around with the equipment does not mean that we are going to increase the chloride concentration. So that was the value that was assessed as a conservative measure. What we actually expect to happen will be the lower values.

To conclude, with respect to those chloride concentrations that were assessed, the data falls well within the observed range of chloride concentrations for the Canadian Shield and the Northwest Territories. The data was adjusted for potential increases in chloride concentration as a function of depth, and it is important to note that we feel very confident that the data that was used in the model, in the impact predictions, is appropriate. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Ken. We have one last short presentation on paste backfill geochemistry, and Ken will be giving this one as well.

**MR. KEN DEVOS (Golder Associates):** Okay I will just continue on then with some additional information. Discussion was requested around the paste backfill geochemistry, so the purpose of this presentation is to provide some of the rationale and background for chemistry values that were used in the environmental assessment for the paste backfill. This topic has been addressed in the environmental assessment report. Appendix 9.1 provides a discussion and section 3.2 provides a discussion of what was actually used in the environmental assessment report.

Since then we have taken it one step further. We have done some additional work that we had discussed and indicated in the environmental assessment report was ongoing. Some of that work is provided in the North Lakes report, and some of that work is discussed in information requests.

So essentially if we are looking at paste backfill geochemistry some of you may say well what is "paste" for instance. It is a blend of the different rock types, and these rock types are blended together and used to backfill either the mine or for placement on the surface. This will be discussed more in the geotechnical sessions, but essentially these are pictures of an application of the paste backfill in Sudbury, Ontario, different sites around Sudbury. This is the consistency. Essentially what we are dealing with is toothpaste, the consistency of toothpaste I should say.

In the case of the mine at Snap Lake we will be adding cement to this so it will harden up and will be deposited underground in the worked out areas of the mine. Just to give you some idea of how this material hardens up, this gentleman is standing on a paste that was deposited. This is after 24 hours, so the paste hardens up from the toothpaste consistency to something you can stand on in 24 hours. This is not cemented. When we add cement to this material it binds up, hydrates and solidifies.

Just to give you an idea of the setting where this is going to be used in the mine, I am going to be talking about the mine paste backfill here. This is a cross-section through the mine from west to east and from north to south. We will have water inflow into the mine and we will have paste deposited in the worked out areas, in this case this is the kimberlite dyke. We have granite material here, and we have meta volcanics. The granite material, as you can see in this bottom slide, extends far away from that peninsula, and it comprises the majority of the material we will be working in, or will be mining.

So the paste is deposited behind the active or working area of the mine. Below the paste there will be some open areas, some hollage drifts, these are



essentially tunnels; whereas the working areas of the mine are essentially sheep and the paste will fill up those sheep.

Just to go back, the chemistry -- the reason this is being discussed is during operations the question of the chemistry of the paste material and any water released from that paste material what effect will that have on the overall water quality of the site and at closure, when flow moves away from the mine, what are the implications with respect to the chemistry of the paste on this water quality from any in the mine and moving away from the mine at closure.

In order to refine the values that were used in the environmental assessment we conducted some additional laboratory testing. To do the environmental assessment we took a very conservative approach. We wanted to make sure that the values that were used in the assessment were the highest that we could expect. So in order to do that and in order to get those conservative values, we used short-term leachate testing. To describe what a short-term leachate test is we took a sample of relatively uncured paste, so after 24 hours we took the paste sample (I believe it was 24 hours), we crushed it, we added water to the sample and we measured the concentrations in the water after that sample was allowed to soak for 24 hours. Those were the values that were used in the environmental assessment. That is a worst case scenario because if the paste isn't cured and it's agitated to cause the material to leach or release its chemistry -- we knew that those were our worst case values. Those are, I expect, the worst case values.

To refine those values we are conducting ongoing laboratory tests in which we have a cemented paste material, essentially the cylinder, and this just a picture of a typical setup in the lab for these materials. We have one of these materials where we add water on a weekly basis. We let the water sit in the cemented block of paste for 24 hours and then we take the water off and analyze it, and leave the paste column in the air to continue to cure. That just simulates what would happen in the mine itself during operations.

Then we have another for each one of these (and there are four samples in total), two of which are conducted in these fashion where we let the sample aerate or dry. The other two samples we add the water to the sample and we let the sample sit underwater for one week, then we drain that water off and analyze the water and add a fresh batch of water on a weekly basis.

Then we have weekly data. For each week we do an analysis on this data. This has been going on now for about -- we have three to five weeks of analytical results. The tests have been ongoing for about nine weeks now, and they are 20-week tests in general, typically.

We also have another setup where we run the water from the paste cells through either the granite material or the meta volcanic material to determine if we can see on the short time scale any potential attenuation or flowing absorption of the chemical on to these rocks. So even after the preliminary results from these

repetitive leach tests were completed, the three to five weeks of data, we go from our very conservative case that was used in the environmental assessment report getting to a little bit more realistic case where we are looking at perhaps some longer term data here. We see the PH decrease, and that PH decrease has the largest affect here on chromium concentrations. We see the chromium concentrations decrease by almost an order of magnitude from that which was used in the environmental assessment report. We see an aluminum value similar to what was used in the environmental assessment and a decrease in copper, molybdenum and ammonium.

These were the particular parameters that were brought to the attention of Golder and De Beers through the environmental assessment process and the IRs, and that is why I put those ones up here.

To conclude, we feel very confident that the data used in the assessment is conservative. In fact, with respect to chromium we feel that is very conservative. All of the available results from the kinetic testing, or the ongoing laboratory testing data, have confirmed that lower concentrations for those three parameters of concern will be -- they confirm that those values are lower than what would be used in the environmental assessment report. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Ken. Hal, I guess it is back over to you. That concludes our presentations for this morning.

**MR. HAL MILLS:** Thank you, John, and thanks to all the presenters. I think you did a fine job there and I hope that the rest of the participants found that as useful and as educational as the facilitators did. Obviously you are not here to educate the facilitators, but it sure helped me. We have about 15 minutes or so for general discussion before getting to specific issues after the coffee break. The floor is open now for any general discussion, questions or comments that you have related to the presentations that you have just seen. The floor is open.

**MR. JOHN MCCONNELL (De Beers Canada):** I think everyone needs a coffee.

**MR. HAL MILLS:** Okay, I think you are right, John. Just briefly before doing that, I did want to make one comment. In terms of going through some of the background material, the IR documentation and so on, a lot of that described an area that the initiator was somewhat concerned about, but I think it left Mike and I (if not De Beers and other people) scratching their heads and saying, yes but exactly what is the issue? To some extent I don't think, perhaps to a large extent, that has never really been well worked through. For the discussion that we get into after coffee break it will be helpful, I think, to that discussion and to everybody if you can be as specific as you can and tell us exactly what is the issue that you are raising, that you want to have discussed. So just think about that a little bit. I think it will help the discussion. We are breaking about 15 minutes early. It is just before 10 o'clock by my watch. This will give us 15

minutes that we will have saved to devote towards the discussion of the issues afterwards, so please be here ready to get into that at 10:15 a.m. Thank you.

--- Break

**MR. HAL MILLS:** ... discussion of the issues related to the different topics on the agenda, so related to the presentations that you saw on the water management plan. We have four bullets, one dealing with groundwater in general, the second dealing with fracture flow, the third with water inflow and the fourth with paste backfill. Roughly speaking I see that we have probably about half an hour for the first one and 25 minutes or so for the other three, so not a lot of time. We will be keeping to the general agenda. If we find that a particular bullet doesn't take, if there are no issues or it doesn't take very long, then that will save us more time for the others. Okay the way we are going to proceed then is, in general, according to the six points in the procedures that you laid out there I have just given you the indication that the first discussion is going to be on general groundwater issues.

What I will be asking you to do now is identify the issues that you think need to be discussed here. If it is an issue that has already been dealt with sufficiently in the EIS or in the IR process, or from the presentation, then presumably it needs no further discussion. We want to know from you what are the priority issues that you think need further discussion here, and in terms of getting you to identify those I would like you to do it briefly just in terms of identifying the issue that you want to have some discussion on here this morning, and we will draw up a list and then we will return to them and go through them one by one and have a discussion on them.

If that is clear I am open for identification of issues that you want to have discussed here related to groundwater.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** We would like to discuss the issues of groundwater, fracture flow, uncertainty and groundwater inflow to the mine.

**MR. HAL MILLS:** I'm afraid you misunderstood. Within the groundwater category what specific and exact issues do you want to have discussed here?

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** We would like to discuss the conceptual model that was shown to us on the presentation on groundwater.

**MR. HAL MILLS:** Alex, is there an issue there?

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** The conceptual model is the underpinning on all the numerical modeling that goes on of groundwater flow at the site.

**MR. HAL MILLS:** Okay, I understand that, Alex, but I don't hear from you an issue.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** Well it impacts the volume of inflow, the rate and quantity of water that moves from the mine to the North and Northeast Lakes. It is fundamental to a lot of the predictions that are made in the EA.

**MR. HAL MILLS:** I give up. I still don't understand. You are outlining an area of concern but let's let that go. Did you want to add something, Mike?

**MR. MIKE BELL:** Maybe we are being too specific, but when we are talking about an issue an issue is something like we think the model maybe seriously flawed -- the conceptual model that you are using -- then we have an issue on the basis of discussion. We are trying to distinguish here (maybe not appropriately) between an area which is the conceptual model or what an issue is about the conceptual model. An issue might be that the conceptual model isn't clear to us. The conceptual model may not be valid and we have some concerns in that area. Something that we can get a handle on so that we have some kind of a discussion to have an issue to resolve an issue.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** Okay, we are not convinced of the conceptual model. Is that clear enough? Okay.

**MR. HAL MILLS:** Other issue identification, things that you want discussed here?

**MR. ROB DICKEN (Gartner Lee):** I have two issues. One is with respect to the regional groundwater flow model and the assumptions involved in it, and the uncertainty that that represents. The second one is the modeling of the volumes for inflows into the mine and those assumptions as well, and the possibility or probability of flows being higher than predicted.

**MR. HAL MILLS:** Here again for my clarification, are you now down to the third bullet? We are obviously getting into a little difficulty as to how to proceed here, not too surprisingly. I am trying to get people to focus on the first bullet for discussion here and issues related to it. Garth.

**MR. GARTH WALLBRIDGE (Rae Edzo Metis Nation):** Thanks, Hal. I am having a hard time here in the last five minutes, as well as other people obviously, because when there were four or perhaps six presenters this morning in my mind to a large degree they all rolled into one, so to try to break it out now, any questions I might have in the four separate areas I have somewhat of a difficulty with that. I wonder if it wouldn't be more productive, and we can move ahead, if we just identified issues and not worried about which of the four bullet points they go within.

**MR. HAL MILLS:** I am quite willing to go with that. Okay, we are simply identifying issues related to the overall morning that you want to have discussed before lunch.

**MR. LOUIS AZZOLINI (Review Board):** I am just as a participant, not as a person doing my job.

-- Laughter.

You have each received one of these and it is a summary of all the technical issues, and there is one specific heading called, I think, groundwater. There are seven points identified there. If that is a reasonable representation of the issues which have already been identified, maybe that is a good departure point. If it is not, then you can take my idea and do with it what you...

**MR. STEVE WILBUR (Dogrib):** I guess I am just a little confused. In order to be interactive here, do we have to identify all the issues initially, or can we bring them up as the conversation evolves?

**MR. HAL MILLS:** I expect you will do what you wish, but my idea was to identify the issues -- not necessarily everything on Louis's list -- if they have already been satisfactorily taken care of then we may not have to discuss them. I was looking for a quick identification of which things you wanted to discuss this morning and then to return to each of them in order for a fuller discussion.

**MR. STEVE WILBUR (Dogrib):** I would seem to make sense that the issues that De Beers presented are the issues that we would like to talk about, rather than to go down -- I guess you want to have a specific -- I understand that you are trying to get to building towards a consensus in order to have an issue to be able to say do we have a consensus on that particular issue? My opinion is that might be hard to develop without going through some of the topics more informally.

**MR. MIKE BELL:** I think there were a variety of presentations this morning and my sense is that the presentations were very good and presented a lot of information. At this point what we are trying to do, to deal with some of the timing constraints over the next hour and a half, is to say to people do you have any concerns or issues that were raised as a result of the conversation this morning in any of these four areas, let's quickly just indicate what they are then we will go back and deal with them. This will give us some kind of a sense of how much time we have got to handle how many issues. For example, we have a clear one, there is an issue. Somebody has brought up an item about the validity of the assumptions on which the model is working. That is something we can work on. If we can get a few more issues like that, things that people would like to talk about, then basically we will start the conversation going and try to keep it as free-flowing as possible. Are there other issues?

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** One of the issues we have is the potential for groundwater chemistry to actually have higher levels of certain constituents than what has been used in the EA for the purpose of predicting impacts.

**MR. HAL MILLS:** Anything else you want to flag right now?

**MR. NEIL HUTCHINSON (Gartner Lee):** My question is, if the average plus one standard deviation used for groundwater chemistry was used for all depths in the groundwater input model, or if the chemistry inputs varied with depth such that you could get a total load in of chemical constituents into water in order to determine your average mine water quality.

**MR. HAL MILLS:** Okay, let's start off on the...

**(UNIDENTIFIED MALE SPEAKER):** Just one more here concerning the issue of fracture flow and uncertainty. NRCan has some concerns about the way fractures were considered in the groundwater flow model, which may affect predictions.

**MR. DAVE BALINT (Fisheries & Oceans):** We have some questions on the testing results of the paste backfill tests.

**MR. MARC LANGE (Fisheries & Oceans):** I am going to take Louis' suggestion here and go to the list of issues before tab 1, and our issue is going to remain on the table right now relating to groundwater contamination due to contact with paste backfill. We will be asking questions -- specifically Julie Dole has got some questions and David Balint is formulating some right now.

**MR. HAL MILLS:** Okay, we have a number of issues there. Shall we get started, the first one being about the conceptual model and not being convinced of its validity. Do you want to describe that a bit more, Alex?

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** Yes, the conceptual model shows a broad groundwater flow system with recharge at Snap Lake, and groundwater flowing downwards and outwards radially towards nearby lakes that have deep enough tellicks. Now in the EA and in the North Lake study I really didn't see any head data that would support that type of big regional flow system; for example no head data showing a downward gradient beneath Snap Lake. Did I miss something, or do you have such data?

**MR. JOHN MCCONNELL (De Beers Canada):** We will ask Don Chorley to respond to that.

**MR. DON CHORLEY (Golder Associates):** Yes in the North Lake report that is the one piece of data that is very useful since we have, for the same period of time, the head in the well that is closest to Snap Lake and the actual elevation of the water in Snap Lake itself. It does show a downward gradient.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** I recall that the data from that well showing that the head was the head in Snap Lake. I don't remember it being packed off at different depths. Am I mistaken?

**MR. DON CHORLEY (Golder Associates):** It is actually about, let me see -- it is 150 metres and the well screen is actually located in the last 25 metres of that, so it is actually at 60 degrees, so it is probably about 100 metres below Snap Lake.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** So you do have a downward gradient?

**MR. DON CHORLEY (Golder Associates):** Yes we do.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** I have another question concerning a phenomena that is frequently observed in deep bore holes in the Shield, and that is abnormally high heads linked to glacial loading and slow dissipation after that. Have such elevated heads been observed around Snap Lake?

**MR. DON CHORLEY (Golder Associates):** No they have not been observed. In underground most of the data that we have, where we have a bore hole that we have measured the pressure on the pressure is less than Snap Lake or near Snap Lake depending on the permeability. We haven't seen any pressures higher than Snap Lake.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** Okay, one final question. In the calibration of the numerical flow model, no head data was used and yet there is quite a bit of head data in attachment 1 to appendix A of appendix IX.3. Why wasn't the head data used in the calibration of the regional flow model?

**MR. LEE ATKINSON (Hydrologic Consultants):** I am not sure what you mean by it wasn't used. We used all of the lake levels. This groundwater flow system groundwater flow system is dominated by the water levels in the lakes.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** No but you had head measurements in the underground bore holes.

**MR. LEE ATKINSON (Hydrologic Consultants):** Yes, but all of the head measurements we had in the underground bore holes were the result of short shut-in tests, and as Don indicated they did not recover to a static water level. They are reflecting the fact that we are creating temporarily a sink in the underground mine. They would not have been appropriate water levels to calibrate the model to, and we did not have long term ones. They were continuously drilled and tested. We did those flow and shut-in tests and then repeated that process.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** So basically you are saying that you consider that the heads that were measured in the underground testing are not representative of in situ values. They were just representing disruptions due to drilling and mining?

**MR. LEE ATKINSON (Hydrologic Consultants):** Okay, the direct answer to that question is, they do not represent a steady state or long term values, so that is why I did not use them.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** Okay.

**MR. LEE ATKINSON (Hydrologic Consultants):** I don't think they would have been the appropriate calibration targets.

**MR. STEVE WILBUR (Dogrib):** I would just like to follow up on the questions. I guess the assumption that the surface water in the lakes, that is the only head data that you are using for your model. Is that correct?

**MR. LEE ATKINSON (Hydrologic Consultants):** That would be correct for getting the regional water levels established as the boundaries for the model, yes.

**MR. STEVE WILBUR (Dogrib):** So we have made the assumption that surface water is connected to the groundwater system fully?

**MR. LEE ATKINSON (Hydrologic Consultants):** In this particular hydro-geologic setting, yes.

**MR. HAL MILLS:** If I could jump in and just remind you, I would like everybody to do what Steve is doing. Every time you start making another comment, please identify yourself. I know it gets repetitive here, but it will immensely help the people doing the transcripts later.

**MR. ROB DICKEN (Gartner Lee):** I understand that you have used lake levels for the regional flow system, and I don't disagree with that, but there are a number of assumptions there involved in the model which lakes have tellicks and connect with the system. There is some uncertainty in the first runs of the model in the EA report. There was flow towards the North Lake. The issue here, of course, is flow after the mine is closed and contaminated groundwater reaching some of these other lakes 50, 80 years, many years after the mine has been closed. What monitoring is proposed, and what sort of time frame and issues will be used to confirm the model results?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think that while there is a discussion around groundwater, that is largely moving to the potential impacts from north lakes. If I could, Mr. Chair/facilitator, suggest that that issue would be best dealt with in the North Lakes discussion. If we can defer that question until that time tomorrow afternoon to provide that in its proper setting.



**MR. JOHN KEEPER (NSMA):** I think that the monitoring issue is an important one. Are we going to discuss this in more detail later?

**MR. HAL MILLS:** As Robin said, there will be -- with respect to both Snap Lake in the morning and the North Lakes in the afternoon there will be opportunities to bring things up for all of them at that point.

**MR. JOHN KEEPER (NSMA):** Okay, but you are just talking about the North Lakes in the afternoon? I share the same concerns in terms of the regional groundwater, and I didn't seem too much data to support that. I think that the monitoring program could really help in that direction, so that is why I think it is very important to kind of discuss the monitoring and what is going to be done in that sense.

**MR. STEVE WILBUR (Dogrib):** If I could maybe ask the question a little bit differently rather than with respect to monitoring. Does De Beers plan on testing its model validity in any sense? If that is actually through future monitoring, that is maybe where we can discuss it. If it isn't monitoring, what is it? How would they actually propose to examine these questions that we are asking about the uncertainty?

**MR. HAL MILLS:** Robin or John, do you have a response?

**MR. JOHN MCCONNELL (De Beers Canada):** Yes, I think probably Steve's rephrasing of the question is more appropriate because I think we can get into the details of monitoring at a later date, but I think it would certainly be our intention that, as the mine is further developed and we continue exploring the area, we will continue to apply the data and revise the model as we move forward.

**MR. JOHN KEEPER (NSMA):** I have a question on the regional groundwater assessment. I would like to know, in the model, if it is postulated that the water moves from Snap Lake towards the North Lake? From the North Lake where does the groundwater go to?

**MR. DON CHORLEY (Golder Associates):** It would go further and continue further north to Camsell Lake or Mackay Lake, which is also at a lower elevation. But remember that most of the groundwater that is passed through the backfill paste will have actually gone into the North Lake and the Northeast Lake, so that water that leaves the Northeast Lake or the North Lake and goes further to the north would be a different chemistry, much more diluted than would be coming into the North Lake or the Northeast Lake. Maybe we should be talking about that during the North Lake session.

**MR. JOHN KEEPER (NSMA):** I think I would just like to put up a little slide if I may just to kind of bring some of the ideas that I have here. Perhaps you can comment on this and see how it relates to the overall project.

**MR. HAL MILLS:** Just to make a comment while we are getting set up with that slide; if we come to a point in the discussion where two or three people or a small group need to get together to deal with something we do have a room downstairs so that could very well, depending on circumstances, be something that we could make use of and we could invite you to go to that room, work things out and come back and give us a report as to whether it is resolvable or not. We will keep that in mind as we work through the next number of days as to whether we need to make use of that or not.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** Is the room on the second floor?

**MR. HAL MILLS:** Yes, it is the room on the second floor; just as you go off the stairs on the second floor you go to the right.

**MR. JOHN KEEPER (NSMA):** Okay I guess I can show this later. The point I want to make is that perhaps the groundwater is not necessarily going into the North or Northeast Lakes. It may be going underneath the lake somewhere else, or may be going in another direction. This is what I would kind of like to show on this picture that I had here.

**MR. HAL MILLS:** Did not one of the earlier slides that you showed us depict exactly that, that water does go out in different directions?

**MR. DON CHORLEY (Golder Associates):** Without the overhead, I don't know. What I think is important here is that we have to bring it back to the impact assessment. There are basically two questions there. One is, could it flow in a different direction? When Lee was giving his presentation we indicated that the structure going in a east-west direction it was not seen as a preferred pathway, so all our evidence so far is that it operates somewhat as a mass of bulk hydraulic conductivity.

On the second point going further than the North Lakes, we are confident in the conservative values that were used in the impact assessment (that is if the water was to go to the North and Northeast Lakes).

**MR. JOHN KEEPER (NSMA):** What I find interesting is that you have permafrost of about 200 metres there. The distance between Snap Lake and the North Lake is about 1.5 kilometers if I remember correctly, so I find it interesting that the water will go virtually down for 200 metres, horizontally for 1.5 metres, then virtually up for another 200 metres there. If we deem 1.5 kilometers, it seems more reasonable to me that the water would just go underneath the lake, not having to go up to the lake and then go down again. So that is why I was asking, where is the water going when it leaves the North Lake there. You had one slide which was very schematic, and perhaps you can just show it back there from your presentation.

**MR. DON CHORLEY (Golder Associates):** We are going to be dealing with a lot of this in the North Lakes session. I just wonder, specifically about that, if we could maybe defer it until tomorrow afternoon.

**MR. JOHN KEEPER (NSMA):** If you wish, we can talk about this later. I don't have any problem with that. I think my view is broader than just the North Lakes. The North Lakes have been kind of singled out as being receptive for the groundwater there, but we can do that later, no problem.

**MR. HAL MILLS:** Robin is doing a search -- not search and destroy I guess -- but I think we are agreed that we could perhaps bring that up tomorrow afternoon. Anything else related to the conceptual model?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Part of the reason why Don has described the groundwater flow as essentially radial -- the key of why the discussion is around the North Lakes is because of the flow of water contacting paste backfill into the mine and flowing to that area. That is why the focus from an impact assessment point of view is on those lakes. I think that we are getting tripped up here and that, to some extent, it is one of these areas where we are trying to deal with the areas perhaps a little ahead; I think we can address your questions relating to the North Lakes tomorrow and that there is ample time to do that. I think if there are further questions overall on groundwater flow then I think we need some clarity there in what those definitive questions are.

**MR. STEVE WILBUR (Dogrib):** I have additional groundwater questions, which relate to groundwater as a whole. If we can handle all the groundwater water questions in the North Lake that is fine, but I have more groundwater particular questions -- follow-up on some of these things that have been raised.

**MR. HAL MILLS:** I think the intent is that if they do relate to the North Lakes tomorrow afternoon would be a better place to deal with them, but if they are general here please bring them up.

**MR. STEVE WILBUR (Dogrib):** I have questions relating specifically to the presentations that were given today, so I could phrase them in that way. With respect to the calibration, Lee you mentioned that you calibrated to mine inflows. I guess I just want to know a little more about how the model was calibrated with respect to mine inflows, and also how you used the surface water levels as part of your calibration.

**MR. LEE ATKINSON (Hydrologic Consultants):** Two questions there, I think I will answer the second one first. The lake levels are almost like a boundary condition in this model. They establish the regional water levels of the water table I might add because there is a vertical gradient here. They establish the water table throughout the entire model domain. Then in the areas that were excavated in 1999, 2000 and 2001 we had recorded inflows to which we calibrated the model by simulating the actual advance of those initial drifts. I had mentioned

earlier there was a leachens factor, that is a very important part of the calibration, and we actually used those flows to calibrate the model specifically to that area.

**MR. STEVE WILBUR (Dogrib):** So is that the only area that you could actually calibrate the model?

**MR. LEE ATKINSON (Hydrologic Consultants):** Calibration is a process -- there are really two types of calibration. One is the water levels before you put in any -- and I will use the general words "hydraulic stress". A mine is a hydraulic stress, you are going to be pulling water out of it. Testing is a hydraulic stress, so is drifting. What we did, using the lake levels we wanted to make sure that we had a good regional water table depicted. If we did not have the right properties in that model we would have had very strange water table configurations between the various lakes. What we wanted to get was a nice flat one. We had to make sure that we were -- sometimes in models if you don't them right you have a water level 50 metres above the ground surface. That is kind of a reality check on a system. I am not being facetious about that, this is part of the process. You want to get the water table to the best representation of how you understand it. In this situation the lakes are -- these are mirrors of the water table, the lakes themselves.

The other calibration then would be to changes in water levels that would occur because of something you have done. One gentleman already asked that question. The very small changes that were caused by our testing program did not cause any water level changes in the large system. That is something we haven't been able to do yet because the stresses haven't been large enough.

The calibration that was done to the inflows is in the area to which we have present data. Again the initial drifting from 1999, 2000 and 2001. So that is the status of where we are in calibration.

**MR. STEVE WILBUR (Dogrib):** I notice that the water levels where you established the boundary conditions vary between maybe five and 12 metres from Snap Lake in their actual elevation. I was wondering how well we know those elevations and how much those elevations vary over time, so we have an idea of how much those gradients between Snap Lake and these other locations vary.

**MR. DON CHORLEY (Golder Associates):** The water level elevations in Snap Lake itself are well known. We actually did that water level survey through the winter months. The elevations in the North and Northeast Lakes are less well known, but they are based on the topographic map. They were surveyed this year. John tells me they were surveyed this year. What we found was that when talking to the people on the surveys was that relative elevations in the lakes are accurate over a local area, so what we did there was, knowing the Snap Lake average elevation and looking at the differences on the topographic map -- the topo map doesn't have Snap Lake at that elevation. It has a slightly different

elevation (I forget what it is); but we changed them to have the same relative difference to Snap Lake as in the topo map using Snap Lake as actual surveyed values. John tells me that the North and Northeast Lakes have been surveyed since that time; has confirmed those elevations.

**MR. STEVE WILBUR (Dogrib):** So the Lake Capeau, Reference Lake and Camsell Lake and all the other lakes in the area haven't been surveyed, we are just going on map data?

**MR. DON CHORLEY (Golder Associates):** The further ones out, yes will be on map data.

**MR. STEVE WILBUR (Dogrib):** And the Reliance - I guess the model assumes that this is the boundary condition that the model has been established. I guess my question is, we haven't surveyed the data and we don't know how much those lakes actually vary in elevation, so we don't know precisely how good these gradients are between the lakes and how well the boundary conditions for the model are really well established.

**MR. DON CHORLEY (Golder Associates):** The water levels in the lakes aren't going to vary that much. It is pretty flat topography there, flat sloping topography towards, so the slope of the land is generally in that direction, the regional slope. We would not expect the lakes there to vary by five metres, for example. I am sure we have data to confirm that, but I am not the one to talk to about that. As you say, the Northeast Lake is some 13 metres lower than Snap Lake, and when you have raises in the water level, raises in the lake, you have the water level rises in all the lakes because it is responding to the melting of the ice in the spring. It might not be all relative but the differences shouldn't be that big. I think it is 13 metres or something like that between Snap Lake and the Northeast Lake.

**MR. STEVE WILBUR (Dogrib):** Thirteen metres is a very small difference, that is correct. If you have a change at five metres, that is going to change your gradient significantly over that long distance. I would suggest that if I'd altered every one of those lakes by five metres in elevation, or any particular time, that these gradients could change significantly and change the model boundary conditions. The assumption you are saying is that they are all going to change equally at the same time, and I guess what you are saying is that they will all change equally through the season through 20 and 40 years.

**MR. LEE ATKINSON (Hydrologic Consultants):** Let me add one concept to that argument, and that goes back to what we discussed earlier on the uncertainty analysis and sensitivity analysis. The changes, you are right, let's assume they are five metres. That gradient you talked about between lakes would be five metres over 1500 metres. The actual changes in the gradients would be very small. Don mentioned that is the driving force.

But what we have also taken into consideration -- there is a fundamental law in groundwater called Darcy's Law and it says that the amount of water that moves through something is directly proportional to its hydraulic conductivity (which I have defined) times the gradient times the area. What we have done in all of our model sensitivity analyses is we have changed one the primary variables (the hydraulic conductivity) by an order of magnitude and shown the sensitivities to that. So these differences in elevations would have a much secondary impact on the predictions of the direction and rate of groundwater flow.

The other thing I might add too is the gradient is the driving force. Water does not necessarily flow in the direction of the gradient because of this overall fabric that is put into it by the fractures. It will move in that general direction, but water does not necessarily move directly down the gradient described by the heads because it has this preferred direction of flow. I don't know if that helps any or not, but I am trying to show that there are other variables other than just water levels that determine flow.

**MR. HAL MILLS:** I am getting a little cognizant of quite a bit of time being spent on levels and gradients here, and we do have some other topics. Anything else crucial there, Steve, that you need to bring up at this point?

**MR. STEVE WILBUR (Dogrib):** I could continue my conversations with Lee and Don another time if that is necessary.

**MR. HAL MILLS:** The next topic I had was the regional groundwater water inflows.

**MR. ROB DICKEN (Gartner Lee):** Lee, you explained the uncertainty analysis you did and the sensitivity of various factors, and just now talked about how things like the leachens factor, the leakage from above, and certain assumptions between vertical hydraulic conductivity and horizontal hydraulic conductivity can vary over orders of magnitude and, therefore, are very sensitive parameters. I think you said there were seven parameters that can vary over order of magnitude. What I didn't understand in your sensitivity analysis, and maybe you can clarify that for me, is you went from that -- if you took the product of all that uncertainty obviously you would have millions and millions in terms of your range which is not very accurate, but how do you go from clarifying that uncertainty to just saying one or two standards of deviation?

Of course this is very important in terms of inflows to the mine in that while you have good data because of the advanced exploration, you have really good field data around the mine, what if conditions, as you go deeper you hit something that is orders of magnitude more permeable? Can you just sort of comment on that aspect. The reason I am concerned of course is that that affects how much water you have to treat and how much impact on Snap Lake, and that is probably the biggest issue that I see.

**MR. LEE ATKINSON (Hydrologic Consultants):** Could we try to break that into a couple of specific questions and have a dialogue where you ask and I will try to answer that individual question?

**MR. ROB DICKEN (Gartner Lee):** Okay. The first one would be, how did you go from talking about the ranges of all the sensitive parameters to that sort of leap to saying okay we will take one or two standards of deviation based on our average of the most likely?

**MR. LEE ATKINSON (Hydrologic Consultants):** Okay. The first part of that answer is in the appendix that I referred to where we have all of that data. We have actually done the statistics based on the shut-in flow tests that we did underground. In some cases we did not have the factor of 10. The range was much tighter than that. So what we did at this stage of the model, having this many variables, we made the assumption (which is a fairly standard assumption in engineering) -- uncertainty analysis is not just a hydrologic consideration, it is used in many forms of engineering -- but we have made the assumption based on the data that we have seen and then the fact that we expect all of these parameters to have some range. Some will be significantly less than that, plus or minus a factor of 10. We use that as a -- that was an assumption at this stage that that covered the ranges of the values.

The one thing that I didn't mention is we have also simulated. We measured the values in the underground in the shut-in tests, then what we did was we assumed during mining -- because of the subsidence that occurs -- this rock will actually, as they pull the kimberlite, this rock will under gravity move downward. We have assumed that its hydraulic conductivity would be enhanced by a factor of 10. I don't know if this is the appropriate place to go into this level of detail, but in subsidence you have a beam action. It is a mechanical concept. Underneath the neutral axis, if a material bends, underneath it goes into extension and fractures would actually open and we have assumed that they would increase by a factor of 10.

Conversely, in the upper part, things go into compression and they get tighter. We purposely did not include that conservative factor, so we took I guess you could call it a one-sided uncertainty and assumed the worst case condition underneath, or a bad condition underneath, and not conversely a condition above that would actually reduce the inflows. So in addition to just the assumptions of what that range is we have some build-in. In my professional opinion we have some built in conservatism.

**MR. ROB DICKEN (Gartner Lee):** Could you comment on the leachens factor and how you came up with that factor into the drifts? As I understand that, that is a factor that is applied around these drains in the model that represent the drifts and the panels that are being mined. If you didn't put that factor in, based on your discussion before basically the drains would pretty well drain everything? Is that fair? What is the basis? How do you come up with those terms?

**MR. LEE ATKINSON (Hydrologic Consultants):** I mentioned earlier that there is a fundamental groundwater law called Darcy's Law that says how much flow will occur as a function of hydraulic conductivity area and gradient. That is a universal law. It works in broad flow fields, what happens in flow to points of convergence, and by that I would define things literally like wells and underground openings; there is a lot more resistance to flow locally. So what you do -- maybe the best analogy it's like having a big pipeline -- you understand the physical characteristics of the pipeline but empirically you know there is less water coming out the end, and how would you explain that? Well there has to be some valving or something. That is what occurs in nature when you have convergent flow to a relatively discreet amount of opening. If you put this in the regional context of this huge regional flow field and think what these drifts and mine panels are going to be, they are very small.

So that leachens factor is numerically representing this valving system and it is something. Does it have a physical basis? Yes it is related to the hydraulic conductivity of the rock. It has geometric factors in it, but it also has non-Darcyian properties because of this convergence to flow, so the best values are those that are derived by model calibration. That is why we made a specific effort to calibrate it to the available data we have at this point right now.

In future in any additional exploration or pre-development that is done, that is something we are going to very carefully focus on. We will monitor the inflows and we will recalibrate the model.

**MR. ROB DICKEN (Gartner Lee):** Can you comment on the sensitivity of the inflows to the lake sediment hydraulic conductivity? Has there been any testing of the lake sediment hydraulic conductivity?

**MR. LEE ATKINSON (Hydrologic Consultants):** Again two questions, I will try to answer them. The model, in the sensitivity analysis we did, I defined the seven variables. The lake, in fact, is -- the lake leachens factor -- and this corresponds to the amount of flow that would come through the organic sediments at the bottom of the lake and get into the bed rock -- the model is most sensitive to that parameter of all seven. No we have not done any direct hydraulic conductivity testing of the lake sediments. That is one that we applied what I consider in that case, the mean value was to use a very typical till type hydraulic conductivity for Canada, and again raise or lower it one order of magnitude.

**MR. HAL MILLS:** Thank you. I would like to move on if we can. The next issue was over the potential for groundwater chemistry to have higher levels than used by De Beers.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** What happened to fracture flow, or was I asleep? It comes second after groundwater.



**MR. ROBIN JOHNSTONE (De Beers Canada):** Hal, I wonder if we might just add a point of clarification to the end of the last comment to Gartner Lee?

**MR. HAL MILLS:** Sure.

**MR. DON CHORLEY (Golder Associates):** There was some testing of lake bed sediments in the program that Lee had forgotten about. We did do a falling head test, or was it a rising head test in that well up here?

**(UNIDENTIFIED MALE SPEAKER):** A rising head test.

**MR. DON CHORLEY (Golder Associates):** A rising head test in a dry point that was put into lake bed sediments, so we had that. We also had some tests of the till on the northwest peninsula, so we had some data on that too. There was some data, although limited.

**MR. HAL MILLS:** Thank you. In response to Alex, when I tried to get things organized by those four bullets, the room asked me to do otherwise and we simply took a list of the different things. We have fracture flow on the list but it is not next. The next item then is over the potential for groundwater chemistry to have higher levels than used by De Beers. Don.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** Thanks, Hal. Ken this morning in his presentation I think gave a very good overview of where the information came from that was used to predict the levels of total dissolved solids and chloride in groundwater emanating from the mine and hence what could potentially be released to Snap Lake. That information primarily relied on information from the earlier exploration program, some regional data from Diavik and then from some other data that was collected in Shield areas elsewhere in Canada.

The North Lake study which was completed more recently seems to provide some additional information that is, I think, relevant to predicting the levels of chloride and total dissolved solids in groundwater. Specifically, and I am reflecting on some of the comments made by Ken Raven of Interra Engineering Limited, who was also on the INAC team. I will try to struggle through this as best I can, but when you ask me detailed questions I will throw up my hands and say, I don't know.

Essentially what the results of the North Lake study show, and it is consistent with what we have seen in other areas, is that salinity does tend to increase in groundwater in the granite with depth, and that chloride levels at depth averaged 500 to 600 milligrams per litre. Certainly some of the measurements were lower than that, but on average the measurements seemed relatively high. This information, because it is site-specific and possibly the best data available, in our view should have been used -- and of course it wasn't available when the assessment was done, Robin, I understand that -- or should now potentially be

used to evaluate how reasonable the early predictions were that were used in the EA about the levels of chloride in TDS were in groundwater.

Of course the reason we are focusing on this issue right now is that it brings to bear what the predictions will be in terms of releases of waste water from the facility into Snap Lake and associated concentrations of chloride and total dissolved solids. Our question is, to what extent have you already considered this additional data and used it to evaluate how reasonable the predictions that were used in the EA were?

**MR. KEN DEVOS (Golder Associates):** The data that was collected for the north lakes program, you are correct that data was not available when we did the environmental assessment. We did go back and consider the data and the range of data that was collected in those bore holes relative to what was used in the environmental assessment. The data falls within the range that was observed for the granites in the underground bore holes. Considering that we used the average granite groundwater concentrations, and that the values were assessed at the plus one standard deviation level for chloride, we feel very confident that the data that was used in the assessment for the underground inflows is appropriate.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** If Ken was here, I am only going to guess what he would say, what I think he would say in response is that when he looked at the data what he observed was that the data from the North Lakes study seemed to show that yes the levels of chloride and TDS were within the range that we saw in the regional and broader data sets, but they tended to be in the upper end of that range, and as a result of that his evaluation would be that perhaps the plus one standard deviation does not really adequately reflect the range of possibilities that we might see in terms of the concentrations of those substances in groundwater.

I know this is challenging, on the fly trying to figure out, what exactly the levels were again in the North Lakes study and how they compare to the levels that were used in the EA. More specifically, I think what Ken is looking for right now is to, one review that information but, two, is to then look at higher potential levels of chloride in the groundwater and then re-run the Goldsim model with, for example, the values that he suggested were 600 milligrams per litre of chloride and 900 milligrams per litre of chloride and see what kinds of results those generated in terms of average levels in the lake over time. Also, the indication was that we should probably look at some of the other major ions and other substances like phosphorous that also seemed to be present at higher levels in groundwater from the samples that were collected as part of the North Lakes study, and potentially re-run the Goldsim model to evaluate what the implications of higher than anticipated levels of phosphorous and other things would be on the concentrations in Snap Lake.

**MR. DON CHORLEY (Golder Associates):** I just want to step back a bit, Don. What we found in those wells between Snap Lake and North Lake was that the concentrations of the one well close to Snap Lake was similar to our average range that we were using, and the concentration near the North Lake was higher -- you are correct in that -- but some of the work that Casgrain has done on the TDS and chloride concentrations with depth would suggest that that would be expected, and I will tell you the reason why. It is because that is upward flow at the North Lake, and at Snap Lake it is downwards flow, so what you have is -- not only do you have diffusion transporting the TDS but you also have advection moving the chlorides from deep, right, the deep higher concentration of chlorides. So what he concluded, Casgrain, is that he noticed that in discharge areas concentrations of TDS were generally higher in the regional system than they were in recharge areas.

We feel that the concentrations near Snap Lake are appropriate for the ones that were used in the impact assessment.

**MR. HAL MILLS:** Just as an observation here, we are spending quite a bit of time where people are describing a subject that they are interested in and wondering how it was handled, whether certain information was used and how, and so on. All of which still leaves us asking the question, what is the issue? I don't want to keep beating you over the head on this, but the more you can focus on a particular issue rather than just seeking more information I think it will help the discussions along. The next topic that we had, and neither of the facilitators were able to get it down, but Neil identified one or two things that he wanted brought up, and I am simply going to have to turn it back to Neil to describe more succinctly just what it was. Thank you.

**MR. NEIL HUTCHINSON (Gartner Lee):** A polite way of saying, what did I say. My question relates to the fact that groundwater chemistry changes with depth and that the groundwater model for inflow into the mine uses average values for things like chloride and phosphorous. I guess I need an answer to the question, as the mine proceeds deeper, groundwater will come in at different rates at different depths, and I am willing to be corrected on that. But if you are using a total groundwater flow for the mine, and an average chemistry for the groundwater but the average chemistry changes with depth, do you have an accurate estimate of loadings of chloride or phosphorous into the mine water? Is that clear?

**MR. KEN DEVOS (Golder Associates):** In looking at and deciding to use an average concentration for the mine, we took into account that that water would be coming in from the various levels of the mine workings. In using the granitic information and the average for the granitic information with the different depths, we feel that that will take into account the fact that as the mine water progresses, as water flows into the mine, we get more of the lake water and changes in concentration with the different depths in the mine. We feel that we have

accounted for that in using those values. We are confident that we have accounted for that.

I think there was a second part to your question, if you could just go over that again I would appreciate it.

**MR. NEIL HUTCHINSON (Gartner Lee):** I don't think there was a second part of my question. My question was, average chemistry, I appreciate that that was used. Is the groundwater inflow -- are there any depths where groundwater inflow is greater than other depths in the working mine as you go deeper?

**MR. DON CHORLEY (Golder Associates):** No there are no levels that are higher, but I want to clarify one thing too that Ken hasn't touched on. We also account for upwelling of deep saline water. We also have a component of water that is coming up that is more saline during mining, so that was also accounted for. We did a variable density model for that, that is in the EA, and we indicated that there was how much of an increase, Ken? I forget right now, but there was an increase because you are getting deeper and higher TDS water over time. That is accounted for also in our evaluation.

**MR. HAL MILLS:** The next then...

**MR. STEVE WILBUR (Dogrib):** Can I have a follow-up question?

**MR. HAL MILLS:** Sure, Steve.

**MR. STEVE WILBUR (Dogrib):** This is just for clarification, I guess, what you have just said is that the mine inflow quantities and the mine inflow chemistry were not varied through time?

**MR. KEN DEVOS (Golder Associates):** For the general water chemistry from the mine with respect to the connate water, we used the average values. With respect to the lake water infiltrating into the mine, the lake water chemistry was assigned a varying concentration in time depending on what was happening with respect to the discharge to the lake. That is for all parameters with the exception of chloride. With respect to chloride, we varied the concentration of chloride with time depending on the expected depth of mining, pumping and upwelling of water into the mine.

**MR. STEVE WILBUR (Dogrib):** So chloride was used as a surrogate for the other parameters in a sense, or did you just expect chloride was the only one that would actually change with depth?

**MR. KEN DEVOS (Golder Associates):** In reviewing the literature, it became clear to us that the parameter that would be affected by depth would be chloride. We didn't see a lot of change in the other parameters with respect to depth.

**MR. STEVE WILBUR (Dogrib):** The plot you had up there was TDS versus depth, not chloride versus depth. Is that correct?

**MR. KEN DEVOS (Golder Associates):** Yes, that is correct.

**MR. STEVE WILBUR (Dogrib):** So what you are saying is that that variation in TDS with depth is all just with chloride and none of the other parameters?

**MR. KEN DEVOS (Golder Associates):** What I said in the presentation is that chloride is the dominant parameter on that TDS plot.

**MR. HAL MILLS:** Okay. Don.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** Hal, just to be clear and I am looking at the procedures and I see that one of the goals of these discussions is to determine whether or not an issue is still an issue, and I haven't on any of our issues thus far heard any discussion from the originator of the issue about whether or not that issue has been satisfactorily addresses or if it still remains an issue; but I do want to be clear about the issue related to the concentrations of chloride and TDS in groundwater. We still don't feel that that issue has been resolved, so it is still on the table for Indian and Northern Affairs Canada.

**MR. HAL MILLS:** Okay, thank you. The next is NRCanada's concern about how fracture flows are handled.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** I am concerned about how fractures and other large features were represented in the groundwater flow model because of their potential for being preferential flow paths for solutes. I have looked at the discharge logs from the underground exploration program and they certainly reveal discreet features with high inflows to the wells, to the underground holes. That would certainly suggest that there are significant features that maybe should be modeled explicitly. I am thinking of the Snap Lake fault which had inflows here. This is for underground bore hole 83 with inflows of approximately 60 gallons per minute.

Another feature that I think might be important in the flow model is the contact between the meta volcanics and the granite. Again that contact, there seems to be a high flow associated with it in the same ball park of 60 gallons per minute. Can you comment? Is there any intention on incorporating these features into the flow model explicitly; namely the Snap and Crackle faults and the contact between the meta volcanics and the granite.

**MR. LEE ATKINSON (Hydrologic Consultants):** Based on how we have already implicitly incorporated the effects of the fractures into the hydraulic conductivity, no at this time there is no intent to explicitly include them. We can, but based on our interpretation of the data that we have seen to date there is no reason. Let me add one other thing about fractures, and I will toss in some things

I have learned in my 20 some years of working in this, when we do these tests underground (these flow and shut-in tests), they sample a certain volume of rock. The volume they sample is a function of how long you run the test. If you run the test for 15 minutes you sample such and such. If you run it for three hours, you sample so much more. None of these tests were run more than a couple of hours. These are typical. Actually we ran these longer than I typically do on a lot of projects.

What happens is that you end up biasing it actually slightly to the high end, the reason being -- I drew that schematic diagram of a fractured rock mass. Fractures don't continue forever. They terminate, they can be inter-connected with other fractures, but all in all fractures are not continuous. Whereas in a short test of short duration time and a very specific bore hole, you are going to have a tendency to see in early time that they do continue. I can tell you this based on my experience and using the same technology, I tend to over-predict the amount of flow to mines -- clients will tell you that -- pits, underground mines, and why? It is because I am using, I am honouring the field data I have and what happens over long periods of time is the larger scale properties take over, which simply means that some of these fractures we are seeing in small test intervals aren't extensive.

Right now, based on the field data that we do have, we have no plans on explicitly representing fractures. I will tell you this. In one of the early versions of the model we did have the Snap and Crackle fault in it. If you look at the grid of the model you can see how it was accounted for, but in the process we did not apply any specifically enhanced hydraulic properties to it based on the data.

Now the contact zone, if you remember the diagram I had where we showed various drill holes, we have gone through it in the drill hole, we have actually mined through it. In the 2001 AEP, certainly in the ramp in the 2001 AEP there is no evidence of a significant amount of water associated with it.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** But there is in some of the bore holes.

**MR. LEE ATKINSON (Hydrologic Consultants):** We have taken that into account in effective hydraulic conductivity models...

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** You mentioned that the tests were only representative of smaller features in a fracture zone, and yet you can still correlate the Snap fracture over large distances. Do you have any other conductivity measurements from bore holes that intersect the Snap fault that would support your assumption that it is not a continuous high conductivity feature?

**MR. LEE ATKINSON (Hydrologic Consultants):** I have to apologize, could you repeat the last part of that question.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** In defending your choice not to model the Snap fault explicitly you mentioned that hydraulic tests only have a small volume of investigation that is not representative of large scale features. Is that correct? Am I paraphrasing you correctly? My understanding is that the Snap fault can be correlated over large distances, and presumably that the high conductivities are fairly continuous.

**MR. LEE ATKINSON (Hydrologic Consultants):** One thing I think we have to understand, number one is a fault does not mean large hydraulic conductivity necessarily.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** I can appreciate that.

**MR. LEE ATKINSON (Hydrologic Consultants):** If I could just elaborate a little bit though because very often -- one of the reasons we had to stop the one drill hole was because it got into a clay gouge and the drillers actually had problems completing the hole; it was in the structure. Faults have a tendency to be both water bearing and just the opposite, barriers to groundwater flow. Very often a fault will be both in different areas, so I don't think to say that it is correlateable -- I think you are speaking in a geologic sense that it's a line on a map but we have no reason to believe that it's a continuous hydraulic feature.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** But I also asked you if you had any other hydraulic conductivity measurements from the same feature, from the same fault, that would support the fact that sometimes the fault is water bearing or flow, and sometimes it's filled with gouge and relatively tight.

**MR. LEE ATKINSON (Hydrologic Consultants):** We have the two drill holes that I pointed out. One encountered, I think you were correct, 60 gallons per minute. The other one didn't. We certainly hit magnitudes of that flow of 60. In other holes there was -- in my professional opinion there was nothing out of the ordinary or remarkable about the Snap fault in the two intersections we had with it.

**MR. HAL MILLS:** Alex, if there is more here and I sense that there may be, could I invite the two of you to have a discussion...

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** Sure, okay.

**MR. HAL MILLS:** ... and report back to us later as to whether there is an issue that is unresolved?

**MR. STEVE WILBUR (Dogrib):** I have a couple of questions and maybe other people might also have some besides just Alex, I am not sure, so I would like to continue the discussion.

**MR. HAL MILLS:** Okay, fine, Steve, I will also point out that we have less than 20 minutes left before lunch for the other issues that we haven't gotten to yet as well. I didn't mean to scare you off. The next issue is the testing results of the paste backfill.

**MR. DAVE BALINT (Fisheries & Oceans):** The groundwater that was predicted to come in contact with the paste backfill had, in the EA, high levels of chromium and pH. If you can briefly describe the testing that was done to derive those values and then explain how in the tests that you have just conducted what would account for the difference in those elevations.

**MR. KEN DEVOS (Golder Associates):** I think it was described in the presentation the difference in tests. To go back and think about that again, the tests that were conducted for the environmental assessment were conducted under very conservative conditions, so what we did was we took a relatively unconsolidated, or uncured, cement sample and we rinsed that with distilled water and looked at the leachate that came off that. That was done in the short term before the cement had a chance to cure like it would in a mine setting. For these repetitive leach tests, or the more recent tests, we knew that the data that we were using in the environmental assessment is conservative, and that is why we used it in the environmental assessment because we knew it was conservative.

For these tests we are taking a little bit of a longer term view on the tests. We are doing repetitive leach tests similar to what would happen when the paste backfill sits in the mine and you have water washing over the paste backfill. We also allowed the samples to cure for a longer period of time so you get hydration of the cement, changes in the pH and changes in the form of the chromium due to those changes in the pH. We expect that the data that we are getting now from the kinetic test work is much more representative of what we will actually see in the mine.

**MR. DAVE BALINT (Fisheries & Oceans):** I think in your presentation this morning you stated that chromium dropped, I think the level was 300 and then down to 38. Is that as a result of the change in pH or are there any other factors?

**MR. KEN DEVOS (Golder Associates):** That would primarily be due to a change in the pH. The pH change would result in chromium changing from a more mobile form of chromium (chromium 6) to a solid phase chromium 3. So what happens is that it changes into a chromium hydroxide form, and that chromium hydroxide form is in the solid phase and that will precipitate out into the mass and it will not be available for leaching or migration. That is what we expect is happening in the longer term tests.

**MR. DAVE BALINT (Fisheries & Oceans):** So questions related to contact with that groundwater and mine inflows, water coming when it contacts the paste backfill, could you perhaps describe the diffusion rates. Paste backfill is projected



to be more permeable than surrounding bed rock. Could you describe how that would go through the paste backfill when the mine is in operation.

**MR. KEN DEVOS (Golder Associates):** With respect to diffusion rates, in the environmental assessment it was assumed that the water at closure that came into contact with that paste backfill would have the chemistry of the paste backfill. The diffusion rates were not accounted for in the environmental assessment. Conservatively we assumed that that water would be in equilibrium with the paste backfill values, so the diffusion rates didn't come into play in the environmental assessment. We conservatively assumed that the water had the chemistry of the backfill material. Did that answer your question?

**MR. DAVE BALINT (Fisheries & Oceans):** I think my question is, will water or how it go through as it comes into the mine when it is in operation -- what I want to get to is whether there will be substantial contact with that backfill that it will influence groundwater coming out of the mine to be treated.

**MR. HAL MILLS:** I think I would like to point out that the paste fill operational issue -- we have a major block of time on the agenda for December 3<sup>rd</sup> and it seems to me that you are getting into the operational thing, so it would be more appropriately addressed there.

**MR. DAVE BALINT (Fisheries & Oceans):** I believe that that would be a chemistry issue because it influences the groundwater flow through the mine and how it is treated.

**MR. KEN DEVOS (Golder Associates):** With respect to the chemistry of the paste during operations, we have accounted for paste water coming off the backfill material in the operational phase. We have accounted for about 14 percent of the original water in the backfill entering the mine system during operations. We feel that is very conservative. In the testing that we are doing now we saw very little water coming off that paste, much less than 14 percent. In the second instance. The reason for doing the ongoing testing that we have now is that we will have a better grasp and a better understanding of those issues, but we feel very confident right now that with the water that we have assigned to the backfill material, that we have accounted for that possible uncertainties related to the diffusion. The diffusion is expected to be very low relative to what was included in the environmental assessment.

**MR. DAVE BALINT (Fisheries & Oceans):** Just a follow-up with your testing, you are continuing these tests for a length of time. Can that information be provided to parties for review? This is still ongoing work as part of the environmental assessment. Would we have an opportunity to review that information?

**MR. KEN DEVOS (Golder Associates):** With respect to the environmental assessment we feel that the data that we are using in that assessment is very

conservative. We don't feel that this data represents new data that would affect the environmental assessment. With respect to whether that data will be made available, that is a question for De Beers to answer.

**MR. JOHN MCCONNELL (De Beers Canada):** I think it comes back to a similar question that Steve had earlier related to ongoing test work to prove or refine the water modeling. I think that becomes a licensing issue. When we get to the Land and Water Board, they are going to put a number of conditions on our water licence, of which further test work on paste backfill could be one. They could ask for annual reports on such things. Certainly any data we collect in the future we are quite happy to share with people, but there could be specific examples of studies that the Land and Water Board requests as part of future licensing.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think in this case that we will make the data available if it comes. The critical point around the data is that -- and I hate to paraphrase a geo-chemist, very dangerous ground -- the critical point is that it is not like we would anticipate the concentrations to increase over time. The conservatism is incorporated in the results from the first few weeks of tests, that is the worst case scenario and it is going to trickle over there. We are happy to send that data on.

**MR. HAL MILLS:** Julie.

**MS. JULIE DOLE (Fisheries & Oceans):** I just want to ask one more question on this topic here. You had presented a table on one of the last presentations that had a column of data that was essentially the predicted values in the environmental assessment report, and a column of values from your kinetic tests. The column of data from the kinetic test was presented up there, I thought, as sort of evidence of how conservative the values presented in the EA report really were. I thought I heard that the kinetic tests had been ongoing for nine weeks now, and that you had currently between three and five weeks of data back that was presented. My question is two-fold. One is, that column of data that you presented as the kinetic test results, are those week five results? Are those average results over the five week period, or are they minimum results encountered in the five week period?

The reason I am asking that is, first of all because you presented it as evidence for the conservative nature of your predictions. The other thing is that I recall an issue coming up with the Diavik review -- and I don't remember the particulars exactly but I do recall something about the results of kinetic test being presented and several weeks into the test there was an increase in parameters. I don't think it was explained very well why there was an increase several weeks into the kinetic tests, and that it started to decline at some point after that. I am just wondering where in the kinetic test did you take the value, and has there been any unexplained increase?

**MR. KEN DEVOS (Golder Associates):** The data that was presented there, as indicated in the column, was the latest data. It was either week three data or week five data, whichever analysis we had the latest data for. With respect to the potential for this to increase in time as was observed in other locations, this is quite different than the kinetic test data that was completed either for Diavik or for several of the other mines. The main difference is not in the way that the test is performed. The main difference is in the materials that are in the test. When you deal with a material that has sulphide content in it such as acid rock drainage, then the chemical reactions for the sulphide could cause an increase in chemistry concentrations over time.

In this case there is minimal sulphide in either the rock types -- we have some minor sulphide in one of the rock types. When that is blended with the kimberlite we have essentially no sulphides in there, or very very low concentrations of sulphides, so we don't expect that those reactions are going to take place. I will talk about ARD issues next week in the geo-technical sessions, so the only issues with respect to these -- not issues, but the only changes in chemistry that we expect with these cells result from leaching of the materials and hydration of the cement. That is why we don't expect those concentrations to increase. We are very confident that the early time data is the most conservative data. What we saw with the kinetic test is that the early time data there was, in fact, a concentration for lower than the short term leach tests that were used in the environmental assessment. That is why we are very confident that the environmental assessment data is conservative.

**MR. HAL MILLS:** Thank you. The next topic in my list is very closely related to this one, and maybe you have already been into it to some extent, and that is groundwater contamination from paste backfill.

**MR. STEVE WILBUR (Dogrib):** I just have one short comment on that last answer by Ken. Can I do that one?

-- Laughter.

Ken, on that graph that Julie mentioned you had six parameters I believe, pH, aluminum, copper, chromium, molybdenum and ammonia. Not all the values actually decreased, one of them slightly increased and I think that was aluminum by a little bit. I was wondering how you felt that was going to change over the long term.

**MR. KEN DEVOS (Golder Associates):** That value is essentially -- it was a .01 milligram litre change that was observed. I don't expect that we would see a lot of -- I would be speculating right now, Steve, if I was to give my opinion on that, but I feel that those values are reasonable, the ones that were given.

**MR. HAL MILLS:** Is there something related to groundwater contamination that you still want to raise as an issue? That is groundwater contamination from the

paste backfill. Okay, there is a final topic related to the calibration to mine inflows. I am not quite sure what that issue was or who raised it.

**MR. ROB DICKEN (Gartner Lee):** I think we have already talked about that. That was my discussion of leachens and calibration, etc. I think that one has been dealt with.

**MR. HAL MILLS:** Okay, as Don correctly pointed out we haven't gone very far in terms of documenting agreement on issues, or which issues are unresolved. When we had the discussion on procedures yesterday we weren't sure that we would get to that very well. I think Don did something good, which I am going to encourage you to think about and see whether we shouldn't follow that. If there is something that you feel is important enough that is unresolved that you want recorded here the mention it as Don did, and if you would provide Lisa with the precise wording of what you feel is unresolved. Then I think not only will the room be aware that you feel something is unresolved, but you can be fairly assured then that Lisa will have the precise wording of what you feel is unresolved to put into the summary report. Is that generally agreeable? John.

**MR. JOHN MCCONNELL (De Beers Canada):** I think I sense that there has not been very many things concluded here this morning, and I think a lot of it is the time constraint. I think many people have had questions they wanted to dialogue back and forth on some pretty specific scientific issues that perhaps two-thirds of the people here have no interest in at all that kind of suggests that maybe the hydro-geologists and hydro-geochemists get together outside of this meeting. De Beers and many of the interveners have spent a lot of money bringing in consultants to Yellowknife for this session. I think it is quite an opportunity for them to have some one-on-one dialogue. My only suggestion would be that if they get together, they make some notes and they bring it back to the general forum at a future time so it does get entered into the minutes of the session that perhaps some consensus was arrived at.

**MR. HAL MILLS:** I think that is an excellent suggestion, and back to the mention that we did make earlier. We do have a room downstairs. If you go down to the second floor, just as you get off the stairs at the right-hand side, there is quite a nice room there where small groups like that could get together to discuss specific things.

**MR. JOHN MCCONNELL (De Beers Canada):** I think there is even limited time for that during the day because I think the session this afternoon all the same consultants need to be at to be commenting on. We would be quite happy to make our offices available in the evening for such a discussion as well, if that seems appropriate to people.

**MR. HAL MILLS:** Thank you

**MR. JOHN MCCONNELL (De Beers Canada):** The Black Knight is available too. I will buy the first round.

-- Laughter.

**MR. HAL MILLS:** Okay, John, I heard that. It is lunch time.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** Excuse me, can I comment?

**MR. HAL MILLS:** Sure.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** Listening to this morning's scenario I do get the sense that things were not resolved. I don't mind the two people going downstairs if they want to, or outside if they want to, but I don't want to wait until the last day to get issues resolved and sorted out. I wouldn't mind hearing how they resolved the issues by the end of each day because it sounds like people are coming and going, experts coming and leaving. A point well taken, maybe I don't understand a lot of what is being said, but I am learning. I don't mind listening to experts explaining how they have come to where they agree to agree. We are interested in the water flow on the land, the groundwater flows. We are very interested in how the water moves. I am with Steve, trying to find out exactly how that works. That is why I don't want to hear somebody say just wait until we get to the Land and Water Board when we come to talk about the water licence. I don't want to wait until then either. I want it resolved this week or next week. Thank you.

**MR. MIKE BELL:** We are going to have a little conversation up here right now after lunch and we will come back and perhaps ask you to do a brief review, if it is alright, of this morning's situation. I think there is a way of resolving and getting the information that is basically being requested. When we come back, if we could take 10 or 15 minutes to just review the process and come up with some specific suggestions on what we might do. Okay, would that be alright, because I sense that everyone is concerned about what is resolved and what is not resolved, so we will probably make some specific recommendations to you. We will see you at 1:30 p.m.

**MR. HAL MILLS:** Okay, and please do your best to be here to get started at 1:30 p.m. Thank you.

--- Break

**MR. HAL MILLS:** Okay, thank you. My name is Hal Mills. Not surprisingly, or at least not completely surprisingly, once we got into the discussion after coffee break this morning we had a few difficulties in working through things as the organizers of this, or the facilitators had originally envisioned. That was reflected in part by comments such as from Rachel. I want to respond to that, and Mike is going to lead the discussion where we will go over some of the process and procedures things that we are thinking of changing.

**MR. MIKE BELL:** Good afternoon. I am Mike Bell. Normally at this point in a discussion I would turn to people and say, how did you think the morning went? But I'm afraid that might become a very involved conversation. What I would like to do first is share a couple of observations about the morning, make some specific suggestions and then see if we can deal with what I am suggesting. This is going to result in a little change in the schedule because it will take 15 or 20 minutes to do this -- maybe a little longer, I hope not -- but it is better to do it now than to do it later on. I am going to give you my observations on this morning.

I thought a lot of very good and very useful information was exchanged. I don't think we came to consensus on very much, and I am now at a point where we are re-examining the nature of consensus. I think what makes an issue an issue is whether or not the person who has raised a concern thinks it is an issue. Ultimately, unless there is satisfaction on the part of the individual who raises the issue, it is still an issue.

We started by asking you to try and define the issues and then lead to the discussion. What I am sensing is that many people are not sure if their concern is an issue because they are not sure they have enough information to make that decision up front. So what I sensed this morning, on a technical level, was that people were expressing concerns. Then we had one case at the end where somebody said, "I raise this concern but it is still an issue for me." So I think what is happening and what we should do -- the other point I would like to make was the point that Rachel made at the end that really we haven't allowed enough time for the filtering down and for an observation on whether or not things have been resolved or they haven't been resolved. We need some kind of consolidation at the end of the discussion area.

What I would like to propose is this. After we have the presentations and we move into the identification of the issues, let's take all those things. Instead of trying to break them down into groundwater, fracture flow and uncertainty, let's take that block and the first question we will ask is, does anyone have any concerns about this? That will probably lead to an exchange of information the way we had it this morning. At the end of that period, and perhaps after further discussion, the person who raised the concern in the first place should by that time know whether or not enough information was provided, or whether or not there is an issue here. If the person decides there is an issue, it would be helpful at the end if they simply said, I raised this concern, I have listened to the discussion and I think this is still an issue. So at least we have some way of documenting basically what has happened.

After that they have various alternatives for solving the issue. I thought John McConnell's suggestion that people get together with the consultants was good, but the difficulty is that we need the same consultants for the next session that we need for the first session, so we just can't siphon everybody off to basically do this. It is my understanding that if people have concerns they could consult directly with De Beers to get further information. The next thing that they can do

is put together a technical paper coming out of this session. This would go to the Board and the Board would ultimately decide how the situation would be resolved.

What I would like to suggest is this -- the other thing I have noticed quite frankly is that in most groups what I do is consolidate at the end the issues or concerns. In this situation, quite frankly, I can't even understand some of the issues. What do I know about groundwater as a result of the conversation this morning? Not very much. It would be very helpful to consolidate this process. If the person who raises the initial issue later on -- and I think not just after the person has finished speaking but after more discussion has taken place because there may be people with similar concerns that are going to help clarify things -- if the person who raised a concern could turn around that and say, I raised this concern, I don't have the concern any longer, or I raised this concern, I think this concern is still an issue. That would probably be the type of issue they would put forward in a paper.

It would be extremely helpful, I think, coming out of this process if we could know where we are standing in relation to the discussion. I think that would help De Beers, I think it would help the Board and it would give people a sense of where things are and where people are at.

So what I would like to suggest for the discussions is first somebody says I have a concern, here is my concern. We have a discussion of that. First of all I think we list all the concerns at the beginning because that gives us a sense of how much ground we have to cover in the amount of time that is allowed. Once we get the concerns out we will go back and take them one by one. After we have gone through all of this process we will go back to the person who raised the initial concern and by this time they may have three or four or whatever, and say okay I raised this concern, I think there is still an issue here and I think this is the issue. We will move on the next one and move through the process this way.

I think it will make sure that we have some way of pulling things together and ultimately I think the people particularly, at the technical level that we are dealing with -- the people that really have to determine whether or not for them this is still an issue are the people who have expressed the concerns in the first place. Does that process make sense to people? Garth.

**MR. GARTH WALLBRIDGE (Rae Edzo Metis Nation):** Thanks, Mike. Thank you for attempting to make things clearer. It is a different process than most of these types of things many of us will have been in before. I am not clear though, having just listened to you, if you are making any distinction between an issue and a concern.

**MR. MIKE BELL:** Yes I am. I think a number of people when they start out have a concern. For example, I have a concern about the model that is being used. I may not be absolutely sure that there is an issue here until I ask a lot more

questions and I get basically more of a sense of what was done, how it was used, what the variant points were, all of these types of things. So people oftentimes start with concerns and, depending on the information they get back, it may no longer be a concern after they have had the discussion. However, if they have had the discussion and it is still an issue -- and I think the way of thinking about this is, if it is likely to be one of the things that I would raise with the Board in the technical paper coming after this. That is what helps distinguish it as an issue. I think we go from basically, this is the concern and I think my concern has not been satisfied, so I think there is an issue here.

**MR. GARTH WALLBRIDGE (Rae Edzo Metis Nation):** Thanks, Mike. Thank you for that, but I have to say that I think we are probably going to have some problems with that as you did when you were getting close to your summation four or five minutes ago. You actually said well whoever first raises an issue and then you went on from there. So even in your own mind in the language -- and I am not critical here...

**MR. MIKE BELL:** No, I made a mistake.

**MR. GARTH WALLBRIDGE (Rae Edzo Metis Nation):** We are going to slip back and forth, so I am not certain that we are clear.

**MR. MIKE BELL:** What I should say, at the end of the session, probably to take the time maybe half an hour before 4:30 p.m. of whatever this is, I will ask people to go around and say, okay you raised a concern. Is there an issue in this concern that you wish to express for the record, as far as you are concerned, after all the discussion, is still unresolved? I think we get some consolidation. I think De Beers gets a better indication of where people stand in relation to the things that have been raised, and I think basically the Board gets a better consensus of what is going on. Comments please. Steve.

**MR. STEVE WILBUR (Dogrib):** I guess we spent a lot of time talking about listing out concerns or issues, and I guess for my part and for a lot of people they have already been written out and we have lots of documents about what the issues and concerns are. Perhaps if we just dive right into it rather than -- I know you kind of want to have an idea of things but I guess in my mind it would expedite the process and we could get into the meat of the substance sooner.

**MR. MIKE BELL:** I would like to suggest again, Steve, to be clear about this, the reason we are asking that the concerns be expressed first and we have some kind of a list, is that we have no idea whether or not there are three concerns or 15 concerns that have to be raised within a time period that affects our ability to move through them. If there are only three concerns we can take all the time we need.

**MR. STEVE WILBUR (Dogrib):** I guess the other point that I would add to this is, sure we have got this list that has been compiled but hopefully a lot of these



have been dealt with through the IR process or through other mechanisms. If everything that is on this list is still an issue that needs to be discussed here, then we had better schedule an extra 20 days for the sessions.

**MS. JANET HUTCHISON (NSMA):** It is my understanding that that is the case. That list of issues is the list of issues that people had outstanding coming into this process. They are the ones that weren't resolved through the IR process.

**MR. STEVE WILBUR (Dogrib):** One further comment. A lot of these are overlapping. If you look on one page, the groundwater for example it is not just one issue then the next issue is fracture flow, and then another issue. It is all dealt with within one context, so maybe for your sake it is all groundwater flow and that is the one issue rather than to piece it out into a lot of separate little things. Maybe that helps.

**MR. MIKE BELL:** Any more comments on this? Are people happy with this, because I think we have to start to get to some resolution? I was walking out and somebody said walking down the stairs, "We are never going to get to consensus on some of these things." I was in the back and they didn't know I was there. I think somehow we have to try and find out what is outstanding after all the discussions. There has to be some filtering down or consolidation. I take this -- this is audience participation time right here -- as okay we will try this. Okay, good.

The next thing I have in mind is, would it be possible for the persons who are bringing us concerns this morning to turn around and say, I raised this concern, this is my issue flowing out of it, or it has been resolved? I think we have to consolidate what we did this morning. Is that alright, we will just quickly go through?

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** We raised the concern about the estimates of concentrations of chloride and total dissolved solids in groundwater, particularly deeper groundwater entering the mine. We have some very good discussion about that, but we still have an outstanding issue related to that and what we mean by that, we still feel there is a need to evaluate the potential for higher levels of chloride and TDS to be in groundwater that is eventually having to move through the water treatment plant; and there is a need for further modeling to see what the implications of those higher levels in groundwater would be on the levels that we would predict in Snap Lake.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** This morning I raised concerns about the conceptual groundwater flow model and calibration to head values. I also raised concerns about the treatment of fractures in the numerical flow model. I had additional concerns that I didn't get a chance to voice because of lack of time. NRCan's view is that these issues really haven't completely been addressed at this time.

**MR. DAVE BALINT (Fisheries & Oceans):** I raised a concern with the chemistry of the paste backfill and the influence on groundwater, both during mine operations and afterwards. As a result of the indication today that testing is ongoing it would still remain a concern until that testing can be concluded.

**MR. ROB DICKEN (Gartner Lee):** I raised a concern as well about the uncertainty in the regional groundwater flow directions in the conceptual model. I think there has been some clarification of that. One the things I wondered about was a response to monitoring in terms of improving the calibration of that over time. That was an area that we really didn't get into because it was more of an operational thing. The second concern was with respect to the calculated mine inflows that have been modeled, and again I have received some clarification. I think I understand the issue better than I did, but I think it remains an issue as well in my mind.

**MR. NEIL HUTCHINSON (Gartner Lee):** I raised an issue on variation of quality of chemical constituents of groundwater with depth and whether it was appropriate to average those and make in the EA predictions. I have received some clarification on that. The approach used by De Beers of taking a conservative approach, adding one standard deviation, removes some of my concerns; and I have been pointed to certain points of the EA report where I can go to find some sump water quality which may help me resolve that. So it is still an issue with me, but I can see perhaps a means to resolving it.

**(UNIDENTIFIED MALE SPEAKER):** I didn't raise an issue.

-- Laughter.

**MR. MIKE BELL:** A warm glow comes over the room every time you walk out of it, Steve. Go ahead.

**MR. GARTH WALLBRIDGE (Rae Edzo Metis Nation):** If I might just as we are going past, I didn't raise any concerns this morning. However, since we didn't do introductions this afternoon I would like to introduce, back from the Grey Cup game, my client, the vice-president of the Rae Edzo Metis, North Douglas.

-- Applause

**MR. MIKE BELL:** Did you want to say anything, Steve?

**MR. STEVE WILBUR (Dogrib):** I guess just for clarification I had not been fulfilled on all the questions. I still have some questions. The one issue I do feel in my mind has been resolved is about the testing that has gone on about the pasting and that the chemistry is improving over time. Other than that, I still have lots of questions on the groundwater concepts.

**MR. JOHN KEEPER (NSMA):** I do not specifically raise an issue here but I share some of the issues that other people have brought forward, in particular

the regional groundwater flow. I am not completely satisfied so far with what we have seen, and its relationship with the North Lake. The second issue that I have is in terms of groundwater monitoring and collecting additional data that can support what has been shown so far.

**MR. MIKE BELL:** Okay. Anybody else? Have we covered the ground on that? Thank you.

**MR. HAL MILLS:** Thank you, Mike, I think that will be helpful. Okay then, back to De Beers regarding presentation on the areas of issues to be covered this afternoon. I should point out that we had a little error in the original agenda that you got. It says that they have 15 minutes for this. They were supposed to have 45 minutes, so we will see how long they actually need here. Over to De Beers for the presentation.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Hal. We are going to cover the areas of both water and sewage treatment this afternoon. Our first speaker is going to be Greg Oryall and he is going to set the stage for overall water treatment or materials treatment on the site. Greg is a metallurgist by education. He is vice-president of operations for AMEC's mining and minerals group based in Vancouver. He has been working in the consulting and project management area in mining and the environmental sector for over 20 years. Greg has been working with us on Snap Lake since 1999, and also has other northern experience both in Northern Saskatchewan and in Nunavut at Cominco's Polaris Mine. Over to you, Greg.

**MR. GREG ORYALL (AMEC):** Thank you, John. What I would like to do this afternoon is briefly describe to you the components of the water management system that is being proposed at Snap Lake. After I present an overview of that, Tom Higgs then will talk in more detail about the performance and some of the questions that have been raised about the water treatment plant and about the sewage treatment plant.

This is my picture. Basically the fundamental components of the water management system, excluding for the moment the sewage treatment plant and the sewage system which is quite separate, we have the mine itself which is generating mine water and also provides an opportunity for some temporary water storage within the mine. The mine water is fed into the water treatment plant where it is treated before it gets discharged into Snap Lake. We also have the north pile. The north pile is basically where they process kimberlite, and waste rock from the mine is deposited and stored. So there is some runoff from the north pile. Again that is directed to the water treatment plant where it is treated and discharged into Snap Lake.

Also on the surface we have the water management pond, which you have seen located on the surface just adjacent to the plant site. The water management

pond provides an opportunity for some temporary storage in the event that we require that in certain situations.

The overall water management system has been described in the environmental assessment report in section 3 and in appendix 3.4, and there have been some information requests pertinent to this and in particular 2.4.38:

I would just like to point out a few of the key components of the water management system, or some of the key points associated with it. The first, as was mentioned earlier this morning, is that mine water is far and away the predominant component. Over 90 percent of the flows that we have to treat on site, or manage on site, are mine water flows. That really allows us then to focus predominantly on mine water quantity and quality as defining some of the system characteristics.

It has been our practice in the design of this system to provide practical redundancy throughout the system. That means that instead of having one pump pumping water we will have two or more. Instead of one pipeline, two or more. Instead of one filter we have several banks of filters. That allows us then to have additional pieces of equipment in case some are down, and it also provides over-capacity through the system. In fact, throughout our system, as I think Lee mentioned this morning, we have designed initially the entire water management system not just for the expected flow but for the two sigma, for the 95 percent predicted flow range.

The water management system also provides, within the surface water management pond and to some extent within the mine itself, provision for short-term storage as backup for the system.

Lee showed some curves of predicted inflows into the mine, and we will be monitoring the actual inflows and comparing against those predicted curves. This is something that we have been doing for the last few years throughout the advanced exploration program. In the very early days we made predictions about what those inflows would be, and then as we mine underground we compare the actual flows that we had to discharge to those predictions. Throughout the mining operation itself, the mining practices that will be used will be such that they will try to minimize the impact of water flowing from the mine.

Let's discuss some of these in more detail now. First, just as a setting, the geology of the mine -- it is in permeable competent country rock, granitic rock, with water flow principally through steeply dipping fractures, as Lee has described this morning. Given that situation then, a number of operating practices in the mining operation itself come to the fore. First of all, we always cover drill before developing a mine. We did this throughout the advanced exploration program, and it was very effective. That means before we set out to develop along at it or around it, there is a 50 or 100 metre long cover drill drilled

in advance of that to see if we intersect any significant water. If we do, we have an opportunity to grout it out to consider what is happening.

Before each blasting round, we drill many short cover drills just ahead of the distance that is being blasted, once again to determine in the short term if there are any water bearing structures, and if there are there is an opportunity to go out and deal with those.

Also before mining out very large areas of the mine, we are always developing ramps and access ways ahead of that, and these ramps and access ways provide a limited insight into the likely water situation there and allow us to control the water flows and to see what is likely to be happening before we expose a much larger area.

**MR. HAL MILLS:** ...and the translators are having a very hard time keeping up with you.

**MR. GREG ORYALL (AMEC):** Okay, I am sorry. Shall I go back over some of that? Just go slowly, okay. So as I said, we will be cover drilling in advance of actually developing the mine. The cover drilling is by drill and sample to detect where we have large water flows. To support that we will always have grouting equipment, grouting materials and trained personnel on site within the mine to perform those operations. We have emergency water storage areas within the mine itself. Lower portions of the mine will be developed and made available to store temporary water flows if for some reason we can't pump that water out of the mine immediately. We will have an installed network of pumps, pipes and sumps to take the water out of the mine, but in addition to that we will have portable pumps that can be moved from one location to another to treat higher flow situations that may occur temporarily.

Then we will always be monitoring the structural integrity of the hanging wall, ceiling above the mine and the pillars. This in part of course for worker safety, but also because a very small stress or strain in the hanging wall might indicate some deflection that might open up a crack and cause some higher water flows. So that will be an ongoing monitoring action during mining operations to try to predict perhaps an early incidence of water flows.

As Lee mentioned, we are working from his predictions of quantity of groundwater flow into the mine. If you recall that curve, the curve had a gradual increase over time, over about the first several years, and then started to flatten out and basically maintained, although it was jagged, a roughly constant flow into the mine. Because of the gradual flow increase over the first several years, we have an opportunity to monitor the actual flows against that increase and have time to correct and install additional treatment capacity, or additional water handling capacity if we need to in advance of reaching the maximum flows. So we will be constantly monitoring what the actual flows are against the predictions and making those corrections and understanding how they differ.

Our experience with other operating mines in the Canadian Shield, operating in granite situations, below lakes and otherwise, also tend to support the predictions that Lee and Don have made regarding groundwater flows and give us a fair bit of operating practice with similar mines that we can apply here.

The water management pond on surface, as I have said, provides a temporary storage capacity in the event that we need to put water somewhere because we can't discharge it all. Currently the water management pond that is installed on surface I think is about 130,000 cubic metre capacity. The intention is that the dyke will be raised and that will be about 250,000 cubic metre capacity at the time the mine is operating. Assuming there is going to be a little bit of water in that pond at all times, that means that we have probably 200,000 cubic meters or better as a surge capacity in that water management pond. At the expected flow rates that Lee was talking about in the neighbourhood of about 20,000 to 23,000 cubic metres a day as an expected line, that is in the neighbourhood of 10 days flow that can be held in the water management pond.

As Tom will outline in more detail after me, the water treatment facilities have additional installed capacity beyond what is predicted to be needed, and the capacity can be extended ahead of the forecast requirements because of the way the water flows build up. Furthermore, the entire water management system (the pumps, the water treatment plant equipment and so on) is on emergency power supply, so in the event of a primary power outage for some reason for the overall mining facility, the entire water management system is backed up on the emergency power supply and will continue to run.

I would just like to walk through three different scenarios. We took a look at a number of different situations that might happen to understand how the water management system behaves in these scenarios. The first scenario I would just like to walk through briefly is if we get an unexpected large inflow of water to the mine. Not a flood, not a major inflow, but larger than expected for a period of time. The first thing we would do as the mine is underground we would then begin operations to drill and grout to stop that flow, to reduce that flow. Under most conditions we would expect that to be solved within a shift or within two shifts. That has certainly been our experience to date in the advanced exploration program and from the work that we have done with other mines. It has also been a similar experience in other mines operating in that sort of situation.

We will still be treating a larger flow for a period of time, and that additional flow we expect can be handled in the treatment plant because we will always have over-capacity. We will have additional capacity installed in the treatment plant at all times. In the event that that over-capacity is still not sufficient to handle this temporary high flow, then we can store the water underground for a period of time, or we can pump it to the surface and store it in the water management pond for a period of time. Once the grouting has taken effect and the higher flow is reduced, the water treatment plant now is treating the reduced level of flow that is

normally coming from the mine, and we have got more than enough capacity now to empty the temporary storage underground or empty the temporary storage in the water management pond, and restore both of those again to act as temporary storage basins.

What about a second situation where we have a piece of plant equipment that breaks down? In most cases, as I mentioned, we have multiple pieces of equipment installed. We have more than one pump, more than one filter, so if one piece of equipment breaks down we can take one off line to repair it and the rest of the plant can continue to function. Tom will go into more detail on this. So we have the ability to isolate individual pieces of equipment for repair and maintenance without disrupting the ongoing operation of the treatment plant. Once again, the water management pond and underground workings are available for temporary water storage should they be required.

In the third scenario where we have an extremely large uncontrollable mine water inflow. This is considered to be highly unlikely. It has certainly not been the experience of other mines operating in similar situations in the Canadian Shield, but if it does happen ultimately we have controlled flooding of the mine to contain all of the water. We don't have to pump the water out of the mine to the surface. We can retain it in the mine and then go back in and understand the nature of that high flow condition and try to solve the problem, and then eventually drain down the mine and re-establish the workings. So even in an uncontrollably large water flow situation out of the mine we don't have risk of that water being discharged into the environment. It is contained in the mine.

Now over to Tom who will describe in more detail the water treatment plant.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Greg. Our next presenter is Tom Higgs. Tom is a design engineer with AMEC. He specializes in chemical and biological waste treatment processes, both their design, construction and operation. Tom has spent a great deal of time in the North working both in the NWT, Yukon and Alaska. Over to you, Tom.

**MR. TOM HIGGS (AMEC):** Okay up until now you have heard about all the sources of the waste that ends up needing treatment, and basically the talk I am going to give is the final connection between the waste and the environment. Obviously this aspect has quite a bit of importance to everyone and there has been quite a bit of emphasis placed on the sources, how it gets to where we want to go, and what I am going to do is talk about two of the treatment components that basically protect the environment.

First off, the sewage treatment plant. We are all familiar with sewage. I am going to describe the process, and I am also going to focus on the phosphorous removal issue because this is one of the topics that has been brought forward because of the impact of phosphorous on Snap Lake. Secondly I am going to discuss the water treatment plant which is obviously much larger and describe its

function, how it works, and I am going to talk about two topics that have been brought forward -- the issue of capacity. You have heard Greg discuss the issue of capacity as well. I am going to dwell on that to some extent as well, and I am also going to talk about TSS removal because TSS removal is integral to complying with the metal criteria for discharge to Snap Lake.

Further I should state that the design and selection of these treatment plants has been based on a combination of factors. Those factors include the practical aspects of operating a treatment facility in a remote northern environment; practical aspects of dealing with the large flows, certainly in the case of the mine water treatment plant where we have flows of upwards to 35,000 cubic metres a day. Also in the context of ambient water quality criteria that were established by the EA team at the onset of the work, and finally by a combination of test work that was done both at the bench scale and at the pilot scale to prove out these processes and to define the toxicity and the limits that the particular flow sheet could meet. You will hear more about that aspect tomorrow with Mark and Kevin.

First off on the sewage treatment plant, the proposed treatment plant for sewage has to meet a criteria of .2 of milligrams per litre, and that is in conjunction with limiting of phosphorous loading on to Snap Lake. That is our target. We are proposing to use what is called the SBR process. This is the same process that is currently in use at the camp. We feel that it has the requirements to meet our target. I have shown here a photograph of an SBR-type of plant from a vendor's web site. The treatment facility at Snap Lake won't necessarily be like this, but the purpose of the photograph is to illustrate the fact that the sewage treatment is actually carried out in large tanks, either one or multiple large tanks. In our case it will likely all be housed in a building, but it will basically consist of large tanks.

Where this information has been brought forward, it appears in two sections of the environmental assessment report, section 3.6.9, and then addition information in the appendix 3.4. This has also been the topic of a number of information requests.

This is a photograph again from another vendor's web site showing batch treatment of sewage in two tanks. In one tank you have active treatment going on, aeration and an active bio-mass, and in the other tank in the stand-by mode waiting for a load of sewage to carry out the sequence.

I will now walk you through the process a bit, and I think I might try to move out here - I don't know if it is possible or not -- I can't see the screen very well. That is it. Anyway this is a schematic put together to illustrate how the sewage treatment system works. There isn't a series of tanks. This tank is basically the same tank carried through the process. It is separated out just to explain to everyone how the process works. Consider the fact that you can treat sewage in a batch process. Essentially that was the way sewage was treated before the continuous more modern process was developed, and we have come back to the batch process because of the availability of sophisticated controls and instrumentation



that will now allow the systems to run automatically in batch mode as opposed to the more conventional mode.

I will follow through the process here. Start off with an empty tank, it contains biomass. This is the activated sludge that you are used to seeing and something like an extended aeration plant or a common package plant. The sewage is then loaded into this tank. The tank fills up. It starts to go through a process and you might have anoxic or a non-aerated step first. That is for a period of time. That might be followed by an aerated step. There may be additional anoxic and aerated steps brought into the process to try to accomplish different things such as oxidation of ammonia to nitrate, luxury uptake of phosphorous biologically and also de-nitrification, which is the removal of nitrate by converting it to nitrogen gas, so the beauty of the SBR, the sequencing batch reactor design, is that it gives you the flexibility of carrying out a lot of different functions in one tank by changing your cycle, changing your conditions and changing the length of time that you carry out that function.

It has a lot of flexibility, and also inherently provides equalization which is a critical part in sewage treatment because of the wide variation in diurnal flows. We have high flows in the morning and we have high flows in the evening often, and it is more of an accentuated case at a camp where you have shifts than it does in a city. A city has some of those loads spread out over the day. A camp typically has those loads in very defined and very tight sequences which require that you have equalization regardless. That being the case, the SBR process has an advantage because it provides that storage internally.

Going further to what we are proposing to do at Snap Lake, since we have to remove phosphorous we are proposing to add ferric sulphate to the decant overflow. This is the final process to precipitate phosphorous and then to remove that in a multi media filter prior to disinfection with a UV sterilizer, and then discharge of the treated effluent to combine with the mine water. Ken outlined that this morning. It is going to combine in the outfall with the treated mine water and go to the Snap Lake diffuser. I think that is it for that.

So the focus of the question is, can the sewage treatment plant meet the .2 milligrams per litre target? We acknowledge that certainly this is a tight specification. Certainly people working in the business would recognize that, but we are confident that we can accomplish that. There are a number of factors that I will bring next time, but I should point out that one of the first jobs I had after graduation was working in the phosphorous removal program for the Ministry of the Environment in Ontario in research. We were always very successful at being able to get phosphorous down to less than .1 milligram per litre, but the issue was removal of suspended solids. By having a process that had filtration as its final step it gives you an opportunity to drop the phosphorous level down to close to what would otherwise be the dissolved value by removing all the solids.

These are some factors about phosphorous removal in the sewage treatment plant. The SBR, the sequencing batch reactor process, has been proven. The advanced treatment system is basically a modern version of the conventional activated sludge process, the continuous process which you are all aware of from seeing package plants. It is an enhancement, so it is proven and it is being used in a number of facilities in Northern Alberta, Alaska and B.C., as well, especially in cases where there are small flows and a camp type situation with a lot of variation.

The first step obviously to deal with phosphorous as an issue would be to limit the use of phosphate detergents and to minimize the phosphorous loading on the sewage treatment plant. That will probably get us to a target of about 15 milligrams per litre in the raw sewage. The next step would be phosphorous removal in a series of steps. We have both biological in the SBR process as well, and chemical as part of the filtration step, the biological process to remove the phosphorous down to between .5 and 1 milligram per litre. That is probably about as low as that step can take us. Then finally the chemical precipitation step which would be the polishing step using ferric sulphate would then take us from the 1 milligram per litre down to the .2 milligrams per litre, and knowing that the solubility limit of phosphorous is very very low when it is precipitated with ferric then it is just a question of getting very very conservative filtration design -- and in this particular case that filter is sized for effective removal of suspended solids down to the point that it's equivalent to practically drinking water level.

That also plays a critical role in ensuring that the UV disinfection works well because obviously UV disinfection works better if the water is very clear and has a low turbidity. So we are very confident, based on that concept, that the combination of two steps and very high filtration efficiency will get us to the .2 milligram per litre range. In conclusion, I am concluding that we can meet the proposed target for phosphorous.

Next I will move on to the -- you want me to run these consecutively - yes. Next we will go onto the water treatment plant. The question here was the issue of capacity. Certainly Greg has talked about that as well, and you have seen the curves of predicted flows starting from year one. Here I have just thrown in a couple of photos of water treatment plants that I have been involved with just to show you what a water treatment plant might look like.

I will bracket the issues on water treatment capacity. First off is, can the water treatment plant deal with high flows? Secondly, can the water treatment plant provide sufficient capacity to deal with the mine shut down situation? Thirdly, does the treatment plant have the capacity to deal with a mechanical process failure?

This topic has been addressed in 3.6 in the environmental assessment report, and there have been two information requests about the capacity issues. The factors related to capacity -- the design accommodates high flows because the

capacity is added ahead of the time of it being needed. The plan at this point is to construct a system that is basically going to handle 35,000 cubic metres a day through the thickener and 20,000 cubic metres a day of filtration capacity, expanded to 35,000. There is actually no additional capacity needed for a mine shut down. In a mine shut down situation, say if mining stopped for a period of time, the water treatment plant simply continues to work. The mine is still dewatered. The water is pumped to the surface and the water is treated, so there is no extra capacity needed in that situation.

Thirdly, in terms of the mechanical process failure, the water management pond provides more than sufficient storage to allow the plant to be shut down for repair or maintenance in a typical situation. I will elaborate on that additionally.

Next I will go through the process, and I think I will move over here again because it is easier for me to see. This is a very general schematic of the water treatment system. You have heard Ken talk about the sources. We have the mine water, we have the north pile and the runoff. As has been emphasized, the mine water constitutes about 90 percent of the water requiring treatment and disposal. We follow the mine water along first. The mine water contains a fair amount of solids. The decision was that there wouldn't be an attempt to isolate a lot of the solids underground because of the difficulty of constructing sumps and handling large amounts of solids underground. The more effective way is to pump that water containing solids to surface and direct it into a thickener. The designed value of four grams a litre (it is a fairly high solid level) would be taken out in the thickener. Folactinum would be added to the feed -- schematically this isn't shown properly, but folactinum would be added to the feed and the thickened sludge from this thickener (basically a cellular) would then report to the paste backfill plant and be combined with the rest of the paste for either being returned underground or going to the north pile depending on how that process is worked. The thickener overflow then reports to a combined filter feed tank where chemicals are added for additional flocculation.

We are back to the north pile runoff. Since the north pile runoff already goes through a series of ponds and sumps, it doesn't contain high levels of solids so the normal flow path would be to go directly to this filter feed tank. In the event that the north pile runoff flows are high, in other words if there is a major event and it is beyond the capacity of the treatment plant at that time, the north pile runoff can be diverted to the water management pond since it has sufficient extra storage in the neighbourhood of this 250,000 cubic metres that Greg had mentioned.

Water collects in the water management pond and then gets pumped through the filter feed tank as capacity in the treatment plant allows. A further by-pass is that in the event that the thickener is down, the mine water can be directed directly to this pond as well, and the pond then obviously acts as a settler for solids, and the water from the pond then gets pumped through and treated. So the thickener itself can be by-passed in any given situation if there is a problem with it.

We will go back to the filter feed tank, and in this particular tank we have the ability to add lime and ferric sulphate. Ferric sulphate in this case would be added to act as a coagulant. It would potentially precipitate some phosphorous. We are not taking any credit for that in any of the modeling at this point because of the low level, but it would act as a coagulant to help with suspended solids removal. This suspension then would be sent and flocculent added to it, and be sent through a filter again, a multi media filter for solids removal.

Not shown on this drawing is that the back wash water from this filter would go back to the thickener. There is also another by-pass line that the thickener overflow could go back to this pond such that if this portion of the treatment plant is down for some reason -- it is very unlikely because the filters consist of a series of banks where one filter or many filters can be taken off-line at any time -- then the partially treated water could be stored in the water management pond. The reason why we favour this situation is because if we just used the pond for settling by itself, it would eventually fill up full of solids and require dredging. So this has the advantage of returning those solids to backfill quickly.

**MR. GENE UREMKO (DIAND):** It was my understanding that some of the treated water would be taken back to be used as mine processing water. I don't see that there.

**MR. TOM HIGGS (AMEC):** Yes, it is a very simplified flow sheet, but that is true. This treated water here is available for process make-up, yes. There are a few other lines that aren't on this drawing too.

**MS. JULIE DOLE (Fisheries & Oceans):** Could I ask you a quick question for clarification. A couple of slides back you had that the water management pond can be used as a backup there. Are you talking in relation to the sewage treatment plant there?

**MR. TOM HIGGS (AMEC):** No.

**MS. JULIE DOLE (Fisheries & Oceans):** Okay.

**MR. TOM HIGGS (AMEC):** No, the sewage treatment plant has its inherent equalization provided in tankage, in large tankage. These are some of the factors associated with capacity. As I said, the capacity of 20,000 cubic metres a day would be installed at year one, and in fact the thickener portion of it would be 35,000 cubic metres per day because it is not really practical to install thickeners in two stages. The cost of two thickeners, which would be the case, would be a lot more than twice one thickener, so the thickener would be installed for a full 35,000 cubic metres per day. The plan outlined in the environmental assessment report was to install a minimum of 20,000 cubic metres a day capacity of filtration with the ability to add additional filtration capacity as the mine water flows increase. The year one projected flow is only 7,000 cubic metres a day, so obviously there is almost triple the initial year one capacity installed at start-up.

The mine provides about 90 percent of the water, and this is an important factor because the actual flows increase with the amount of mine water development. Therefore, it is reasonably well defined that as the amount of exposed area underground increases the amount of water being generated also increases. These future flow rates have been developed based on estimates, they are estimated values. Those values are based on the best available information at this point, but during active operation those estimates can be rechecked, and a look-ahead to future years can be made to determine how accurate the future prediction might be. Those estimates can always be rechecked and determine when additional capacity may need to be added.

Additional factors related to capacity -- the use of reagents or chemicals obviously improves the performance of any water treatment plant. Ideally from a water treatment plant perspective you would rather not use reagents because it is an additional chemical you have to handle and it is an additional operating cost. Initially if the treatment system has lots of extra capacity it may not use much in the way of reagents because it won't be necessary; the thickener will be well over-sized and the filters will be well over-sized. However, as the flows increase there is a trade-off between operating costs and capital costs, and certainly the availability of reagents will be there at day one but they won't necessarily be needed, but they will be available to increase performance when they are needed. In other words, they will be there to increase the capacity of the thickener and increase the capacity of the filters -- so there is flexibility involved there.

I should point out that the plant is a mechanical facility. It has mechanical equipment. A rig drive on a thickener, a pump, it is all mechanical equipment. There is some process aspect to it, but it is not a complicated process. It is not a process that is prone to process failure. Once the mechanical equipment is repaired, then it can be put back into service. The key mechanical equipment is twinned -- underflow pumps, metering pumps, even the chemical dosing lines are often twinned because of the cost and the complexity of repairing those when there is a failure is not worth the savings involved in the capital costs, so often those are twinned. Also it is very common to have warehouse spares of items that could fail. Metering pumps are a prime example of that where they are used throughout the process facility and they are a common item.

Monitoring and process control -- all the new modern treatment plants have what is called a PLC (program logic controller) and that is a computer control system that takes information from the plant and actually runs it. It takes in instrumentation, it monitors the operation of pumps, it tells you basically how your plant is running and gives you a trend or a look-ahead as to whether there is a potential failure that is going to occur before it occurs. These systems can be quite sophisticated. They can switch to backup systems, they can be run remotely, and this really provides a lot of advantages in terms of capacity and performance that even 15 years ago we didn't have because we relied on

electrical mechanical devices that were much more prone to failure than the more modern PLC controlled systems.

Finally, the storage in the water management pond provides an incredible amount of flexibility in that, as I showed in the flow sheet, different units can be by-passed and the storage available allows us to take units off-line and repair them or monitor them.

In conclusion, based on the current water balance the plant will be large enough for the first six years of operation. The monitoring in early years will provide us with enough of a warning that when we need to add additional capacity the capacity won't be a problem. Finally, as you heard a number of times, the water management pond will allow the water treatment plant to be shut down for a period of time as required. As Greg pointed out, the water management pond has about 10 days of storage and typically repairs are in the matter of five or six hours, so there is more than enough capacity.

The final issue I will deal with is the suspended solids removal in the water treatment plant. As Ken pointed out, a critical aspect of water treatment is the fact that the metals are in a particular form. All the work we have done so far on the mine water indicates that the soluble metals are very very low, so the primary function of the mine water treatment plant is removal of solids. So meeting a five milligram per litre target is very important because obviously if we can't then there is potential that the metal levels will be higher. The environmental assessment work that is going to be presented tomorrow will go over some of the actual levels involved, but as I pointed out at the start of my talk it was the ambient guidelines that were set up at the start of the program that got us to this point. We looked at what we could do with the technology and were convinced, based on the test work and the technology that was available, that we could meet the five milligrams per litre limit with the proposed thickener-filter combination, and we went forward with that, and we also tested it thoroughly.

The factors affecting the TSS reductions, there are two removal steps. First the thickener which, as I showed you, moves the major amount of solids and flocking can be added to that thickener to improve the solids removal, and finally the filters which is the final removal step. The filtration design is conservative. It is sized using rates equivalent to drinking water treatment systems in many drinking water treatment plants in various jurisdictions that draw their water supply out of rivers and deal with water that has [inaudible] and are able to produce good quality water using filtration. Finally the use of reagents assist with the suspended solids removal, namely ferric sulphate. I forgot to emphasize in case you don't know that this is a thickener up here and then this is a series of multi media filters below.

An additional factors related to TSS reduction is that the final effluent will be monitored continuously for turbidity, and there is a direct relationship between turbidity and total suspended solids which is the target we had set for ourselves.

The controls will allow diversion of treated water back to that water management pond in the event that it does not meet the targets. That provides us with flexibility so that the turbidity can be monitored continuously. That instrumentation can then initiate a diversion of treated water back to the water management pond in the event that the treatment plant is not meeting its targets, and the process issue related to that can be corrected. This flexibility provides us with time and the tools to correct the problem prior to discharge.

Finally, in conclusion, the technology and the controls that we have designed can assist us with complying with the five milligram per litre target. That is it.

**MR. JOHN MCCONNELL (De Beers Canada):** Good, thanks, Tom. I guess it's back to you, Hal.

**MR. HAL MILLS:** Okay, thanks very much. Are there any questions or comments related to that presentation?

**MR. MARK DAHL (Environment Canada):** You mentioned that there is 10 days capacity in the mine water containment pond, that is 250,000 cubic metres. That is assuming that you are starting empty.

**MR. GREG ORYALL (AMEC):** That is correct, and as I mentioned that pond would typically be operated partially full, maybe 20 percent full, but there is going to be some water there at any given time; so assuming there is in the neighbourhood of 200,000 cubic metres capacity available in that pond out of a total of 250,000.

**MR. NEIL HUTCHINSON (Gartner Lee):** You have indicated that you are going to be monitoring your water flows as you go and hope you could adapt your storage and treatment requirements if necessary. If your flows turn out to be higher than predicted, do you have the physical footprint to store more water to give yourselves more water storage capacity? How would you go about increasing your storage capacity if it was necessary?

**MR. GREG ORYALL (AMEC):** Yes, in fact, we have both the capacity within the water treatment plant building to install additional filtration, additional equipment within the building, but we have also allowed an additional foot print in the yard itself to install much more plant in case we need it. We will have the available space on site to install more capacity. We do not, however, expect that we have the ability, or need to be able to install more temporary storage capacity in the water management pond.

**MS. JULIE DOLE (Fisheries & Oceans):** I guess I just have a couple of questions here. You talked about having some underground mine water storage. Could you give us an indication of what the volumes are of that storage. You used the term "temporary". Could you define what you mean by temporary in terms of how long it could be used as a backup storage area?

**MR. GREG ORYALL (AMEC):** It is called temporary storage not because it is only available part of the time, but because we wouldn't be using it to permanently store water. The intention would be that it is always there for short-term periods if it might be needed. There will not be a lot of capacity for storage of water in the underground mine without some disruption to operations. Typically we would expect in the neighbourhood of maybe 30,000 cubic metres could be made available, and that is basically by running additional ramps or tunnel ways below the mine workings to allow some storage capacity.

If you recall, we are always developing the mine in advance of where we are actually doing the mining, and in that development area we have the ability to temporarily store water. Beyond that, as I mentioned, we always have the ability to store water in the mine itself, to start flooding the mine, so that we will never have a situation where we have to discharge water from the mine if we can't handle it in some fashion on surface.

**MS. JULIE DOLE (Fisheries & Oceans):** This limited storage within the mine workings, is that considered a contingency or is it considered an active component of the water management where you would direct some water there in the process of sending it somewhere else?

**MR. GREG ORYALL (AMEC):** No we would consider that to be a contingency that would normally be flooded that would be available for use if it was needed.

**MR. HAL MILLS:** I think we are actually getting into the concerns rather than just clarification on the discussion. Shall we take a break and come back to this afterwards? So we will have the balance of the afternoon for you to raise your concerns, and we will have the sort of wrap up that we did that related to the things that you feel are still issues at the end of the afternoon. We will take a 15 minute break now. It is almost 12 minutes to three I guess, so we will resume shortly after 3:00 p.m. Thank you.

--- Break

**MR. HAL MILLS:** Okay, are we ready to rock and roll? Just briefly because we really do need to save as much time as we can for getting into the issues, we are getting fairly bombarded with people with ideas about how this session should be going as opposed to how it is going. Unfortunately, we are getting bombarded with ideas that range from here to here, which makes it a little more difficult to deal with it. We are getting people saying that this is the list of issues, let's get at it and wade our way through them. We are getting people saying that most of these aren't real issues, there are important issues, let's focus on other things. Without trying to say anything further on that at the moment, John Donihee has asked to speak to this on behalf of the Board. John.

**MR. JOHN DONIHEE (Review Board):** I would simply like to remind everyone that we are entirely aware that all of the issues on this list -- whether we call them



concerns or issues, the terminology may assist us in the way that we interact here -- but whatever they are they are there for a reason. They are there because of an agency responsibility or because a First Nation is concerned about it and they have put it forward for us to give some further thought to it. They may be there simply because they want discussion of matters raised by the Board itself because of its review of the EIS and the IRs.

I have listened to the discussion this afternoon and it strikes me that probably debating whether or not these are issues or concerns -- I don't want to undermine what Mike tried to do at the outset because I think it was quite useful -- but I don't put a whole lot of weight on the particular terminology that is selected. At the end of the day what we have said in structuring this process is that nobody is bound by the results and that if you want to put a concern or issue into your technical report you are entirely able to do so irrespective of the discussion here. I don't want in structuring things that way to undermine the purpose of these two weeks because they are very important.

First and foremost I suppose we will have an exchange of information among people with expertise, and hopefully that can be done in a way that those of us like me that don't have expertise in some of these technical matters can still come away with a better understanding, but at the end of the day we also want to try to resolve some of these matters and if it is possible to come to some consensus on some of them. If we don't achieve that, no one should be surprised about the fact that ultimately the Board will do that because the Board is required by law to do that, and the Board will have to apply its view of significance to these issues based on what happens in a hearing context.

It would be of great assistance, I think, from the standpoint of the Board, even if we can't get complete consensus if we could even come up with some kind of a ranking perhaps of what are really important issues and which are moderately or less important issues. Again, I think what the Board has to do under section 128 of the Act, at the end of this process, is to determine whether there are going to be any significant public concerns or significant adverse environmental impacts resulting after the mitigation measures proposed by the company are considered.

If you can over the next few days, it would really be helpful if you could keep that requirement in mind because it is entirely possible that experts in similar disciplines or in the same discipline may have fundamental disagreements about whether a model should have been structured this way or that way, of whether you should have plugged the numbers in way or another. I am really not a technical expert so this example is probably going to break down, but at the end of the day that fundamental disagreement may make no difference to whether there is going to be a significant impact. Quite frankly, if it doesn't make a difference in helping us determine whether there is going to be a significant impact, it may not be worth spending a lot of time at it here at the table.

I do know as well that there were some concerns that everything should be, to the extent possible, discussed here at the table and that we should go through this whole list. I am not saying don't do that, but I am saying that time is very limited and if it takes a PH.D in Hydrology to understand this issue (and there are three of them in the room), I really wish they would go into the corner and come back and tell us what the heck this means, because to tie up 90 people listening to this (not that it's probably not fascinating) is not necessarily the best use of all our time. Much of that discussion may be unintelligible to some of the elders and folks that don't speak English.

What I would like to suggest is that perhaps first thing tomorrow maybe Louis and I will spend a bit of time with the facilitators. I am not trying to disturb what you are going to do for the rest of the afternoon, but we would like at least try to put some suggestions forward for how to kind of group these concerns; and I am only talking about sort of close enough for horse shoes here. Again, I realize it is without prejudice, but we need somehow to put a bit of a framework together if there is going to be any hope whatsoever of consensus. That is the basis for my concern, and the basis for taking your time. I don't really want to suggest that we debate it right. I think more productive would be for you to get into talking about issues and concerns, but we will try throw a little bit of a framework together that we can take half an hour or so to lay out (hopefully less) in the morning to see if we can't provide just a little bit of additional structure to assist in making the discussions you are going to have more productive.

**MR. MIKE BELL:** I just want to ask if there is any clarification in terms of what John has just said.

**MS. JANET HUTCHISON (NSMA):** Mike, I don't know if it is really a clarification, and I am certainly not one of the technical experts trying to work with this structure, but it seems to me that one of the things that is making this conversation and discussion a bit stilted is the amount of structure that is trying to be imposed upon it. I have to say from my involvement with this process to date, the constant focus on sticking to time lines and sticking to an expedited process, rather than giving the issues the time, attention and discussion they deserve, it seems to be impeding the process a great deal more than it is expediting it. If the facilitators are aiming for putting more structure on the parties than already exists at the moment, I don't personally see that as a positive step. The few interactions I am hearing that have been somewhat positive have been the ones that have stepped out of that structure a little bit. I would really invite the facilitators to think about that rather than trying to continue to impose this artificial structure. This is the first time the parties have had a chance to really sit down and talk about these issues.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** I was going to say ditto.

-- Laughter.

I agree with her. I don't think you should worry about the elders and the Land and Environment Committee members for the Yellowknives Dene First Nation. We were preparing for coming here. We were prepared for sitting until 5:00 or 6:00 p.m. I don't like all that telling me that the time is three o'clock and we are supposed to be on this subject. I would rather hear the experts resolve an issue. This way I understand how things have been resolved and when we get together as committee members in our community we can kind of get the sense that something was done, or something was heard. Thank you.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** I guess I am a bit confused by the message we are getting from the Board's counsel. My understanding was that this was to be a technical session, and at short notice and at great taxpayers' expense we came up at ARCan, and yet we are told that detailed technical discussions are not really welcome.

**MR. JOHN DONIHEE (Review Board):** If that is what you understood I said, you have misunderstood me, and I apologize for not being clear. We want technical discussion, but what I am suggesting is that once the exchange of information, debate if you want to characterize it that way, is completed, we are seeking an approach to try to rank or weigh the issues or concerns that are left over. Rachel, I wasn't trying to say that we shouldn't have a fulsome debate. I am just saying that when the time comes that we need to try to pull the results together, we are hoping that there will be some way of identifying those things that are really important and distinguishing them from the things that are perhaps resolved or not so important. We are hoping to get your help to try and develop something like that for structural purposes I suppose, and we were thinking that we could put something together and run it by you first thing tomorrow. That is all I am suggesting.

**MS. JANET HUTCHISON (NSMA):** I am just thinking that there is no one at the table that knows better than these ladies and gentlemen how these technical issues could be best discussed, and I would sure like to hear from them about how they think they could have an effective discussion.

**MR. MIKE BELL:** I am going to suggest that we have that discussion tomorrow morning after we have discussed it ourselves internally, okay? Why don't we just continue with the discussion back on schedule in terms of what we are dealing with, and we will kind of move it from there. We will take into account everything that everybody has told us. We will have a meeting either this evening or this afternoon at the end of this, or tomorrow morning, and we will try and work out something and propose it to you. Okay? Good.

**MR. HAL MILLS:** Okay, thanks. Let's get at it. Basically then we have the presentation related to the water management system, so the issues related to that are open for discussion now. In terms of this list it is...

-- Portion not recorded

...issues on it of 1.5 of the treatment of drinking water. The floor is open.

**MR. NEIL HUTCHINSON (Gartner Lee):** This is just a point of clarification. You mentioned in the discussion of the water treatment plant before break that you had done pilot plant testing on the TSS removal capabilities. Are the pilot plant results available anywhere in the appendices of the environmental assessment report?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Neil, the results are summarized in one of the sections of the EA and we are just trying to pull those out and we will provide you with that reference.

**MR. NEIL HUTCHINSON (Gartner Lee):** That is all I need, thank you.

**MR. HAL MILLS:** Okay.

**MR. GENE UREMKO (DIAND):** My questions has to do with your comments concerning water treatment and the possibility of an emergency shutdown. I think I read somewhere in your report that you assumed that there would be a breakdown of not longer duration than one day to get back to business again. I realize you have stated that you have emergency pumps, or standby pumps, but is there anything at all in the treatment system, anything in that system, that if it broke down in the middle of January at 40 below, that you need more time than one day, or two or three days?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think that is a two-part question. The first question you ask is there anything that would break down and would take longer to fix than one day, and I will ask Tom Higgs to respond to that in general.

**MR. TOM HIGGS (AMEC):** Certainly all the rotating equipment like the pumps are already twinned, so if one of those units fails then there is already a backup. The only unit that would fail and would take a longer period to repair would be the rake drive on the thickener, but as I have shown the thickener can be by-passed by going to the mine water pond during that time. If the thickener rake broke or damaged, or the drive was broken and needed to be repaired, there certainly could be a spare drive on site, but that could still take several days to replace; but in the meantime the thickener could be by-passed. I don't know of a piece of equipment that would be down that would affect the process -- not one piece of equipment.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think Tom got to the point. The second part of your question was if something does go down for more than one day is there redundancy in the capability to handle the water to avoid an untreated discharge ultimately. I think Tom answered that.

**MR. NEIL HUTCHINSON (Gartner Lee):** Just a brief second question. Someone mentioned that the pond would always be full of water, 20 or 30

percent of the pond would be filled with water all the time. In the water balance output I noticed that it was assumed in every month except one month of spring runoff there would be zero storage in that water management pond. Could that make a difference in your conclusions? If you started the water balance off with having that much capacity used up?

**MR. GREG ORYALL (AMEC):** There are two parts to that. First how we are going to operate the water management pond, if it is going to have water in it or not. I have said for the sake of argument, let's assume there is some water in it, maybe 20 percent which still leaves us about 200,000 cubic metres free board available storage capacity in that pond. It is not our intention to operate that with water in it, and it is certainly to our advantage to drain that and keep it dry all the time for a number of reasons, one of which is that when there is a small amount of water in there, as we drain it we will take up some of the suspended solids and pump those into the thickener. Those are far easier to remove in the thickener than they are later on by dredging out the pond. Obviously we want to retain as much capacity as we can in that pond at all times.

But for the sake of argument I was suggesting that perhaps something could happen when the pond was not fully drained. It is our intention to keep that fully drained. I will ask Ken DeVos now to respond about the overall kind of system dynamics in the event there is some water in that pond.

**MR. KEN DEVOS (Golder Associates):** I believe part of your question related to the impact predictions. Is that correct?

**MR. NEIL HUTCHINSON (Gartner Lee):** That is correct.

**MR. KEN DEVOS (Golder Associates):** With respect to the impact predictions, the modeling and what we used in terms of the discharge rates are not affected. We assume that the water would flow through the treatment plant. We did not account for storage into the water management pond. That is a contingency, so it does not affect the impact predictions that were made in the EIA.

**MS. ANN WILSON (Environment Canada):** The treatment system relies on the biological aspect to reduce the first order of magnitude of phosphorous. I was just wondering how vulnerable it is to upsets in the biological community, and how long it will also take to get those up to full treatment capacity.

**MR. KEN DEVOS (Golder Associates):** Sorry, can you repeat the question.

**MS. ANN WILSON (Environment Canada):** The biological aspects of the treatment for the sewage treatment plant -- I am familiar with some other systems and periodically they have biological upsets where their microbe community dies off, whether it is something going as an influence that shouldn't be, a solvent or some such thing. How long does it take for your treatment microbes to get up to full treatment and in one tank are you vulnerable to a down time if they do have an upset?

**MR. TOM HIGGS (AMEC):** Certainly you are correct in terms of the biological process being less forgiving to upset conditions, and certainly it has to have very careful operation. An operation of biological plants is very very important. There will be a requirement for skilled and trained people to operate these plants, but beyond that we have already come up with a plan and that is, because of the nature of the construction there will be an incremental need for capacity for sewage treatment. So what is going to happen is that the actual sewage treatment facility is going to be built in a series of trains, so there will be more than one stand-alone sewage treatment plant such that if one system does have a process problem then it doesn't mean that all the systems are down. If there is a requirement for, say, active bio-mass from one unit to seed a unit that is having a problem, then that can be rectified.

I think the advantage of having twin systems, which we will have because of the need to incrementally add sewage treatment capacity as the construction crew is mobilized and we go from exploration camp now to a full camp, gives us that flexibility. Your point is well taken in terms of the process control. Certainly these systems have to be operated well. None of the biological systems are forgiving without well trained and skilled operators.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I would just like to follow up on Neil Hutchinson's question. He was looking for a table which outlines the pilot plant results. They are found in appendix 9.8, which is entitled Site Specific Water Quality Benchmarks and Mine Water Discharge Toxicity Testing. The table is 9.8-13.

**MR. TOM HIGGS (AMEC):** I will just elaborate on this somewhat. There was a pilot plant program run on three different flow sheets, and those were run continuously and we collected bio-assay samples from those runs, that then were provided to Golder Associates for the bio-assay testing as part of their phase of the work. They did the bio-assay test and then they chemically characterized those samples as well. The data that appears in this appendix is the data from those bio-assay tests, but from our perspective it is a very good combination of both the bio-assay data and the chemical data that is representative of those particular runs.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** The water treatment plant currently is designed explicitly to reduce particulates from the waste water stream, and that is a reasonable course of action of course. If we were to find the levels of dissolved metals were higher than anticipated, is there any way that this plant could be retrofitted in some way to provide treatment for those elevated levels of dissolved metals rather than particulate metals?

**MR. TOM HIGGS (AMEC):** One of the conditions of the feed to this water treatment plant is that it is mine water, and one of the things that is important to remember in this case is that there is a cemented paste backfill being used, and that creates a relatively high pH condition in the mine water which assists with

the removal of most of the dissolved metals. Certainly you would have to know which particular metal was going to be an issue before I could here is the treatment technology for a particular metal. So certainly all the common heavy metals, copper, zinc, iron, lead and cadmium, all those respond to a high pH condition in terms of precipitation.

Beyond that, if there was a metal that potentially was in a colloidal state and not in a dissolved state, then it could be assisted by using the ferric sulphate as a coagulant, and that would improve metal removal because often I find that metals appear to be in solution when chemically they are actually not in solution. They are in a very fine colloidal state and they require a coagulant for effective removal. I would have to have more of a specific in terms of which metal would be elevated before I could tell you what particular modification of the flow sheet we might use to remove it.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** Thanks. Tom. I was thinking specifically of cadmium.

**MR. TOM HIGGS (AMEC):** Cadmium responds reasonably well to a high pH environment, but we are also finding in some projects whereby if we have to remove elements like cadmium and mercury down to extremely low levels, then some people do use a supplemental sodium hydro-sulphide addition to drop those metals down to lower levels. We are really looking at less than 1 PPB level -- certainly for cadmium would be less than probably half a PPB level would be the level that sulphide would be able to accomplish.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** Thank you.

**MS. ANN WILSON (Environment Canada):** If ferric sulphate is added into the treatment stream, will we be seeing increases in iron and sulphates entering Snap Lake in the dissolved form? Has that been accounted for in the estimated lake concentrations?

**MR. TOM HIGGS (AMEC):** The addition of ferric sulphate won't add any additional ferric iron because it will precipitate as ferric hydroxide. It will behave the same way as the other iron that is in the feed, but the sulphate will be added clearly to dissolve species. It would form part of the sulphate loading currently going to Snap Lake. In terms of dosage, probably that sulphate level would be in the neighbourhood of say 20 or 30 PPM of sulphate -- maybe as high as 50 PPM depending on the dosage of ferric sulphate that was used, of additional sulphate loading.

**MR. CHRIS SPENCE (Environment Canada):** Just to go back to the capacity issue, in my opinion I think the water management pond is small relative to the predicted surface spring inflows and the mine inflows, most notably as the mine gets older. I was wondering what you would be prepared to do to ensure that

there is continuous capacity within the treatment plant and within the operation of the pond to deal with these types of flows. What you presented earlier this afternoon suggests that the plant will be operating at a 20,000 metre per day capacity, from what I took from the presentation of the life of the mine. Is that the case?

**MR. GREG ORYALL (AMEC):** I think I might not have explained myself well at the outset in the water management system. I suggested that we would install 50 percent over capacity in the treatment plant in the early years and then ramp it up as we needed to. The intention is that we will always have 50 percent over capacity installed in the treatment plant. Our prediction right now is that the water flows will be in the neighbourhood of 20 to 25,000 cubic meters per day at their peak, which is the ultimate expected flow that was predicted by the hydrogeologists. Our intention then is that by the time we are at that point, we will have 35,000 cubic metres a day, or more, treatment capacity installed.

If, for some reason, the flows into the mine prove to be more than that expected flow level of 20 to 25,000 then we will ensure that we always have additional capacity installed ahead of those flows being achieved. So we will maintain a 50 percent over capacity in the treatment plant at all times, even during full operations.

**MR. STEVE WILBUR (Dogrib):** Greg, then I guess I am confused on an issue about the 10 days storage capacity. If we start with 20,000 and we ramp up to 35,000, do we have 10 days of storage in our water management pond, or have we lost that?

**MR. GREG ORYALL (AMEC):** No, you have lost that. If we have higher flows from the mine, then the water management pond storage in terms of day's capacity becomes more limited. Ultimately the storage capacity there is 250,000 cubic metres, but by that point, by the time we are into year ten or so of operation of the mine, I would expect that the mine workings will be largely developed in terms of access to all the mine points and we would be far less likely to experience any sudden unexpected flows as well.

**MR. STEVE WILBUR (Dogrib):** So how many days, what is your best guess at the number of days of storage capacity, the minimum days of storage capacity that you would have at any given time?

**MR. GREG ORYALL (AMEC):** Storage capacity in the surface water management pond will be about 250,000 cubic metres. The storage capacity underground -- temporary storage that is not interfering with the mining operations -- will be about an additional 30,000 cubic metres or so. How many days that is really depends on what the flow volume is that is entering the system. If we have 28,000 cubic metres a day, then that 280,000 cubic metres will give us 10 days storage. If it is 56,000 cubic metres a day, then that gives us



five days storage, but that is really the limitation of our emergency storage that we are proposing at this stage.

**MR. STEVE WILBUR (Dogrib):** So then the sensitivity of this whole storage component is based on the estimation of the mine inflow and how accurate that is. If we have the numbers off by a factor of two or a factor of three, then we have reduced our capacity to maybe one or two days worth of temporary storage. That is what I am feeling from the discussion. Maybe you could explain a little better.

**MR. GREG ORYALL (AMEC):** Yes I think to some extent that is true, remembering though that we always have over-capacity in the treatment plant, so in effect that is additional to the storage that is available both on the ground and underground. If we need it, we can bring more storage up in the underground workings, but we have to disturb mining operations to do that. We would have to cease mining at the lowest levels, but we have the entire underground mine available to us as a storage basin. That is really a trade-off between what De Beers is willing to accept as an owner-operator in potential disruptions of their operation versus the likelihood of having to invoke that.

Another point I would just like to make -- you suggest that if volumes of water vary by a factor of two or a factor of three that affects our storage capacity substantially. Lee can correct me if I am using hydro-geological statistics incorrectly, but to achieve his factor of, in effect, 50 percent only half-time increase over his expected value, he was moving his hydraulic conductivity variable by an order of magnitude by 10 times more to achieve that. There has to be quite a substantial shift in some of the hydro-geological parameters to achieve two or three times multiple of flow rates.

**MR. STEVE WILBUR (Dogrib):** I can appreciate how the calculations were made, but I guess just from a global perspective we all understand that there is some uncertainty involved, and you have attached a level of uncertainty to that. From our perspective we would like to know just how good those numbers are, number one. Number two, you mentioned scenario number three in which case De Beers would be less likely or less willing to want to jump in and start flooding the mine because it is a big financial decision to do that, whereas scenario number one is fairly routine where you are dealing with mechanical problems, you are dealing with treatment issues that are done on an operational, maybe on a daily basis.

I guess what I am seeing is that there is kind of a grey line between where we are jumping from scenario number one to scenario number three, and we are getting a lot of mine inflow water at what point do we say we need to go to number three? Can you give a firm idea of that, or is that something that is still out there, it is still a grey zone between making the decision between contingency number one and number three?

**MR. GREG ORYALL (AMEC):** I think it all comes down to dollars and cents. I think we would never want to be in the situation where we have to shut down the mine. Maybe there are some other contingencies in there. We could raise the pond level higher at a certain point in the mine life if we felt there was a cost benefit in doing that. I think there are other things that we would do before we would ever want to be in a situation where flooding the mine was the only contingency we had.

**MR. STEVE WILBUR (Dogrib):** Just one more comment. You presented the one scenario, so I guess you are just begging the question -- you mentioned that you could also have other scenarios that you don't think it would be necessary to present right now.

**MR. GREG ORYALL (AMEC):** I guess it depends on how conservative you want to be in your estimates, and I guess we are very comfortable with the risk we are taking right now with saying that we will have a water management pond there that has a capacity in the order of between 200,000 and 250,000 cubic metres, so in the worst case scenario that we can see it is probably seven to eight days capacity. Realistically, is it 10 days capacity? I can't really as a mining engineer imagine a scenario that we couldn't respond to in the mine in that kind of time frame.

**MR. LOUIS AZZOLINI (Review Board):** A point of clarification. I have been listening and I think I am picking up almost a sub-commitment here. What I am hearing is that De Beers is so right that they are willing to let the mine workings flood before they pump untreated water into Snap Lake. Is that, in fact, what you are saying? You trust your numbers, your assumptions and your calculations well enough that you are willing to absorb that risk? That is basically what I am hearing.

**MR. GREG ORYALL (AMEC):** I think that is what we have said all along. Our contingency has never been to have an untreated discharge. Our contingency is that we would let the mine flood before we would do that.

**MR. LOUIS AZZOLINI (Review Board):** So in essence what De Beers is committing to is that there will be no untreated discharge and that the mine workings would flood before that occurred respecting your current mine design, pumping and treatment, and your polishing pond.

**MR. JOHN MCCONNELL (De Beers Canada):** That is the case. I think there can be accidental things that happen on site on surface that could result in an untreated discharge, but in relation to the mine workings and mine water that is exactly true. We never said we would be looking for an untreated discharge.

**MR. CHRIS SPENCE (Environment Canada):** I think that is a crucial point you make, and in the spring you may have an exceedingly large amount of water relative to the size of your water management pond. If you get a wet winter with a

lot of snow, it melts quickly, given the size of the mine site, etc., it may approach 200,000 cubic metres, which you may have to deal with in about a two-week period on top of the mine inflows you are talking about. From what I understand, I am comfortable that you are going to have enough capacity over and above what you require for the mine inflows, but there will be certain periods of the year where you will need to process that mine water in order that you don't have an untreated discharge. I think that is something that you have considered, but it is a point that needs to be quite clearly made.

**MR. TIM BYERS (Yellowknives Dene):** I have a question for Tom. The Diavik diamond mine experienced problems with trying to keep their licensed phosphorous limits below the same .2 milligrams that you folks are proposing. I am wondering, Tom, are you familiar with the Diavik sewage plant system and if so, how does yours differ from Diavik's sewage plant?

**MR. TOM HIGGS (AMEC):** I don't have first-hand knowledge of the Diavik plant. I have discussed the plant with both individuals that have been there and a company that is acting as an operator there now. I understand that there are two plants, an RBC plant and an extended aeration plant, and that the phosphorous removal is being done by chemical precipitation using alum. That is pretty well the sum total of what I know about that facility. I really don't have an opinion one way or the other about why the plant there does not meet the number. I am not their consultant.

Certainly from my experience with phosphorous removal and what we are proposing to do for Snap Lake I am certainly very confident that we can meet that number because of the two stages and my knowledge on phosphorous removal using ferric sulphate. I don't know if that answers your question or not.

**MR. TIM BYERS (Yellowknives Dene):** Yes, it does. I guess I am also trying to get at your SBR system -- is this a system that is used elsewhere in the Territories?

**MR. TOM HIGGS (AMEC):** Yes we are currently using it at Snap Lake at the exploration camp. That is the sewage treatment system in there now for the exploration camp.

**MR. BOB [inaudible] (NSMA):** What are your projected removal efficiencies for phosphorous and TSS?

**MR. TOM HIGGS (AMEC):** I can calculate that but I do n't have the feed concentrations right in front of me to do that. If you like, I can certainly calculate what we expect those percent removals are. That is what I assume your question is. In terms of the phosphorous, what we were looking at was like 15 milligrams per litre for phosphorous in the raw sewage dropping down to .2 milligram per litre in the treatment effluent, so I can calculate the percentage on that. Regarding the TSS I can't recall exactly what we were assuming for design value

on the TSS in the raw sewage, but it is likely several hundred milligrams per litre, I would guess, 300 or 400 milligrams per litre, in that range. Then we are dropping that down to a low value. We don't have a TSS issue with sewage other than the fact that we have to get down a low value for the UV to work properly in the sewage plant. That is going to be in the nature of a few PPM of suspended solids by the time it comes out of that filter.

**(UNIDENTIFIED MALE SPEAKER):** Just a bit of a follow-up. With the addition of floccuants, under normal operating conditions the statement that there is no toxicity anticipated. During upsets, what mechanisms are in place, or an early warning monitoring system, to prevent high residual flocculent concentrations going into the Snap Lake?

**MR. TOM HIGGS (AMEC):** First off, the flocculent addition will be a dosage that is paced by the PLC proportional to flow rate, and typically those addition rates are a few PPM. They are between one and two parts per million typical rate. What the computer or the PLC system is doing is controlling and metering pumped feed flocculent at a rate proportional to flow rate. Certainly for that dosage to be higher than it should be, it requires a malfunction either in the control system or in the pump. The second aspect is that the turbidity is monitored, and things like the pressure drop across the filter are monitored. Those are both items that send information to the PLC that are trended. I would see a scenario if there was, say, excessive flocculent addition ahead of a filter; then would that would do is it would plug that filter up real quickly and you would get a high build up in pressure that would report to the PLC. That would be a trend that wouldn't be a typical trend, that could be an alarm situation for an operator.

For example, on a normal operation the length of time between the pressure reaching a certain set point would be known. That could be a trended item. If the system falls off that trend, then that could be an alarm situation. That would be one way of determining whether the dosage was any higher than normal. It is certainly not a typical situation.

What is more typical is a spill, and certainly a spill is a very serious issue with flocculent handling because it has a serious detrimental affect on process, and typically with flocculent it's handled in a contained area, a separate curbed area, and it doesn't drain to the common sumps. You isolate it. If you have a spill to the floor or something, it is isolated and picked up separately in drums because if you let that material then go to the common sump in your building and it gets added to process, then it causes huge problems. That is certainly a situation that we are well aware of. The design of the flocculent make-up and handling system will be of that separate curbed design so that any spills within that area are retained within that area.

**MS. JULIE DOLE (Fisheries & Oceans):** I just wonder if you could clarify for me what I think my understanding is of the sewage treatment plant. Is it correct that the filter stage is designed not only to take out the flocculated material but

also to recover the iron as the precipitated iron hydroxide, and that it is the sulphur component of the ferric sulphate that will then pass through as part of the treated effluent, and that it could have a concentration of approximately 50 PPM in the discharge? Is that the value that you gave? I just wonder if that value was included in the calculations of impacts to water quality on Snap Lake.

**MR. TOM HIGGS (AMEC):** There were a couple of questions there. I think I can try to capture the first one, which was the issue of what happens with the ferric sulphate and the removal in the filter. The ferric addition in the sewage treatment plant discharge is to precipitate phosphate. Basically a portion of the ferric iron will be tied up as ferric phosphate. What doesn't precipitate phosphate will precipitate as ferric hydroxide, which is also a particle, and those particles plus any carry-over of suspended solids from the biological system gets removed directly on the filter and subsequently get returned to the treatment part of the plant by the backwash; but the soluble species (certainly the sulphate) will go through the filter because it is not a solid, not a particle. The sulphate component of it will go through.

In terms of the concentrations that I put forward earlier, those are just guesstimates on my part, and I should pass you on to Mark Digel to determine what the actual assumed value was on that because I don't have that first-hand number in front of me.

**MR. MARK DIGEL (Golder Associates):** If you had 20 to 50 milligrams per litre, parts per million of sulphate, in the sewage treatment plant at a discharge rate of 200 cubic metres per day, it would have a very small change in the total sulphate concentrations in the mine water release, so you wouldn't expect it to have a large affect. It would be basically the ratio of the concentration in the sewage treatment plant at 200 to the mine water discharge, which is anywhere from 7,000 up to in the 20,000s. The effect would be very very small.

**MS. JULIE DOLE (Fisheries & Oceans):** So is the answer yes, it was considered?

**MR. MARK DIGEL (Golder Associates):** The sulphate in the sewage treatment plant -- I would have to look at the parameters that we did include, I will have to get back to you on that.

**MR. HAL MILLS:** I guess that was a maybe.

**MR. KEN DEVOS (Golder Associates):** If you look at the total sulphate loading from the mine workings and the follow rate from the mine, and the incremental increase that would occur in the sulphate loadings from the sewage treatment plant, it is only a mere fraction of a percent of the loadings that would occur from the mine, at the concentrations in the mine. So essentially there would be very minimal, if any, affect on the discharge concentrations.

**MS. JULIE DOLE (Fisheries & Oceans):** Thank you, that addresses my concern.

**MR. STEVE WILBUR (Dogrib):** I would just like to take a different view on that same issue. I realize that you have taken the sewage and put it into the mine water and just having one discharge, so in essence it is almost like internal dilution is the solution here, and that is probably good water management. What if the scenario is that the sewage treatment system is working, but the other system isn't? You still have to discharge the sewage treatment, or is that going to be held within the water management system? Then the second part of that is, just looking at the loadings (not the concentration) of sulphate into the Snap Lake, I realize the concentration may be lower because it is diluted with the water from the mine and all the other -- but if I was just looking at the total sulphate into the Snap Lake has that been addressed?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Not a water quality expert, however Steve I think that that question really gets on to the water quality issue, and what I suggest is that in general, if we can deal the affects of discharge on Snap Lake water quality tomorrow, that would be great. If we could defer that item to that time. The first question though was around the discharge, and I will get Greg to answer that.

**MR. GREG ORYALL (AMEC):** Would you mind repeating the first question again, I was fascinated with the second one.

-- Laughter.

**MR. STEVE WILBUR (Dogrib):** I appreciate the answer. I just wanted to have that issue out. I realize that we can answer it better when we talk about impacts on water. The first question basically was, you have -- what did I say?

-- Laughter.

**MR. LOUIS AZZOLINI (Review Board):** If the water treatment plant goes down, will the sewage treatment plant continue to run and will you discharge from the sewage treatment plant?

**MR. STEVE WILBUR (Dogrib):** That is essentially it, yes.

**MR. GREG ORYALL (AMEC):** If the water treatment plant is down and there is no water to dilute it, then, obviously there is water accumulating in the mine so it is a pretty serious situation. If that is the case, say a mine shutdown situation and the mine is allowed to flood then the sewage treatment plant would continue to operate and use the same outfall. In that context it would be obviously using the same outfall, I mean it is still piped over there. That is the only situation I can think of that...

**MR. HAL MILLS:** I think John has some more questions that he wants to ask Tom.

-- Laughter.

**(UNIDENTIFIED MALE SPEAKER):** The answer is that there are two scenarios. It is a batch plant with more than one tank, so we don't have to be continuously discharging from the sewage treatment plant. If we were in this situation for a longer period, then we use the same contingency as for the water treatment plant; we pump it into the water management pond.

**MR. STEVE WILBUR (Dogrib):** And there is only 200 cubic metres a day as opposed to the 20,000 cubic metres a day coming from the sewage treatment plant, so there is a lot more capacity, but you would put it into the water management pond and let it build up there I guess.

**(UNIDENTIFIED MALE SPEAKER):** Maybe Tom can comment on the capacity of the sewage treatment plant, how many days we would be able to operate it before we had to discharge.

**MR. MARK DIGEL (Golder Associates):** I know we can't discuss this in more detail tomorrow because this is really a topic that we were going to talk to tomorrow, but in terms of affects on Snap Lake it is not the concentration in the discharge, particularly if you are dealing with things like phosphorous, that you are really concerned about. It is the loading to the lake, and if you take out the mine water and you were to just put the sewage treatment plant discharge into the lake you are not increasing the loading, and it is the loading that is going to have the effect over time. In terms of putting in the sewage treatment plant discharge without the mine water discharge, it's not going to adversely affect the lake. It is not going to increase the loading, and it is the loading that is primarily of concern with respect to phosphorous.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** I expect that this is probably a question for Mark as well. Assuming that the sewage treatment plant achieves the design specifications of reducing phosphorous to .2 milligrams per litre, what is the relative proportion of the total loading from the mine site that will be emanating from each of the two plants -- the water management plant and the sewage treatment plant?

**MR. MARK DIGEL (Golder Associates):** I don't have the exact numbers in front of me, but I believe it is in the order of around five percent of the total loading that comes from the sewage treatment plant.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** That is consistent with my back of the envelope calculations as well. Given the concerns that we make here relative to phosphorous releases into the lake, this is a question for Tom, what if any contingencies are available for refining or adjusting

the design of the water treatment plant to further reduce releases of phosphorous?

**MR. TOM HIGGS (AMEC):** As presented in my discussion, we have the capability to add ferric sulphate into the filter feed tank or flocculation tank ahead of the filter in the mine water treatment plant. That is not there to necessarily remove phosphate; certainly it is there mainly as a coagulant to assist with removal of colloidal material to assist us with meeting metal levels, but if there is for some reason elevated phosphate levels in the mine water then the ferric addition would remove it clearly. But I think at the sort of levels we are looking at, which are approaching sort of 10 PPB now in the concentration, it wouldn't be that practical to be using ferric sulphate for removal of phosphate to lower levels than that at this point because of the flows involved. You are getting down pretty close to the solubility limits of that compound in the first place. You are probably just double solubility limits at that point anyway, so it's getting more and more difficult as it usually does.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** Thank you, Tom.

**MR. LOUIS AZZOLINI (Review Board):** A question to regulators, with respect to the end of pipe design, are you looking over the loading to the lake over the mine life that is currently designed for, or are you factoring in the total amount that might be in there if it is extended? You are looking at an end of pipe design right now, and that is sort of what is driving the regulatory process. If the system design that is currently in place -- and I am slipping a bit into tomorrow -- should you increase your mine life, have the capacity to accommodate that in terms of the effluent output?

**MR. HAL MILLS:** You are addressing that to the regulators?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I would say at this stage of the day that you are right, you are slipping into tomorrow. I think I would also make the observation at this stage that I think we should, if you want to keep that issue and table it tomorrow. However, we also have some outstanding time of the day and I know that there were issues that people wanted more time to raise this morning. I would suggest that if we are at this point, that we could possibly make your conclusion as to whether we have seen resolution on any of these issues and then possibly go back to any of the topic areas that people wanted more time to discuss this morning.

**MR. MIKE BELL:** If that would be alright, I would like to just go back, I have a little bit of a list here, and find out basically is there an unresolved issue from some of the concerns that people have basically raised. Don raised the emergency shutdown question. There was limited discussion and we really needed more time. What was that about? Who raised the first issue? First of all, Neil, you wanted information. Did you get what you needed?



**MR. NEIL HUTCHINSON (Gartner Lee):** Yes, I will go and confirm that the information they gave me satisfied my concerns. I do have a water treatment question I would like to ask though before we move back, if I may?

**MR. MIKE BELL:** Can we get through this and then ask that question?

**MR. NEIL HUTCHINSON (Gartner Lee):** Certainly.

**MR. MIKE BELL:** Okay. Somebody over here raised a question.

**MR. GENE UREMKO (DIAND):** I raised two questions and I am satisfied with the answers.

**MR. MIKE BELL:** Ann Wilson, biological treatment, possibility of upsets.

**MS. ANN WILSON (Environment Canada):** Yes I have been satisfied with the answer, thanks.

**MR. MIKE BELL:** Okay. I am trying to read my notes here, I am not going to get them right. Just remember what you said. I am going to just twig your memory. Don MacDonald, are dissolved metals higher than anticipated, and if so can adjustments be made.

**MR. DON MACDONALD (MacDonald Environmental Sciences Ltd):** I am satisfied with the answer I got, thank you.

**MR. MIKE BELL:** Ann Wilson, will there be increases of ferric sulphate and what is the effect?

**MS. ANN WILSON (Environment Canada):** I think that has been dealt with.

**MR. MIKE BELL:** Okay. Chris Spence concerned about continuing capacity; think the present capacity is too low over the life of the mine.

**MR. CHRIS SPENCE (Environment Canada):** No concern any more.

**MR. MIKE BELL:** Okay, you guys are doing good here. Steve Wilbur, 10 days storage capacity, if we lose capacity, the best guess at capacity at any given time, how good are the numbers?

**MR. STEVE WILBUR (Dogrib):** I understood their response and I agree with how they have responded. I don't have the numbers in front of me but it sounds okay.

**MR. MIKE BELL:** Okay. Chris, spring runoff may go over.

**MR. CHRIS SPENCE (Environment Canada):** No, there is no concern.

**MR. MIKE BELL:** Tim Byers about the Diavik phosphorous problem.

**MR. TIM BYERS (Yellowknives Dene):** I am satisfied that they are not familiar with the Diavik plant.

-- Laughter.

It seems to me though on the surface that it is the same system, because you guys are using chemical precipitation in biological system, and Diavik is the same thing, although I'm not sure if Diavik's may be a different flocculent, using a different chemical process. So anyway, it sounds like something I'll have to dig into my Diavik literature and see if I can come up with a favourable answer for it. Thank you.

**MR. MIKE BELL:** Okay, good. Bob, projected removal rates for phosphorous and TSS, what mechanisms to monitor and prevent block into Snap Lake.

**MR. BOB (NSMA):** Yeah, the information on the removal of fish and seas, if I could get a more exact answer on your TSS, your in... in terms of flocculence, that information did help, but it does link over to some of the discussion that will happen tomorrow or the next day, so I'm not ready to sign off yet.

**MR. MIKE BELL:** Okay, Julie Dawe, some issue came up and it disappeared, so I just... there's another one coming up, I think, so...

**MS. JULIE DAWE (Fisheries and Oceans):** I remember saying I had no more concern, but I don't exactly remember the question.

**MR. MIKE BELL:** Okay. Steve, one system breakdown, total sulfate ...(inaudible)... into Snap Lake. You were dealing with those two questions.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I was happy with the response.

**MR. MIKE BELL:** Okay. Don MacDonald, what is the relative loading from water management, what contingencies to adjust ...(inaudible)... from plant to further produce phosphorous in the lake.

**MR. DON MACDONALD:** I'm satisfied that I got the answers that I required for informed discussions for tomorrow.

**MR. MIKE BELL:** Okay. Louis and the pipeline design. That was a... and then we decided that we were not going to listen to Louis at that particular point. Okay, your wishes?

**MR. NEIL HUTCHINSON:** Neil Hutchinson, sorry, I can't see you behind the pillar. At some point, I think it is Thursday, some of the IRs have raised concerns about potential biological effects related to TDS levels in Snap Lake. Just maybe to guide our discussion of that, could De Beers comment on A, if it's possible to remove TDS from mine effluent, and B, is this a costly thing to do?

**MR. TOM HIGGS (AMEC):** Tom Higgs, AMEC. Technically, there are obviously mechanisms for removing TDS. Chloride removal can be carried out to easier reverse osmosis. But that is not a practical alternative in the Snap Lake case. Certainly at the flow rates involved, and the issue of dealing with a reject solution, approximately 20 percent of the flow would end up as a reject that would still end up being a problem to deal with. It really isn't a practical alternative in this particular case. Does that answer your question?

**MR. NEIL HUTCHINSON:** Neil here. Thank you, it does.

**MS. JULIE DAWE (Fisheries and Oceans):** It's Julie Dawe here, Fisheries and Oceans. I just had a couple of sort of residual floaters that I just wanted to ask that don't fit into any particular category.

You had talked about some contingencies for mine water management. One of them was that if higher zones... if zones of higher flow were encountered, you could grout to stop the flow to figure out where you were headed. The increased grouting obviously increases total suspended solids load. Would that then decrease the efficiency of your treatment plant because of the higher suspended solids, and would it increase the frequency for the requirement of backflushing of the filters and sort of increase the amount of time that it shut down.

**MR. TOM HIGGS (AMEC):** Certainly the filters can handle higher solids loading, and you are correct. What happens is the backwash frequency increases and what that ends up doing is it ends up reducing the ultimate capacity of the system, because obviously the configuration is that when you have a large number of filters in line, you don't have a classic situation where you collect backwash water and you use that backwash water to backwash a filter that's offline. You take the filter's off one at a time and you leave the rest of them running. But in the larger configurations, you use the product water generated by the filters that are running to backwash the filter that's not running, so what that ends up doing is that it ends up cutting back on your capacity because some of that product water that otherwise would have gone to discharge has now been used to clean up a filter. So when you're dealing with dirtier water, what it really means is that you've reduced your ultimate maximum capacity of that plant and that's really the only major impact of having a higher TSS feed on the filters, is a reduction of capacity.

But I'd have to work that out. I don't... I have to do a calculation.

**MS. JULIE DAWE (Fisheries and Oceans):** Okay, thank you. I just has one other quick question here. Again, in the presentation on the water management system and there was a discussion of scenarios that could be encountered. One of them was suggested as being a highly unlikely scenario, that being encountering large, uncontrollable flow. The statement was made that this was unlikely because it's not our experience with other Canadian shield mines. And I

just wonder if there are other mines operating in the Canadian shield that are under lakes that were used as an example of where this is so unlikely.

**MR. GREG ORYALL (AMEC):** There are other Canadian shield mines operating under lakes. I was looking, as a matter of fact, last night for the reference because one of our mining leads in Vancouver compiled some information from published mining handbooks over the last two years in Canada, but unfortunately, it doesn't distinguish mine by mine and which ones are under lakes. But perhaps Don or somebody else who is more familiar with that can answer that from your own experience.

**MR. DON CHORELY (Golder Associates):** I only know of two others, and that's Red Lake and I believe Hudson Bay is under a lake also.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess directly under a lake, but even if you look at the Con mine over here, it's on the shore of the lake, the mine goes down. I mean, I forget what level they're down to in terms of metres, but essentially, they're under the lake, if you look at the influence that the water body above it would have on it, and the same with the Lupin mine. They're right on the shore of the lake. I don't think physically in plan they're directly below it, but certainly they're, you know, when they're down 1400 metres, there's the influence of the lake on those mines, similar to what you'd have at Snap Lake.

**MS. JULIE DAWE (Fisheries and Oceans):** Okay. I guess I would sort of think that there would be a difference being adjacent to a mine and being under a mine, being down in the decline in the early stages of Diavik when we were out under the lake and it was raining down there because of the water flowing in. I don't know that that is the same sort of thing that might be encountered with a mine shaft adjacent to a lake, but I was just wondering where the conclusion came from that that scenario was so unlikely because it has not been demonstrated in other Canadian shield lakes, that I'm assuming that meant that there were other lakes operating under the lake, and then that's where that statement had come from.

**MR. JOHN MCCONNELL (De Beers Canada):** I think we should also clarify a comparison to Diavik, because they were mining into a pipe, right, so they're in a kimberlite pipe which goes up into the bottom of lake, so the cover rock there was kimberlite, and Don or Lee can talk about the conductivity of kimberlite as opposed to granite, but certainly the conductivity of kimberlite is much greater than you see with granites, which hosts the Snap Lake deposit, and are between the workings and the lake.

**MS. JULIE DAWE (Fisheries and Oceans):** Thank you. I was just merely seeking context for that statement that was made.

**MR. DAVE BALINT (Fisheries and Oceans):** Just a question for clarification. When Tom was talking about dissolved metals and the high PH that they would

precipitate, he mentioned that because of the interaction of the mine water with the paste backfill, that resulted in a high PH, so if you could perhaps explain that in light of some comments this morning where the mine water was not supposed to have that interaction.

**MR. KEN DEVOS (Golder Associates):** The predicted PH and dissolved metal concentrations for the mine water inflow, the dissolved metal concentrations are not dependent on the PH. In the assessment, the dissolved metal concentrations were not dependent on the PH and they still are not dependent on the PH.

**MR. DAVE BALINT (Fisheries and Oceans):** In results presented this morning, there was a decrease in PH, which led to a lower level of those metal species in that kinetic testing.

**MR. KEN DEVOS (Golder Associates):** Sorry, I was just looking down. Can you please just repeat what you had said there?

**MR. DAVE BALINT (Fisheries and Oceans):** Dave Balint. In comments made by Tom in his presentation this afternoon, he had suggested that certain metals will not be in their dissolved form because they will precipitate out at a certain PH. The PH was influenced or the water was influenced because of its interaction with the paste backfill.

**MR. KEN DEVOS (Golder Associates):** Yeah, I think I'd spoken to that one. If you could just rephrase the second part that you had indicated.

**MR. DAVE BALINT (Fisheries and Oceans):** You had indicated that the PH or the metals were not in dissolved form because of PH or there was not an influence.

**MR. KEN DEVOS (Golder Associates):** Ken Devos with Golder Associates. Yeah, Tom was speaking for a specific... specific metals have a lower solubility at a higher PH, and Tom was using that with respect to mine water inflows that might flow through a grouted portion of the mine, or water coming off that paste PH. The dissolved concentrations expected in the mine are somewhat lower than that PH of 11. In fact, the treatment feed concentrations are at near neutral PH. And even at those near neutral PHs, the dissolved metal concentrations meet the targets for what will be discussed in later sessions with respect to Snap Lake.

So there is, you know, there is a little bit of a disconnect between what Tom was discussing in terms of PH. Technically, he's correct. That higher PHs, some of those metals will drop out. And it's on a metal-by-metal basis. It's not the same for each metal. It's not the same for each chemical parameter, but technically, he's correct when he talks about high PH.

With respect to mine water inflows, the discharge of that PH with respect to those mine water inflows is actually expected to be near neutral or neutral.

**MR. DAVE BALINT (Fisheries and Oceans):** So the... what will the PH then be? Near neutral?

**MR. KEN DEVOS (Golder Associates):** The current PH range expected for the treatment feed that was used in the assessment is 6.5 to 7.1.

**MR. DAVE BALINT (Fisheries and Oceans):** And then at that PH, they will be precipitated out or they will be in dissolved form for those metals?

**MR. KEN DEVOS (Golder Associates):** There is an additional degree of precipitation of metals as the PH rises, but that has not been accounted for and is not required in meeting the target discharge limits, as Mark's going to discuss tomorrow.

**MR. HAL MILLS:** Okay, anything else then related to the water management system? Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I'd just like clarification on Tom's presentation regarding phosphorous reduction. And I think he started out, he mentioned you started out with 15 milligrams per litre and then that would allow you to achieve various levels in the biological and the chemical system, ultimately to get down to the target level. My question is if your initial condition was a lot higher than 15, if you had an upset condition, how would that affect your ability to still achieve the target level through the various systems.

**MR. TOM HIGGS (AMEC):** So if I can rephrase your question, you're saying if the raw sewage phosphorous concentration is higher than 15, what impact that has on the ability to meet the 0.2 milligram per litre target? Certainly we'd still have the two steps, the biological uptake and the precipitation step. I would expect that if the concentration was higher in the feed, then the biological portion would take up more of the phosphorous, but regardless, the precipitation step is still driven by the solubility limit of the ferric phosphate compound, and that's not a function of the actual feed concentration. It's... a solubility limit is independent phenomena, as you know.

So there may be a case where you have to increase the ferric sulfate dosage to achieve the same level of removal, but you should still be able to reduce the phosphate level to a very low value if you have effective filtration, and you don't allow any particles to be removed. So potentially, an upgrade would be to improve your filtration step. If you have a very, very high phosphorous loading going to the filter. I think the equipment could deal with that particular situation.

**MR. STEVE WILBUR (Dogrib Treaty 11):** That was good. Maybe I'll ask another question. So you suggested that you might have to increase the ferric sulfate in order to counteract the higher amounts of phosphate. Would that increase the sulfate discharge then?

**MR. TOM HIGGS (AMEC):** Yes, any increase in ferric dosage would increase the sulfate level, but as we've discussed before, it's a very minor component of sulfate loading to Snap Lake. But your question has got me at another answer, and that is that obviously in a sewage treatment plant such as ours, you have the option of also adding ferric sulfate to the biological portion of the treatment plant as well, and that is actually done in some treatment systems, is to add it in two places. That would be a fallback to add it as well to assist with getting the phosphate level down.

**MR. HAL MILLS:** Okay, thank you. I think we're close to wrapping up. I would like to make a small comment related to what has sometimes been referred to as the facilitator's report that's going to come out of this. The facilitators have not been engaged to produce a report. We do have Lisa here who's, to the extent that she can, documenting outcomes from this in terms of commitments or issues where through the wrap-up statements you're saying have been resolved or where there's still an issue and so on.

And from some of the earlier comments about wanting to see this before it's finalized and so on, I think some concern about exactly what is said there. And I want to make the point that you could really help that out, where you have made a concluding remark, be it a commitment or something to the effect that we've had a good discussion on this, but it's still an issue. If you could document exactly what you had to say and pass that on to Lisa, then the chances of it getting recorded accurately would be greatly enhanced, so I encourage you to do that whenever you can.

With that, unless anybody... John, you have something you want to raise?

**MR. JOHN MCCONNELL (De Beers Canada):** I think the last two hours have been kind of what most of us envisioned in terms of a session like this. It kind of takes me back to the old technical committee under the NWT water board, where there was a real good exchange.

But I'm still not satisfied with the exchange of information that we had this morning, and you know, certainly most of our experts, the hydrogeologists and hydrogeochemists are leaving tomorrow evening. So if the forum was wanted to participate, we'd be quite willing to host an evening at our board room, say from six until eight, for hydrogeologists and hydrogeochemists and anybody else that was interested, where we would facilitate a further discussion in this area, and then actually bring a report back to the group first thing tomorrow morning.

**MR. HAL MILLS:** That sounds like a good offer. Would you like a show of hands as to who's interested in participating in that? Okay, would everyone who is interested in taking John up on that offer, please raise your hand.

**MR. JOHN MCCONNELL (De Beers Canada):** We'll even provide sandwiches.

**MR. HAL MILLS:** John, would you repeat again exactly what time and where and so on?

**MS. MARGO BURGESS (Geological Survey of Canada):** Can I raise a concern?

**MR. HAL MILL:** Margo.

**MS. MARGO BURGESS (Geological Survey of Canada):** Well, one I think relates partly to a concern that was raised by the woman down at the end of the table here earlier today that others may not be able to be party to that discussion, and the other is that there would be no transcript from that discussion on the record.

**MR. JOHN MCCONNELL (De Beers Canada):** You're right, there would be no transcript, but we're certainly prepared to try and bring a reasonably detailed report back to this forum.

**MR. LOUIS AZZOLINI (MVEIRB):** I think we're sliding into procedural hell if we start going down that road. I encourage people to get together, to talk, and if it helps the process, if it helps the regulators and these experts and it helps De Beers, please do so. The idea is to exchange, the idea is to get together. You haven't had a lot of opportunities to do it face-to-face. I encourage you to do it. If there's no transcript, that's okay. As long as when they come back, they are willing to put on the record what they have communicated and if they have agreed to something via the discussion.

I think John is sort of looking at me with a bit of a furrow on his head, but he thinks it's okay.

Certainly speaking for the review board, I support and encourage that type of interaction.

**MR. HAL MILL:** Alex.

**MR. ALEXANDER DESBARATS (Geological Survey of Canada):** Yeah, NRCAN's prepared to go along with it, though we're not quite sure what's going to come out of it, but we accept the invitation.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I'd like to see and hear a report tomorrow to see how you resolved your different interests. I was thinking that the gentleman with the blue tie had a map or something this morning, and I thought I was going to see something about on it, maybe he'll be presenting it to you tonight, and I wouldn't mind hearing how the water flows, and underground and underground water flows scenarios. If you work out all those details, I wouldn't mind hearing the report tomorrow. I don't have to be there and sit there trying to understand it all, but as long as I know that something's been resolved, I'll be happy. Thank you.



**MR. JOHN MCCONNELL (De Beers Canada):** But you are invited, Rachel.

-- Laughter

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I'm not driving all the way back from Detah just to listen to you.

-- Laughter

**MR. JOHN MCCONNELL (De Beers Canada):** Well, you could send Tim though. So if it's all right, I think there seems to be some consensus, I'd suggest six o'clock, just because after that, we have troubles getting in and out of the building. And it's the Scotia Tower, third floor, and the whole floor is De Beers, so you can't get too lost. You know, we'll just let it last as long as people are happy to talk. As Steve pointed out earlier, there's no hockey game tonight, so...

**MR. HAL MILLS:** Okay, good stuff. I'll remind you that we have an 8:30 start again tomorrow. The rest of the days we're scheduled for a nine o'clock start. We can always revisit that, but try to be here for 8:30 in the morning. One more comment from Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I hope that when the facilitators get together with John, you saw that this is the first real true test of what we could do today, and I think with how we came up with our idea to resolve issues at the end of the day worked out fine. Don't tamper with it too much.

**MR. HAL MILL:** Okay, thanks very much.

-- ADJOURNMENT

# **MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD**

## **De Beers Snap Lake Technical Sessions**

**November 27, 2002**

### **Yellowknife, Northwest Territories**

**MR. MIKE BELL:** Okay, we'll start. Good morning, everybody. We'll start as we usually do with the introductions for the record. I'd appreciate it if the people sitting in the back row could just come up when they have to and tell people who they are. Why don't we start. I'm Mike Bell. I'm going to serve as your animator this morning. We're a little thin on the ground up here. The only person I've got to back me up is Louis. That may not be a whole lot of help. He told me he would take copious notes, so he's not going to leave me all alone in the lurch. Why don't we start?

**MS. TAMARA HAMILTON (DIAND):** Tamara Hamilton, DIAND.

**MR. DON MACDONALD (DIAND):** Hi, my name is Don MacDonald. I'm with MacDonald Environmental Sciences representing Indian and Northern Affairs Canada.

**MR. SEVN BOHNET (DIAND):** Sevn Bohnet with water resources division, DIAND.

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** Alexandre Desbarats with Natural Resources Canada.

**MS. MARGO BURGESS (Natural Resources Canada):** Margo Burgess, Natural Resources.

**MR. JAY URENKEL (DIAND):** Jay Urenkel, Northwest Technology Consultants representing DIAND.

**MR. STEVE HARVEY:** Steve Harvey, representing... (microphone fades out)

**MS. ANN WILSON (Environment Canada):** Ann Wilson, Environment Canada.

**MR. MARK DAHL (Environment Canada):** Mark Dahl, Environment Canada.

**MR. DAVE BALINT (Fisheries and Oceans):** Davie Balint, Fisheries and Oceans.

**MR. MARK LANGE (Fisheries and Oceans):** Mark Lange, Fisheries and Oceans.

**MS. JULIE DAHL (Fisheries and Oceans):** Julie Dahl, Fisheries and Oceans.

**MR. DAVE LEVY (Fisheries and Oceans):** Dave Levy with Levy Research Services, consultant to Fisheries and Oceans.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, De Beers Canada.

**MR. TOM HIGGS (AMEC):** Tom Higgs, AMEC.

**MR. MARK DIGEL (Golder Associates):** Mark Digel, Golder Associates.

**MR. KEVIN HIMBEAULT (Golder Associates):** Kevin Himbeault, Golder Associates.

**MS. PAT TONES (Golder Associates):** Pat Tones, Golder Associates.

**MR. NEIL HUTCHINSON (Gartner Lee):** Neil Hutchinson, Gartner Lee Ltd. representing Mackenzie Valley Environmental Impact Review Board.

**MR. DAVE OSMOND (Gartner Lee):** Dave Osmond, Gartner Lee Ltd., representing the review board as well.

**MR. ROB DICKIN (Gartner Lee):** Rob Dickin, Gartner Lee.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Steve Wilbur for the Dogrib.

**MR. TIM BYERS (Yellowknives Dene First Nation):** Tim Byers, consultant to the Yellowknives Dene land and environment committee.

**MR. GAVIN MORE (GNWT):** Gavin More, GNWT.

**MR. LIONEL MARCINKOSKI (RWED):** Lionel Marcinkoski, GNWT.

**MR. FRASER FIRMAN (DIAND):** Fraser Firman, Indian and Northern Affairs.

**MR. BOB TURNER (NSMA):** Bob Turner, North Slave Metis Alliance.

**MR. LOUIS AZZOLINI (MVEIRB):** Louis Azzolini, review board.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Rachel Crapeau, Yellowknives Dene First Nation.

**MR. PAUL MACKENZIE:** Paul Mackenzie, land and environment.

**UNKNOWN SPEAKER:** ...(inaudible)...

**MR. GREG ORYALL (AMEC):** Greg Oryall, AMEC.

**MS. LISA BEST (GeoNorth):** Lisa Best, GeoNorth.

**MR. DOUG HALIWELL (Environment Canada):** Doug Haliwell, Environment Canada.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, De Beers Canada.

**UNKNOWN SPEAKER:** ...(inaudible)..., Golder Associates.

**MR. LEE ATKINSON (Hydrologic Consultants):** Lee Atkinson, Hydrologic Consultants.

**MS. AMY LANGHORNE (Golder Associates):** Amy Langhorne, Golder Associates.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA.

**MR. BOB GELAST (NSMA):** Bob Gelast, NSMA.

**MR. JOHN HEBERT (NSMA):** John Hebert, NSMA.

**MR. MIKE BELL:** I'll just briefly, everybody was here as I was yesterday. Just recapping the day, we had water management plan issues in the morning. We sorted through some issues. We had an information exchange and then towards the end of the day we had a... towards the end of the morning we had a bit of a consolidation...no, I guess early afternoon. What I guess we've agreed to do if I can use the format we used yesterday is after the presentations, we'll have some concerns that people may want to express. We'll just list the concerns first so it gives us a sense of how much ground we have to cover in relationship to potential issues, and then as we go through, we'll consolidate those at the end and ask people who raised some concerns whether or not there's an issue in there that they want to express that basically should be addressed. So that's the format that we'll use, if that's acceptable to everyone. In the afternoon, we had the water management system. I must say from my own point of view, I could become a sanitary engineer a lot better than I could become whatever was going on in the morning with hydrologists. It struck me as a little mystical, abstract. I'm not very strong in those areas. But I think it was a very effective day. At the end, we consolidated the various ideas and then for today, the agenda will be slightly modified. We'll have the presentation, but before we have the presentation, there was as I understand it, a very productive meeting last night between De Beers and some of the people in the room, and I think we have someone who will make a brief presentation. Then we'll have the presentation on water quality and quantity. We'll have a break. We'll have discussions after that, and then we'll proceed again in the afternoon with a review, presentation first, and then another discussion, and we'll try and end by five o'clock. I will say that I'm going to bring

the discussion to a close 20 minutes before the end of each period so we can go back and do what we did yesterday and say okay, let's take a look at the people who raised various issues, after all this various concerns, after all this discussion, what's your line on this, is there an issue here or are you satisfied with the information you've been given. Are there any questions on the process? Everybody knows what we're doing? Good. Why don't we start then, if there's no questions, with the presentation of what happened last night. Just a reminder to everybody to please announce your names first before, so we have it on the record.

**MR. GREG ORYALL (AMEC):** Last night, a number of us met at De Beers' offices to discuss some of the hydrogeology topics that were talked about yesterday. Attendees included: Steve Wilbur, representing Dogrib Treaty 11; Tim Byers, representing the Yellowknives Dene; Doug Haliwell, Environment Canada; Alexandre Desbarats, Margo Burgess, NRCAN; Dave Osmond, Rob Dickin, and Neil Hutchinson of Gartner Lee; North Douglas, Rae-Edzo Metis; Joe Kiper, representing NSMA; Don Chorley, Golder Associates; Lee Atkinson, HCI; Colleen English, De Beers; myself, Greg Oryall, AMEC; Ken DeVos, Golder Associates; and Tom Higgs, Golder Associates.

I acted as a bit of a facilitator to help the meeting along and Colleen took some notes from the meeting.

The meeting lasted approximately three hours. The first two hours were devoted generally to the discussions around the model that was predicting groundwater flow quantities into the mine and the amount of water that we would have to treat and discharge from the site. There was detailed discussion regarding the model and the parameters that go into that model, and to summarize generally, I think that the participants found it to be a useful discussion and stated that they felt coming out of that, they had enough information and enough knowledge of the model and the information that went into that to be able to go back into that and write the reports and do their analyses.

For the third hour of the session, we focused more on the regional hydrogeology model and some discussions of the flow to the north lake. There was a fair bit of discussion around that, and I think some understanding of positions of different people was reached there and rather than summarize that now, I think we agreed that when we get to the north lakes discussion this afternoon, that the participants will bring forward some of their specific comments at that time where it was appropriate.

I have the notes that Colleen took from the meeting, and those notes have been passed out now to all of the participants of the meeting last night for their comments, and I ask please that you get your just edits on those back to Colleen around lunchtime today. The intention is then that we will incorporate those corrections into the notes and bring them forward tomorrow to this committee to

be added into the record. I'll presume that some of the participants last night may want to have, or make some other comment.

**MR. MIKE BELL:** Do participants from last night want to make any comments? With just a little window of opportunity, do any of the people have any comments about the meeting last night? It didn't end in a feast or anything like that, so I don't think you missed the fun times or anything like that, but did you have any comments about what went on last night? Okay, well, thank you very, very much to De Beers and thank you very, very much for everyone who participated last night.

We'll now proceed with the presentation on water quality issues for the morning, with De Beers' presentation.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Mike. It's John McConnell. Before we start with the presentation, there was a question on sewage treatment plant efficiency yesterday that we didn't have the answer to, but Tom Higgs has calculated those numbers now, so I'll just, just so it gets into the record, I'd like to ask Tom to bring us up to speed on those numbers.

**MR. MIKE BELL:** Who raised the question first?

**MR. JOHN MCCONNELL (De Beers Canada):** North Slave Metis Alliance.

**MR. MIKE BELL:** North Slave Metis Alliance, okay.

**MR. TOM HIGGS (AMEC):** I looked at the design criteria, the preliminary design criteria that had been used for the sewage treatment plant, and I've calculated a TSS removal efficiency of 97.5 percent, and the phosphate removal efficiency of 98.7 percent.

**MR. MIKE BELL:** Okay, thank you, Tom. Any questions? Okay. John.

**MR. JOHN MCCONNELL (De Beers Canada):** I think... I don't think we have any new participants, so I won't go through the lengthy introduction of Dr. Tones. I'll just ask her to begin with the start of today's presentation.

**MS. PAT TONES (Golder Associates):** I'm just checking whether this mike is on or not. I guess it is. I'm Pat Tones. I'm with Golder Associates, but my role here is to be a tour guide for the De Beers presentations, and a lot of you were here yesterday when I gave a brief introduction, but we may have some new people in the room, and so I just want to help you orient yourself to the topics. We're talking about water quality and quantity yesterday and today, so it's really a two-day session.

I pointed out yesterday that we're located here in Yellowknife, but the Snap Lake project is about 220 kilometres to the northeast, and then farther north, we have the BHP Ekati and the Diavik Diamond Mines projects as well, and they are...

Ekati's about 100 kilometres north of the Snap Lake project. Perhaps because we are talking about water in these two days, the most important point is the fact that the Snap Lake diamond project is in a totally different watershed. It is in a Lockhart River watershed, which is different than the watershed for the other two diamond mines. They are in the Coppermine watershed.

Just going now directly to the Snap Lake site, we have Snap Lake right here. It discharges to the northeast at this point. There is a long arm towards the west. And you'll notice that the northwest peninsula here shows all of the project structures and facilities. One of De Beers' main points all along was to concentrate all of their disturbance in as small an area as possible, and the northwest peninsula is that area and we'll be talking about that a great deal today.

...(inaudible)...through the mine is located at the tip of the peninsula and this black area is the outline of the underground mine, which extends under the lake and onto the north shore, and there's two little squares there and they show the area where the bench raises will be located.

Today, this morning, we'll really going to be concentrating on Snap Lake and effects to Snap Lake itself. In the afternoon, we'll going to be looking at effects to the north, to the northeast lake and the north lake, and a movement of groundwater northwards. There is no surface water connection to the lakes to the north.

So because it's a two-day session, I just thought I'd remind you that yesterday, we had an overview of the site and the way that the water flowed through the site, but our main technical discussion in the morning was on groundwater, particularly related to water entering the mine. And in the afternoon, we looked at water management systems, especially at capacity, to deal with different types of flows, and then the various types of water treatment, the sewage treatment plant and the water treatment plant, and water treatment here being primarily mine water, so that's what went on yesterday, in a nutshell, and so this morning, we are now looking at a focus on Snap Lake. There will actually be a series of about four presentations under the general heading Snap Lake water quality predictions, and one on sediment impacts.

In the Snap Lake water quality predictions, we also start off with a presentation on how the benchmarks were developed and the water quality criteria that we used, as well as the modeling related to the lake. In the afternoon, we are going on to the north lakes, looking at both groundwater and surface water, both quantity and quality. So Snap Lake in the morning, primarily, north lakes in the afternoon.

So that is the end of my brief introduction, and when Mark begins with his discussions on water quality and quantity, he can I think outline some of the

various short presentations that are fitting in under that general heading. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Pat. Our first presenter this morning is Kevin Himbeault. Kevin has a degree in toxicology with a focus on aquatic effects. Kevin's been working with Golder Associates on similar projects to Snap Lake for the past ten years, so without further ado, I'll turn it over to you, Kevin.

**MR. KEVIN HIMBEAULT (Golder Associates):** Is this on? Can everyone hear me? Thank you, John. Kevin Himbeault, Golder Associates. Good morning, ladies and gentlemen. The purpose of this talk is to provide information on the methodology used to develop the water quality benchmarks and the impact assessment criteria. Specifically, it's to clarify that the hazard concentrations that we used, that the cutoffs and identified are minor, moderate major effects, and I'll get into a discussion on the HC5, 10s, and 20s as we go through the presentation.

This topic was addressed specifically in the environmental assessment report in section 9.4.2, and the generic guidelines were provided in section, or the generic approach was provided in a section within 9.4.2, and the details on the methodology used for the derivation of these, of the benchmarks is provided in appendix 9.8. There is a few information requests on this topic and those were provided.

The impact assessment process, we had designed a couple of... it's basically a pre-designed process to make our decisions as we went through steps of the assessment. Step 1 was to look at the maximum discharge concentrations, and this was based on the removal of suspended solids to a concentration of 5 milligrams per litre. These concentrations were compared to available guidelines, specifically the CCME guidelines, or, if unavailable, we would look at U.S. EPA criteria. Just to point out on thing on the CCME guidelines, to let people know how they're derived, they are generic guidelines that typically look at the lowest effect concentration on the most sensitive stage of the most sensitive species and then a safety factor of 10 is applied to that concentration in order to provide protection of all individuals within a system.

After we compare to the generic guidelines, we move forward into step 2 of the process, and that was to actually model the concentrations within the lake once they were released from the pipe. The parameters there were compared to generic guidelines and anything that was within the generic guidelines was then dropped from the table on that and we moved forward with the more detailed assessment, and this was the focus down into the key parameters of concern.

So out of step 3, to look at the detail assessment and looked at those generic guidelines within Snap Lake. Ones that we need to assess further, we then went ahead and we developed the site-specific benchmarks. This was part of step 3



and the application of Snap Lake. The benchmarks were designed, or were looked at... they look at the entire data set of the toxicological literature and it's called a species sensitivity distribution, and how you utilize this is to... to basically look at effects from a population or community level, so our purpose here was to develop some level, some benchmark that we could then use to assess effects within the impact assessment itself.

This figure here is an example of one of the water quality benchmarks. This is specifically for hexavalent chromium. This is provided in the environmental assessment report in appendix 9.8. How we utilize this approach here is that we did, we looked at the toxicological literature and we narrowed it down to species that were resident to the Snap Lake watershed to or could be or were related to species within that system, so we try to keep it focused on northern species. There is a lot of toxicological literature out there that's focused on warm water species and we did not want that to influence our decisions.

In addition to doing, to putting this together and making our decisions on including and excluding species, we did to some extent the draft guidance document that CCME is currently preparing for the development of site-specific objectives, and the details on that are provided in appendix 9.8 as well. And just to go through this figure, I just wanted to point out a few things -- this is on a long scale on the bottom, so it goes up by a factor of 10 at each interval here. The points that you see on the figure here are correlated to these circles or klydocerins, or the small invertebrates, very small, microscopic animals that live in the water. There is also fish and other invertebrates, which include the bottom-dwelling, the sediment-dwelling organisms and other larger side-swimmers in that that occur within the lakes.

And as you see in the distribution here, there's a fair good distribution of each of the groups. Klydocerins typically tend to be the most sensitive, or, yeah, most sensitive species or group of species within the system.

The Y axis here looks at... it says percent affected, but really what it is showing here is the community, and as you move up here, it is represents 100 percent of the community, so a number up here would basically relate to everything underneath there is... would be affected, and that's not the approach we took, but what we did is we then looked at some benchmarks that I mentioned earlier, 5-10 and -20 as being our benchmark values that we would use within the impact assessment, and I will get into a discussion on those as we go along here, the next slide, actually.

Just wanted to put a perspective on the benchmarks that we derived, and the site-specific benchmarks, and this one's specifically for cadmium, the concentrations you see are adjusted for a hardness of 180 milligrams per litre, and the units are micrograms per litre. What I wanted to point out here is this is the CCME guideline, .055, and this is based on, as I said earlier, the most sensitive species, or the lowest effect concentration report on the most sensitive

species, the most sensitive stage, and then a safety factor of ten was applied to that value. So it is protective of the individuals.

In the literature, and this is adjusted again, and this is the geometric mean of that value, and the lowest chronic value is .7 micrograms per litre for the most sensitive species. And then the other value bears the lowest acute value that was provided within the literature that was also, and this is for again, the most sensitive species tested.

The values at the bottom here are the ones we calculated off a species sensitivity distribution, and the HC-5 is .36, and I just wanted to point out that that is lower than the lowest chronic value that has been reported, although it might be higher than the CCME, it still has that level of conservativeness to it, and the HC-10, as you see, is around that value. And the HC-20, although higher than the chronic value, is lower than the lowest acute value for the most sensitive species, so we thought these were pretty good representation of the levels of assessment of effects within the eco-system.

This one again is a site-specific benchmarks and ...(inaudible)... for hexavalent chromium. It's a very similar results that we got, and what this shows is that the approach that we took was consistent. It showed a similar level of protection with the HC-5 and relative to the acute and chronic values. Again, the CCME value is derived the same way on the protection of individuals. Our focus here in the impact assessment was to see what the effects would be on a population community level approach.

Again, just a summary of the site-specific water quality benchmarks. We used this process for four parameters that were identified as being... or four metals that were identified as potential concern, and these are cadmium, copper, trivalent chromium and hexavalent chromium. And in this figure, in this table here, I just wanted to point out that the CCME guideline has safety factors applied to, and I've stated it several times, for protection of individual. If you remove that safety factor and keep in mind the lowest reported chronic values, what you actually see is that our HC-5 is consistently below that value. Some of our HC-10s, most of our HC-10s are also lower than that value, and in some cases, our HC-20 is also lower than that value. And that gave us some confidence that we weren't being dismissive or we were being, you know, somewhat conservative in using these values.

We took these numbers that we derived using the benchmark approach, or the species sensitivity distribution, and we used these and we set up ranges based on these in terms of the concentrations that we would see. But we didn't stop there in our impact assessment because we think it's important to consider within an eco-system and actually, the area of the water body that would be affected. And so that's basically what we did to develop this table, and this was provided in the environmental assessment report as well, in section 9.4.

And basically what it shows is just the percent water body affected, concentrations, and then our classification in terms of the magnitude of the potential impact, the potential for chronic impact within the system.

And I guess a take-home message on this is that the entire impact assessment really was based on these magnitude decisions and what is the concentration, but what is also the area that will be affected, and that's important to consider when you're looking at an eco-system.

We are... our confidence in the approach is high. The benchmark approach wasn't something we invented for this process. It's a fairly common process and it's very similar to a process that the USCPA has been using since 1985. CCME has also used it for the derivation of the ammonia criteria, and it's being used by institutes in Netherlands and other places, so it is an approach that's used by the jurisdictions.

The benchmark approach uses all the data, and that's what we like about it, is that it actually gets a visual and it uses all the data that's available, so you're not just focusing down on one point that was taken from one lab test somewhere in somewhere.

It's a very visual approach and it looks at the system at a whole at an ecosystem level, and from the work that we did, we found that it had a level of conservatism to it, specifically for the derivation of the HC-5 benchmark. We're very comfortable with that value.

The HC-10 and the HC-20 are consistent with risk-based thresholds used by other agencies and other jurisdictions -- Oregon state, as I mentioned before, the Netherlands, there's a number of working groups in the risk assessment world that utilize these criteria as well.

Just in conclusion, I would just like to say that the impact assessments are based on the maximum concentrations predicted to occur in Snap Lake, so basically we took the highest value that we would expect to see and that's how we based all the impact assessments.

At no point within Snap Lake are concentrations expected to exceed the HC-20 value, and the concentrations above the HC-10 or the HC-5 are predicted to occur in less than one percent of the lake. With that said, I will say thank you for this one.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Kevin. Our next speaker is Mark Digel, who is a water quality scientist with Golder Associates. Mark has been working in this field for the past 13 years and his most recent assignment was as the lead water quality specialist on the Diavik environmental assessment. Along with that, Mark has worked on many projects in the NWT and Nunavut, so I'll pass it over to you, Mark.

**MR. MARK DIGEL (Golder Associates):** Thanks, John. So I've got a series of presentations that I'm going to run through. I'm going to address some of the questions that came up and some of the issues identified for this workshop, and the first presentation that I think...the first presentation I'm going to talk about water quality near the discharge in Snap Lake, and the purpose of this is to talk about the methods that were used to determine the area within which substance concentrations may be above general guidelines, or as Kevin was discussing, the site-specific water quality benchmarks, and describe what effects are related to those areas near the discharge that are above the guidelines or benchmark concentrations.

This topic, concentrations near the discharge, was assessed in the environmental assessment report in the water quality section, 9.4, and the impact assessment methods are described in appendix 9.7. There has also been a number of information requests related to effects close to the discharge and effects areas. And those are listed here.

Just to recap some of the discussion from yesterday in terms of water management, water on the site, the primary source of water is groundwater influence, the underground mine workings, a large portion of which are located are located underneath the lake. As well as surface run-off from the north pile as well as site run-off. All of this water is collected and treated in the water treatment plan prior to discharge into Snap Lake through a single controlled discharge.

So concentration of some substances are above guidelines at the point where they discharge into Snap Lake. So the question is what effect could that have on aquatic organisms in the lake? And what I want to point out here is that the effect is related to the area where the extent of the lake, it could be above guidelines or site-specific benchmarks, concentrations that could have effects to sensitive aquatic organisms. If the area, the proportion of the lake, and this is just shown the pie here, is very small, then we would expect the effects to be small. If, on the other hand, the...

-- Interjection

Okay. I'm just trying not to stretch out this cord... I will kind of hide behind here so people can see. If with the discharge you are actually above... that's not it?

-- Interjection

If you are actually exceeding or above guideline levels or site-specific benchmarks in a large proportion of the lake, then we would have expect your effects to be larger.

There is an accepted threshold for effects that where you could distinguish changes at the population level is an effect to 20 percent of the organism, so if you translate this in terms of exceeding guidelines or exceeding site-specific thresholds, this means that if you are above concentrations at about 20 percent

of Snap Lake, looking at guidelines or thresholds that are intended to provide chronic effects, you would have to effect more than that percent of water body, or more than that percent of the organisms before you would actually be able to distinguish an effect at the population or community level.

As Kevin mentioned in his presentation, 20 percent effect is a level at which you could see effects at a community level. To be protective it terms into defining what effect we could confident that the effects would be negligible, we actually selected a much smaller area.

Keep going. That's the one I was actually trying to get too, representing 20 percent. Keep going. So rather than an area of 20 percent, which is approximately one of these squares, we selected an area, a threshold for models of which we would consider effects to be negligible to be one percent of Snap Lake, or in general, one percent of the water body. This green area is a representation based on the actual modeling of one percent, of an area, one percent that could be above a guideline. So our effect threshold for negligible effects is if we are below water quality guidelines, or site-specific thresholds within one percent of Snap Lake, and what we are saying there is, overall, effects to aquatic populations or communities of Snap Lake would be negligible if guidelines or benchmarks can be met within one percent of Snap Lake.

So that still raises, the question was asked, well, what happens within that one percent area, and for the different chemicals that are released as part of the discharge, what percentage of Snap Lake do they actually exceed guidelines or exceed benchmarks in? So what we did with the model is actually predicted the maximum concentrations that we would expect to occur in Snap Lake, and the minimum resolution of the model is actually at the boundary of a 60-metre radius around the discharge, and this 60-metre radius, the area within that represents about .01 kilometres squared, or about one percent of Snap Lake, and as I'll go into a little more detail on the next slide. The reason for this is the discharges, a submerged discharge located approximately or proposed to be located approximately 100 metres offshore, and the discharge has a diffuser structure. And the intent of the diffuser is to provide a high level of initial mixing of the discharge into the water column so as to minimize the concentration that aquatic organisms could be exposed to in Snap Lake. So this is a representation of the conceptual diffuser design that was developed for the project, and it's a... it has a series of vertical ports that are intended to provide relatively high velocities so that you create an area of turbulence, and you get rapid mixing of the discharge with the ambient water. And what this results in... is if the actual spacing of the ports here is about ten metres each, and so the total spacing is about 60 metres, and then there's a 30-metre zone around this where you would have turbulent conditions. And so you expect very rapid mixing, so concentrations within this are going to be close to the fully mixed zone at this boundary, but within the realm of modeling, you can't resolve concentrations within this, but what we can say is what concentrations are at the boundary of this area.

So if we go back to looking at Snap Lake, this represents a 60-metre radius around the discharge and how it fits within this one percent zone within which we would define effects to be negligible. And just to sort of run through part of what Kevin went through in terms of the assessment process, the first step was to look at substance concentrations in the discharge and compare them to general guidelines that are intended to be protective of the individuals, particularly for the metals. If the maximum concentration of the discharge was below the guideline before being released into Snap Lake, then we were confident that the effects of that on aquatic organisms would be negligible.

And so the first step was to look at a list of parameters for which we had guidelines and compare them to the discharge concentration and eliminate those which were below the guidelines in the discharge, and focus on those which were above guideline levels in the discharge.

The next step was to then take that subset of the substances and predict the maximum concentration that we would see in Snap Lake, and that's that concentration after that initial mixing that the diffuser provides, and so at the boundary of that 60-metre zone. If those maximum concentrations were below general water quality guidelines, then we determine that the impact of those substances would be negligible, and they were eliminated from a more detailed assessment.

The remaining parameters were actually modeled to determine the full extent that there could be without stepping back, those remaining substances we developed to site-specific water quality benchmarks for, and that was cadmium, copper, and chromium, the two forms of chromium, so we actually predicted concentrations within Snap Lake and then from those modeled concentrations, calculated areas that could be above the different site-specific water quality benchmarks.

And then based on the area that was above the specific benchmarks, we classified the impact as either negligible, low, moderate or high based on which benchmark was exceeded and in what proportion of the lake, and that was that table that Kevin showed.

So this is the results of that modeling, and I'll run through each of these metals. So for cadmium, the maximum concentration in the discharge was above the general guideline, so at that first step, we determined that there was a potential for it to have effects. If we looked at the maximum concentration in Snap Lake, it was also above the general guidelines, so we then... so that told us that we couldn't eliminate it as having a potential effect just based on a general guideline that is intended to protect the most sensitive life stage or the most protective, most sensitive individual. So we developed a site-specific benchmarks for cadmium to look at a level that could cause effect to 5 percent of the community, the most sensitive organisms, 10 percent and 20 percent.

What we found out is that the discharge concentration was below the HC-10 and the HC-20 concentration, and that concentrations in Snap Lake exceed the HC-5 concentration in less than 1 percent of Snap Lake.

For copper, the discharge concentration, although it was above the general water quality guideline, it was in fact just above the general water quality guideline and was below all three of the hazard concentrations. For hexavalent chromium, the discharge concentration was below the HC-20 concentration, and higher than the HC-10 and the HC-5 concentration in less than 1 percent of Snap Lake. So on the basis of chemical specific guidelines, all of the parameters are met within either prior to discharge in Snap Lake or within a very small area, within less than 1 percent of Snap Lake. So on the basis of guidelines and benchmarks for specific chemicals, the effects to Snap Lake would be negligible at a community or population level within the lake.

We know the discharges are consist of different chemicals, not all of which have guidelines and there is a potential for interaction of different chemicals in the discharge, so we also look at whole effluent toxicity, and what that is is during the... actually take a water or an effluent, and you actually expose organisms to it and you look at, in the case of acute toxicity, you look at levels that would, whether or not that effluent would cause acute levality, so it would cause levality to aquatic organisms. Or in the case of looking at concentrations in the lake, does the discharge have the potential to case chronic, core effluent toxicity, so if you expose organisms to it, are there some lethal effects in terms of growth or reproduction, that you can distinguish when you put organisms in that water.

So from the pilot plant testing as well as the underground workings as part of the advanced exploration, we were able to collect waters that would be representative of the final discharge, and in fact, conservative representations of the final discharge, and we were actually able to calculate the chronic toxicity that they can cause if aquatic organisms were exposed to them. Then we can take that chronic toxicity and model it in the lake, so if we look at concentrations of the effluent, or the discharge in the lake, does it have the potential to cause chronic effects in the lake?

And what we found is that the threshold for chronic toxicity, so this is levels at which you could cause sub-lethal effects, has the potential to exceed the toxicity threshold in 1.1 percent of Snap Lake. And on the basis of this, water quality impacts to Snap Lake were classified as low. This is above the 1 percent threshold, but just above the 1 percent threshold.

So the conclusion is the water quality assessment used a protective threshold for defining negligible effects to aquatic populations and communities in Snap Lake, and this threshold was the concentrations had to be above benchmarks in less than 1 percent of Snap Lake for us to be able to define effects as negligible. This threshold provides overall protection for aquatic populations and communities in Snap Lake and limits the potential effects to sensitive aquatic organisms to less

than 1 percent of Snap Lake. And that last one's an important point because both the chemical specific and the whole effluent toxicity are dealing with sensitive aquatic organisms, and so if you're meeting that within a small proportion of the lake, that you're limiting potential effects to sensitive aquatic organisms and you're providing a high level of protection to aquatic population in the communities throughout Snap Lake.

That's the first presentation that deals with effects near the discharge. The second presentation... okay. I'm going to try for the remaining presentations to stand here.

The purpose of the second presentation is to provide more information on... no, that's the third presentation... provide more information on the nutrient model that was used to predict the effects of phosphorous loading from the treated water discharge on algae populations in Snap Lake, and also to provide some information on the phosphorous concentrations that were used from the groundwater results, which makes up most of the phosphorous in the treated water discharge, and then to just discuss the response of algae in Snap Lake to nutrient inputs in the treated water discharge.

The nutrient modeling and the assessment of effects or changes in... related to nutrient loadings is addressed in the environmental impact in the water quality section, 9.4 and the methods and the description of the nutrient model is provided in appendix 9.7, and there were also a number of information requests related to the nutrient model and nutrient inputs.

I should mention that the focus has been on phosphorous, which is only one of the nutrients. There is also, you know, the other main nutrients are carbon and nitrogen. The focus is on phosphorus because it's the nutrient that's in the shortest supply in the lake, so it's the nutrient that limits the growth of algae in Snap Lake and in most lakes.

Because the Snap Lake project doesn't exist yet, the changes that could occur in Snap Lake must be predicted or modeled. You can't go out and measure them because it hasn't happened yet, so it's a model that changes in concentration. We've used a two-dimensional hydrodynamic -- hydrodynamic is just a technical term for a model that calculates, that simulates the circulation or the flows of water within a lake, and water quality model called RMA. Why do we use RMA? Well, RMA uses established equations for nutrient and phydo-plankton dynamics, and these equations are in fact common to most lake and water quality models. The RMA models simulate lake circulation and mixing, which are important factors in Snap Lake, and it's a continuous model in that it is able to predict changes in concentration in the lake over time, and the model is one of the standards for modeling circulation in lakes and water quality in lakes. It was originally developed by the U.S. Army Corps of Engineers. It's widely accepted. It's considered to be a proven model, so all-in-all, it's a well used, credible model that simulates the main processes that are important in Snap Lake.



This is a simplified representation of nutrient and alga interactions within a lake. ...disadvantage of being back here. So the model accounts for the mass balance, inflows of nutrients and outflows of nutrients, and then the storage of those nutrients within the lake. It accounts for the interaction of nutrients, so the uptake of nutrients by phydo-plankton or algae, and the photosynthesis and respiration or release of those nutrients back into the water column.

It accounts for limitations of sunlight as it passes through the water column, as well as the seasonal variations of temperature, which affect nutrient and phydo-plankton dynamics. The model also accounts for settling or organic particular forms of nutrients as well as phydo-plankton, and the model can account for the release of nutrients from the sediment. This is shown as a dashed line because, for Snap Lake, these sediments act as a net sink for nutrients because oxygen concentrations remain well above zero throughout the water column, and an expected result provides some more information on later, are expected to with the project, so we don't have conditions, anaerobic or low-oxygen conditions in the sediment that are going to promote the release of nutrients, so the sediments actually act as a net sink for nutrients, meaning that more nutrients are settling out and accumulating in the sediment than are being released from the sediment.

How is the RMA model used? There is a... it's a relatively complex model, and it contains a number of parameters that must be calibrated so that it represents the rates of processes that are occurring at Snap Lake, so we do have measured baseline concentrations in Snap Lake, so the model was calibrated to those conditions to set the rate parameters so they would be representative of what's occurring in Snap Lake under baseline conditions. So model parameters were varied within accepted ranges to provide a good agreement between measured values and the model values, and this just shows the average summer measured concentrations for algae, phosphorous, nitrogen, and several forms of nitrogen, and it shows relatively good agreement between the measured values and the simulated values.

And model parameters for those rate co-efficients within the model that define reaction rates were varied within accepted ranges and for ranges that were appropriate for northern lake. This just shows an example of an alga settling rate. If you look at the literature, you get a range for alga settling, and this is for total phydo-plankton, that ranges from about .02 metres per day up to .6 metres per day, and the model, the value of it was calibrated for Snap Lake is at the low end of this range, at .08 metres per day.

So the model also included the sources of nutrients that could affect alga concentrations in Snap Lake. And those phosphorous sources, the primary source of water in the discharge is the inflows to the mine, and this is a diagram that I think you've already seen, and I just wanted to bring it up to point out the fact that the source of water into the mine changes all over time. During initial operation, the primary inflow to the mine is the carnate, or the old groundwater that's been there for long periods of time, and as the mine advances, and this

water, it flows into the mine it's replaced by relatively young water seeping into the workings from Snap Lake, and over time, the proportion of carnate groundwater stays relatively constant, but as the mine inflow increases, the primary source of that water over time becomes relatively fresh inflow from the lake, so this just shows the carnate groundwater, the lake water contribution, and then the sum of these two is the total mine water. So the inflow and then this affects the phosphorous which is coming into the mine isn't just the carnate groundwater.

There is also the forms of phosphorous that's in surface inflows to rates and in groundwater differs. This shows in a simplified way the three main forms of phosphorous in terms of increasing biological availability, and that just means the ability of algae or phydo-plankton to utilize that phosphorous. So mineral forms of phosphorous are not biologically available. Phydo-plankton or algae could not utilize that phosphorous in that form and the conversion of that to more available forms occurs only at a very, very slow rate. Organic phosphorous is a more biologically available form. It's not directly available to aquatic or to algae, but it converts more rapidly to orthophosphate, which is the form of phosphorous which is readily bio-available.

If you look at lakes at Snap Lake and the inflow to Snap Lake, the phosphorous consists primarily of two forms -- organic phosphorous being the highest proportion of phosphorous and then orthophosphate, which represents about 10 percent of the total phosphorous in Snap Lake and the discharges to Snap Lake.

The groundwater, on the other hand, contains very little organic phosphorous, and the highest proportion of the phosphorous is made up of mineral forms, appetite and other phosphorous bearing minerals. And then the smaller proportion is actually dissolved and the dissolved bio-available form of phosphorous. It's this orthophosphate component or that biologically available, the portion in the groundwater that could affect alga concentrations in Snap Lake that was carried forward into the modeling.

So if we look at how the mine water discharge could change phosphorous in terms of concentrations and the forms of phosphorous and the inflows to Snap Lake, if we look at the baseline inflow, we see that it's the concentrations are in the order of 10, on average around 10 micrograms per litre, and the majority of that is organic phosphorous with a small proportion of orthophosphorous. If we take the biologically available proportion of the mine water inflow, so that's the orthophosphorous and you add that into Snap Lake, the concentration of that, a conservative estimate of it is that it's going to be around the same concentration, so 10 micrograms per liter. So if you take the baseline inflow that's the surface runoff into the lake and then you add the mine water inflow, if they both have the same concentration, then the resulting combined inflow will have the same concentration but you will have changed the proportion of organic phosphorous to orthophosphorous, so you will have increased the proportion of orthophosphorous in the inflows or the loading to the lake. And the modeling

predicts, as you would expect, because even though you are not adding more biologically available phosphorous, you're adding more of the form that can be immediately taken up by the algae, so the model predicts that the alga concentrations are going to increase with the mine water discharge, and the model predicts up to a 40 percent increase in alga concentrations because of the more available form of phosphorous in the mine water discharge.

Why do we think that these are conservative? If you look at some of the results from the pilot testing, it showed total phosphorous concentrations in the untreated mine water in the order of 111 micrograms per litre, with the dissolved phosphorous of 15 micrograms per litre and orthophosphorous of 20 micrograms per litre, and this is for one particular sample that was used as part of the treatment. With treatment, so with the pilot treatment, you had a significant reduction in the total phosphorous concentration, and that is what we would expect with a high level of solids removal, because what this shows us is if you take the difference between the ortho and the total, or the dissolved and the total, a high proportion of that total phosphorous is in particulate mineral forms, so by significantly reducing, so taking those concentrations down to less than five milligrams per litre, you remove almost all of that particulate phosphorous. What the treatment also shows us is that it's effective in removing a substantial proportion of the dissolved and the orthophosphorous from the mine water.

And if the... in the environmental assessment, we didn't account for the removal of dissolved forms of any of the substances we looked at. We only accounted for the removal of particulate forms of substances, and that included phosphorous, which is why we included the orthophosphorous in the mine water without accounting for any reduction. But if you look at the treated total phosphorous concentration, it's in fact the same or a little lower than the orthophosphorous that was used in the environmental assessment to represent phosphorous, the bioavailable form of phosphorous in the water discharge. And if you compare the orthophosphorous that we used in the model, which is the biologically available form, it is substantially higher than the orthophosphorous concentration in the treated mine water.

The modeling in Snap Lake predicted an increase in alga concentrations associated with having a higher proportion of orthophosphorous, which is what you would intuitively expect. The model also told us that the total amount of biologically available phosphorous in the lake is... could decrease. And the... there's a number of reasons for that which I'm going to try to run through, to try to take a very complex set of processes that are represented in the model and just sort of simplify them so we can look at it in a way so we could understand how we could have a reduction in total phosphorous concentrations in the lake.

So first of all, there is no increase in the total bioavailable phosphorous in releases to Snap Lake. So you take the surface runoff at about 10 micrograms per litre and you add another inflow, so another stream that's about 10 micrograms per litre and you mix those two together and the result still has an

inflow concentration of about 10 micrograms per litre. So you're not changing the total concentration in the lake. You're adding more water in, but it's coming in at the same concentration. But what you are resulting in is a considerable increase in the proportion of orthophosphorous, or that proportion of the phosphorous that can be readily taken up by phydo-plankton in Snap Lake.

And this results in an increase in algo concentrations in Snap Lake without a concurrent increase in total phosphorous concentrations. Having an increase in algo concentrations results in a higher proportion of particulate phosphorous or phosphorous bound up in organic molecules that can settle out of a lake. And if you look at phosphorous lost from the lake due to settling, the loss from the lake is proportional to the concentration of algae, the fraction of phosphorous which is constant, and the algo settling rate which has caused them.

So if by adding a higher proportion of bioavailable phosphorous, you increase that concentration of algae in the lake, then your loss of phosphorous from the lake actually increases with the project, so you can actually have a simulation of the algo concentrations, but have more phosphorous loss from the water column because the system and the model is achieving, trying to achieve an equilibrium and that equilibrium is changed by not increasing the phosphorous concentration but by making it more biologically available. And another way of trying to look at this is from some of the sensitivity... one of the sensitivity runs that we did as part of the modeling. And so under baseline conditions, we calibrated total phosphorous and algae to measure concentrations, so these concentrations are very close to what we measured as average, open-water conditions in Snap Lake.

If we were to take this settling rate and we were to set it to zero, so we said there's no loss of phosphorous from the settling of algae, then what this does is the model would then predict higher, total phosphorous concentrations in Snap Lake and higher concentrations of algae, because you are not losing that phosphorous from the system through settling. So it's just showing a mechanism whereby algo settling reduces phosphorous concentrations in the lake.

In conclusion, the nutrient model, or the RMA model that we used to model nutrients in Snap Lake was appropriate for predicting the effects of the changes in nutrient loadings on algo concentrations in the lake. With the project, the concentrations, the total biologically available phosphorous in Snap Lake are not expected to increase above baseline concentrations. However, there's the potential for greater proportion of orthophosphorous in the mine water to increase algo concentrations, and if we look at the worst case, the conservative case that was simulated without any removal of that, it could increase algo concentrations in Snap Lake by up to 40 percent.

The results of the pilot testing, the water treatment showed us that we expect that algo, increases in algo concentrations in Snap Lake will be lower than were predicted.

So I've got two more presentations, just in case people wonder if there's any end to these.

This one follows on from the previous presentation which looked at the effect of the mine water discharge on alga concentrations in Snap Lake. This presentation looks at what secondary water quality effects that increase in alga concentrations could have on Snap Lake, and this is the increase in alga decomposition could result in decreased dissolved oxygen concentrations in the lake, particularly in winter. And the decrease in dissolved oxygen concentrations could in turn result in changes in nutrient and metal mobility in lake bottom settlements.

And secondary effects on water quality was addressed in the water quality section of the environmental assessment, section 9.4 and the methods are described in appendix 9-7. There were also a couple of information requests related to secondary effects.

This is a simplified diagram showing the dissolved, processes that affect dissolved oxygen concentrations in Snap Lake. And it's sort of divided into two halves. One is the open water period and one is the ice covered period. And in terms of the open water period, you have external sources of oxygen that can come into a lake in terms of inflow, and this, to a certain extent, can happen under ice-covered conditions, so inflow will contain oxygen, bringing oxygen into the system. You also have what's referred to as reoeration, which is the exchange of oxygen between the air and the overlying water column, and that sets up an equilibrium, and if you have processes that reduce concentrations of oxygen in the water column, then reoeration will tend to introduce more oxygen into the water column. If you have processes that increase oxygen concentrations above that equilibrium, then you will tend to move oxygen from the water column into the overlying air.

There's also internal processes that can consume or produce oxygen in the water column. Photosynthesis by phyto-plankton algae can convert carbon dioxide to organic carbon and releases oxygen into the water column. The respiration and decay of organic material consumes oxygen and the conversion of ammonia to nitrate also consumes oxygen, and that's referred to as nitrification.

The decay of organic material in the settlement can also consume oxygen, and this is commonly referred to as a settlement oxygen demand. Under open water conditions, the oxygen concentrations in Snap Lake and in lakes in general tend to be dominated by reoeration, so the amount of oxygen that can be introduced to the system through reoeration offsets any of the internal sources that can consume oxygen within the water column. And in fact, you tend to have a net reduction of oxygen on average within the water column during the open water period, so the net result is you have well-oxygenated conditions throughout the water column in the open water season.

In the winter, you create an ice cover, which effectively prevents that exchange of oxygen, which means the air and the water, and it also limits light penetration into the water column and temperatures are lower in the winter, so your amount of photosynthesis decreases. And so in lakes, your internal processes can result in net decrease in oxygen concentration in lakes over the course of the winter. And if you increase the amount of the alga concentrations in the lake, you're increasing the amount of organic material, and in the winter, that could cause an increased amount of organic decay, and an increased loss of, or lowering of oxygen concentrations.

So the effects on oxygen levels were assessed, and for open water conditions, the nutrient model, which includes the dissolved oxygen balance, was used to predict changes in summer or open water dissolved oxygen concentration. During the winter, the winter oxygen modeling assumed that all of the algae that was produced over the course of the open water season would decay over the course of the winter and would consume oxygen. The modeling, both for the open water and the winter also accounted for nitrification of ammonia, because we know the mine water discharge, or the treated water discharge contains ammonia, and so that's an additional source of ammonia which can decay and consume oxygen, so these were accounted for in the model. The model also accounted for things like BOD, which is a biochemical oxygen demand, which is just a measurement of the reduction in oxygen from the decay of organic material from the sewage treatment plant, so it included all sources, internal sources that could consume oxygen in the water column.

So if you look at dissolved oxygen profiles that were measured in the lake, so under baseline conditions, we see that during the open water period, oxygen concentrations are well aerated and relatively constant throughout the water column, so if a typical concentration of around 11 milligrams per litre of dissolved oxygen, which at the temperature at the time this was taken, is about saturated conditions in the lake.

In the winter, you can have the decay of organic material can actually cause a reduction in dissolved oxygen concentrations in deeper parts of the lake. This particular profile was taken from a deep part of the lake that's about, or... 28 metres deep. And so this is much deeper than average in Snap Lake. The average depth in Snap Lake is about six metres, so this represents... which would be about here in the profile, so this represents a deep portion of Snap Lake and what you see under baseline condition is that you get well-oxygenated conditions at the top, and then a decrease in oxygen concentrations to a minimum of 5 to 8 milligrams per litre that was measured in some of the deep areas. In shallow areas, you would see the oxygen concentration would remain similar, or certainly above 10 to 12 milligrams per litre. But in some of the deep areas, you can get oxygen concentrations down as low as 5 to 8 milligrams per litre, and that's due to decay of organic material in the water column and in the settlement, reducing oxygen concentrations. So we then... we just did the maximum... or the decreases that could be associated with the increase in alga

concentrations, loading of BOD from the sewage treatment plant, as well as ammonia from the sewage treatment plant in the mine water discharge. And under summer, open water conditions, there was no measurable effect in terms of dissolved oxygen concentration, and that's because the increase in alga concentrations has a net reduction of oxygen, and you get effective exchange of oxygen between the air and the water column, and you can maintain...(inaudible)... that dissolved oxygen concentration near saturation.

In the winter, the modeling showed us that you could expect between 0 and 1 reduction at the... in the water column at the surface, between 0 and 1 milligrams per litre increasing at the base of the water column, so at the sediment/water interface, to 1 to 2 milligrams per litre. And this could result in deeper parts of the lake for concentrations at the surface in the area of 14 to 15 milligrams per litre, and in the deeper areas, minimum concentrations in the order of 3 to 7 milligrams per litre, so 1 to 2 milligrams per litre lower than what we've seen under baseline conditions.

And the... in terms of secondary effects of dissolved oxygen concentrations on nutrient and metal mobility, what the modeling shows us is that even in the deeper parts of the lake, dissolved oxygen concentrations are well above zero, and it's when dissolved oxygen concentrations get down to or very close to zero that you expect that you can change the mobility of nutrients and metals in the sediments, so the oxygen concentrations in the lake are well above the levels that you would expect changes in the mobility of nutrients and metals in the sediment.

So in conclusion, the changes in dissolved oxygen concentrations aren't expected to be measurable in the summer or under open-water conditions. It could result in a maximum decrease of one to two milligrams per litre in winter, and dissolved oxygen levels in the lake will remain above levels that could affect the mobility of nutrients and metals in Snap Lake sediment.

The final presentation this morning is to provide more information on potential effects to sediment quality in Snap Lake. And the potential pathways are settling of fine solids in the treated discharge, and the metal concentrations contained in those solids. And the second one is the absorption of metals to suspended solids, and then the settling of those or the direct absorption of metals to sediments.

Effects on sediment quality were addressed in the environmental assessment report in sections 9.4 and 9.5, and there were also two information requests that were responded to or related to sediment quality.

If we look at settling of suspended solids, as Tom mentioned yesterday, the water treatment plant is being designed to achieve a very high level of solids removal down to concentrations of less than 5 milligrams per litre. And what this diagram here is showing us, based on sediment columns, or column settling

experiments that we've done on sediment in mine water discharge, we find is as you decrease the concentration of suspended solids, you decrease the settling rate. And at very low suspended solids concentrations, you've in fact settled out all of the settle able material and your settling rate is essentially zero. So you've got your very fine suspended material at concentrations less than 5 milligrams per litre. And we don't expect any significant settling, any settling of that material in Snap Lake because we've got a high level of solids removal and you are preferentially taking out the coarser fractions, and you are leaving low concentrations of suspended solids that have a very low or negligible settling rate.

In terms of metal sediment reactivity, and this is the ability of sediments to accumulate metals, the metals in the mine water come from groundwater and the rock material that is being mined out of the underground workings. And both of these sources have low reactivity in terms of the metals, so we expect that the low levels of dissolved metals that are in the mine water will tend to remain dissolved, and the majority of the particulate metals will remain as particulates either incorporated into the mineral framework or absorbed to solids. The mining in the process plant does not add metals to the mine water discharge. And in fact, the water treatment process that Tom described yesterday will preferentially remove the reactive forms of metals and the solids themselves, so the resulting mine water discharge is expected to have a low reactivity.

Conclusions, the effects of the mine water discharge on sediment quality was is expected to be negligible for two reasons. I mentioned the high level of suspended solids removal in the water treatment plant and the low expected sediment reactivity of the solids in the treated water discharge.

And that concludes the presentations.

**MR. JOHN MCCONNELL (De Beers Canada):** Okay, thanks, Mark.

**MR. MIKE BELL:** You are doing great in terms of timing and I appreciate the fact that your presentations are on time. In fact, this one's ahead of time because we gave you a late start. We'll take a break and come back at 10:30.

-- Break

**MR. DON MACDONALD (DIAND):** ...would think with this little sticky in front of me that says name and organization, I could remember to do that.

**MR. MIKE BELL:** Just sing happy birthday to yourself, it helps, you know? Don.

**MR. DON MACDONALD (DIAND):** Shall I just keep proceeding here until I'm done?

**MR. MIKE BELL:** Just keep proceeding.



**MR. DON MACDONALD (DIAND):** Oh, okay.

**MR. MIKE BELL:** We're on a roll.

**MR. DON MACDONALD (DIAND):** I'm happy to do that. My name is Don MacDonald, Indian and Northern Affairs Canada.

-- Laughter

Thank you. Appreciate that. We talked this morning a little bit about the approach that was used to generate the hazard quotient, and generally, by the way, I'm happy with what I see in the methodology. It was well-done and consistent. I have probably some fundamental differences of opinion in terms of how it should be done, but that doesn't affect the fact that the way it was done in the assessment was very consistent and I appreciated the level of documentation there.

Having said that, in Canada, there is a procedure for deriving Canadian water quality guidelines, there is a procedure that's under development for developing site-specific water quality objectives as well, and the approach that was used in this case is essentially the recalculation procedure that has been abdicated also by the Canadian Council of Ministers of the Environment. The one major difference that I see between the approach that was used here in the assessment and the recommended approach for Canada is the emphasis on the species sensitivity distribution models, which is essentially an EPA driven approach except for ammonia here in Canada. That's the only time it has been used by the CCME and it's also been used I think for chloride by B.C., whereas the Canadian approach typically is to focus on the lowest observed effect concentration as the primary basis for setting those benchmarks. That has some implications, of course, in terms of what kinds of values ultimately get generated for use in the assessment. And I've gone through the process of looking through the toxicological database that was assembled to support the calculation of the benchmarks, and I apologize for the long preamble, but it's kind of important to the question.

And what I find is that when I look at the actual data for, for example, copper or... well, specifically for copper, I see that there are lowest observed effect levels in the toxicological database that are lower than the HC-5 concentration in some cases. And those in fact were acute toxicity, acute LC-50s for sensitive species, in this case, klydocerins. And so what I'm wondering is to what extent did you all review that information. I know what you did was you looked at the reported chronic toxicity values, but did you also look at the reported acute toxicity values when evaluating the level of confidence that you placed in the HC-5 concentrations?

**MR. KEVIN HIMBEAULT (Golder Associates):** Don, if I have your question correct here, you're wondering if we considered any of the acute data when we

developed our species distribution, species sensitivity distribution? The answer to that is yes, we looked at the acute data. Where there was chronic data available, we would use the chronic data. If there wasn't chronic data available for the species that was included in the distribution, we would use an acute chronic ratio to predict what a chronic value would be.

I'm not sure if looking at the data set, you've taken into consideration that it is, there is a hardness correction on there as well in our species sensitivity distribution, and I guess that's the question. There may be some confusion in the two tables that we present, in that the main database, the data's actually presented on a hardness of 50. And we did that adjustment afterwards to adjust it to a hardness of 180, and that may be where that difference is coming in. I hope that helps.

**MR. DON MACDONALD (DIAND):** Kevin, thank you. No, that's not really my question, but thank you for that answer anyway. The question was did you go back then, and I know you looked at the chronic toxicity data, and ask the question is our hazard quotient five lower than the lowest chronic value that was represented in the database? And I agree that you've done that and that was done appropriately. What I'm specifically referring to is some of the acute toxicity values. In this case, they refer serodaphnia dubia, and yes, I did understand, by the way, that the data presented were normalized to 50 milligrams per litre of hardness, and that you then have to use the slope and the conversion equation to generate values for 180 milligrams per litre of total hardness, but if you look at some of the values, for example, from Bright 1995, you will see that the studies were conducted at a hardness of a little over 400 milligrams per litre of calcium carbonate and the reported LC-50s adjusted to 50 milligrams per litre were 1.5 and 1.6 respectively, and then I went ahead and used a slope that you reported in the appendix... sorry, that's on page... it's on the second page of the table, about halfway down. And then I used your equation to normalize those values to 180 milligrams per litre, and essentially calculated lowest observed effects levels at 180 milligrams per litre of water hardness of 4.8 and 5.2 milligrams per litre, both of which are lower than the hazard quotients.

And the reason that I bring that up is that those were acute LC-50s, so the concentrations that resulted in 50 percent mortality to the exposed organisms, and then if you apply an acute to chronic ratio to those types of values, then you see effect thresholds that are even lower than what I'm talking about here. And this is a concern for me because it appears that the klydocerins are the most sensitive representatives of the community that are present in Snap Lake, and also that they represent important fish food items, and so for me, it's important to make sure that as we're doing the assessment, we establish thresholds that are going to allow us to evaluate effects on the species that we think are... you know, I've used the term keystone species previously when we've discussed this. I think it's really important that we make sure that we do not have adverse effects on really important species in the ecosystem, and I think klydocerins really are a very important species.

**MR. KEVIN HIMBEAULT (Golder Associates):** Thanks, Don. The approach that we took was actually, if you... looking through that database, there's about a page-and-a-half of data, acute toxicity data that has been developed for serodaphnia dubia, what we did was we took that information and we calculated out the geometric mean of that of all that data that's available. What that does is it provides you... it takes away issues that may be there in terms of different laboratory techniques, and it focuses into what is the most common measured value that has been seen for these tests. We took those values, we came up with a species mean acute value of 8.9, and that was at a hardness of 50. We then adjusted that value and applied our acute chronic ratio to come up with the chronic value for serodaphnia dubia at about I think it was 10... around 10.5. So to make a long answer short, we did consider that, but we did it based on the geometric mean values, and we felt that was a good way to represent all the data that is available on this species.

**MR. DON MACDONALD (DIAND):** Kevin, thank you. I'll get the hang of this yet, honest to goodness. Yes, I appreciate that and it really reflects the differences between CCME recommended approach and the USEPA approach, and this is one of those places where we are simply likely to agree to disagree on the approach, but I understand what you've done, but I did need to identify that as a concern.

I think I'll yield the floor here for a little bit, and then maybe if I could come back later on a couple of other issues.

**MR. MIKE BELL:** Just a point, when you're dealing with an issue that's this complex between two groups, it might be better to do a sidebar somewhere along the line as your... I mean, not now, but if you want further information, the offer's been extended by De Beers so I'm sure people would be quite happy to meet with you to discuss things in more detail.

**MR. NEIL HUTCHINSON (MVEIRB):** I wanted to talk a bit about the phosphorous modeling that was done, and the first question I had was the data that was presented for the water treatment plant pilot testing showed, which was used in your modeling, showed that your total phosphorous was reduced from 111 in untreated water to 9 micrograms per litre in treated water. Now this strikes me as a very, very superb pilot plant if it's able to achieve these low levels. We heard Tom Higgs say yesterday that you are hoping to get 200 micrograms per litre from your sewage treatment plant, and it raises two questions; one, is this an overly optimistic pilot test, and two, if it's real, should we combine the sewage stream and the water treatment streams and get superb phosphorous removal onto the lake?

So first of all, I would just like to have somebody speak to the water treatment plant.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. We'll be with you in a moment.

-- Laughter

**MR. TOM HIGGS (AMEC):** There's a couple of issues, and certainly the issue of the sewage treatment plant in terms of phosphorous removal, that would seem relatively conservative when you look at the results of the pilot plant work on the mine water, but the thing you have to bear in mind with the sewage treatment plan is that it's starting with a considerably higher initial phosphate level of 15 milligrams per litre compared to mine water, which starts in the PPB range, which is reported in the EA.

There's two things to keep in mind here as well, is that the pilot plant test work was done based on collected mine water samples, which were taken, bulk sample taken from the mine near the end of the advanced exploration program, and that was as much as we could generate a representative sample contained high levels of solids, but there are those limitations, based on that. And we use that for our pilot work.

The modeling work that Ken DeVos has been presenting, it was a model based on looking at all the inputs from both mine water and from the surface run-off, and then doing a prediction of the discharge water quality based on the 5 milligrams per litre target that we had set up for ourselves. So there's basically two systems here, one which is the testing on the real sample and the other which is the modeling. Obviously done to come up with a prediction.

I will go back to the pilot work. The pilot work was obviously done to simulate a number of different flow sheets, and the flow sheet that we have assumed to be, the preferred flow sheet at this point is to use a thickener followed by flocculation, coagulation, and then filtration. And in the pilot work, that was evaluated. We used ferric sulfate as a coagulant prior to filtration. So certainly you would expect that there would be some phosphorous occurring in that process, which obviously the results would tend to indicate, but I am somewhat hesitant about saying that is something that we should accept as a proven process because we are starting off with a very very low initial phosphate level. We have not basically taken credit for that removal that may occur with ferric sulfate in the modeling. So the modeling stays conservative because it assumes that the soluble species will stay in solution and will not be precipitated out by coming in contact with a coagulant like ferric sulfate.

**MR. NEIL HUTCHINSON (Gartner Lee):** I guess what I am getting at -- I think what you said, Tom, is that you don't want to put a lot of high faith in these pilot results from the water treatment plant, and I would interpret that as meaning that we might want to try repeating running the utrification model say with 20 micrograms per litre of ortho-phosphate, which is the untreated value from your

mine water, and see the results and come up with a range of responses based on how effective the treatment plant might be.

**MR. MARK DIGEL (Golder Associates):** The particular sample that was used in the pilot treatment had an ortho-phosphorous concentration of 20 micrograms per litre. What we actually used in the modeling was the average ortho-phosphorous concentration that is expected in the mine water inflows. So 20 was just from one sample. We have used the average, which represents, over time, the total amount of ortho-phosphorous that you are expecting to come into the mine that would be discharged into Snap Lake, rather than a value that was just in one particular sample.

The other thing is that Tom had mentioned about the differences between the sewage treatment plant water and the mine water, and I just wanted to put that in context. If you look at the feed going into the sewage treatment plant the ortho-phosphorous in terms of micrograms per litre is about 15,000 micrograms per litre of ortho-phosphorous, whereas in the mine water the ortho-phosphorous average is 10 micrograms per litre. In that one particular sample the ortho-phosphorous was 20 micrograms per litre, so they are very different waters.

**MR. NEIL HUTCHINSON (Gartner Lee):** Okay, so you are happy then with the 10 microgram per litre ortho-phosphate used in the model. I am pleased to see the treatment plant performing that well and look forward to following through on that. One of the other concerns I have had with the modeling is, first of all the explanation this morning on how phosphorous can actually decrease with the extra loading was clarified a lot in my mine and thanks for putting up that equation that did that; but it also seems that your responses depend on assumptions that, certainly in the lake water, organic phosphorous is not at all bio-available. You have equated phosphate in the mine water to phosphate in the lake water, and have not accounted for the organic form of phosphorous which in an equilibrium situation would tend to move between compartments. Ortho-phosphate would be taken up by algae and it would then become organic phosphorous, and there is quite a bit of shifting about between the two pools.

Do you think it would be worthwhile to address organic phosphorous in this modeling?

**MR. MARK DIGEL (Golder Associates):** The model actually does incorporate organic phosphorous, and it does account for the uptake of ortho-phosphate and the conversion then of that phosphorous to organic phosphorous, then as the algae dies and respire that mineralization of organic phosphorous back into an ortho-phosphate form. So that mineralization or that conversion of organic phosphorous back to ortho-phosphate is included, so that cycle that you are talking about is already included in the RMA model.

**MR. NEIL HUTCHINSON (Gartner Lee):** Thank you, that is a good explanation. One more question then. Is the other assumption that the mineral phosphorous

remains totally non bio-available. Over time you would get some form of solubility. I agree that it would probably be slow, but it is not non-reactive. It is just slowly reactive. Would there be any reason to consider, since so much of the mine water is the mineral phosphorous form, that there might be a contribution of that to the phosphorous budget?

**MR. MARK DIGEL (Golder Associates):** Primarily the mineral phosphorous, as shown in that one particular slide, is particulate phosphorous. The majority of that will be pulled out as part of the water treatment process just by the filtration, so the amount of the mineral phosphorous getting into the water column is going to be very small. By assuming a ortho-phosphorous concentration of 10 micrograms per litre, which was equivalent to the total phosphorous from the pilot testing, I believe that we are being conservative in terms of the total amount of phosphorous discharged to the water that could become biologically available.

**MR. NEIL HUTCHINSON (Gartner Lee):** Thanks, a good answer. I am going to have to go and think about this some more, but these answers are certainly giving me lots of food to think about. I have one question then about your secondary model and your oxygen model. You said that under winter the full model would decrease dissolved oxygen at the bottom of the water column by one to two milligrams per litre, and that would take it from where it had once been five to seven it was down to three to seven now. The range of dissolved oxygen between three and five marks a fairly sensitive physiological threshold for a species such as lake trout. How much of the water column would actually be depressed by this amount, and do you have any opinions on what the ecological effects might be?

**MR. MARK DIGEL (Golder Associates):** I won't speak to the ecological effects, but in terms of the proportion of the water column that could experience levels down to the three to seven, it is going to be a very small proportion of the lake. That particular profile which had the lowest concentrations at the bottom was -- I believe the depth of that profile was 28 metres -- the average depth in Snap Lake is six metres. So the majority of Snap Lake is going to be at depths that are significantly less than that, and you would expect those lower concentrations below the 10 milligram per litre range to be in only a very small proportion of the lake.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Thanks, Mark. With regard to the ecological influence, I suggest that we discuss that or carry that over for discussion in the aquatic resources section tomorrow.

**MR. NEIL HUTCHINSON (Gartner Lee):** That is okay with me. I will note that a 28 metre depth is very close to the actual intake location, is it not? Sorry, the outflow, the diffuser.

**MR. MARK DIGEL (Golder Associates):** The diffuser is actually in about 11 metres, at a depth of about 11 metres.

**MR. NEIL HUTCHINSON (Gartner Lee):** Yes, that may be true. Dave Osborn just has a map that shows there is a deep hole fairly close to there, so we can carry this over for tomorrow. That is all for me for now.

**MR. MIKE BELL:** Okay. Dave Levy.

**MR. DAVE LEVY (Fisheries & Oceans):** The first question I have is for Kevin. Kevin, you showed an aquatic community response model which showed the percentage of affected species plotted against the log of concentrations, and you mentioned that the klydocerins were the most sensitive species to chromium. Just for the non-biologists in the group klydocerins are little microscopic shrimp in the plankton that fish feed on. Was that conclusion just for chromium, or was that for all of the feed metals of concern, cadmium and copper?

**MR. KEVIN HIMBEAULT (Golder Associates):** For the majority of the cases it is true. For I believe cadmium one was one [inaudible] that was more sensitive depending on how you calculate your numbers. In all cases the klydocerins were at the lower end of the curve, that is correct.

**MR. DAVE LEVY (Fisheries & Oceans):** In your preface to your presentation you said that guidelines typically try to protect the most sensitive species and in particular the most sensitive life history stages. You mentioned that you have a page and a half of serodaphnia dubia observations and I was wondering if you had any data for the chronic effects of those substances on the neonates, or the baby klydocerins. Would they tend to be more sensitive than the adults?

**MR. KEVIN HIMBEAULT (Golder Associates):** Off the top of my head I'm not sure if neonates were ever one of the final end-points for this. The majority of the time it is not for serodaphnia dubia test, and when I look at some of the data if there was a measured chronic value on a reproduction end-point or something like that, we would use that value instead of using the acute lethality end-points. In all cases though when we looked at the acute lethality we would then adjust that using an acute chronic ratio to get a chronic value. It was reduced. We didn't use the acute value at that point.

**MR. DAVE LEVY (Fisheries & Oceans):** Kevin, maybe you and I could get together and just go over that data set together. The second question I have is for Mark. Do you have a map of Snap Lake on your Power Point presentation that you could put up on the board?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Of the entire lake?

**MR. DAVE LEVY (Fisheries & Oceans):** Ideally of the entire lake, but just showing the project footprint and discharge would be sufficient. I think there was probably one in your first presentation. Okay, that is fine, thank you.

In terms of defining the level of effects to determine whether an impact is negligible or whether it is more serious, you went back to some literature which

was suggesting that if 20 percent of the community was affected by something, then that would, in effect, destabilize the eco-system and that would be a point that you would be concerned about. There is an important difference here that that 20 percent threshold is actually referring to a species distribution, or community, so I think I read in the environmental assessment report that once 20 percent of the species are eliminated then you have problems in terms of the persistence of that eco-system.

In your arguments you took that number and you went more conservative down to one percent, but then you started talking about populations of organisms and you even went further to talk about areas of the lake, looking at whether or not the water quality impact would extend over one percent of the lake or more as the threshold. I would just like to point out that there is a very big difference between percentage of species that are affected, the percentage of population and percentage of area. One thing I am concerned about as a fishery biologist is that I have looked at your fisheries assessment data and you have done surveys in various parts of Snap Lake. In your water quality analysis you are treating the lake as if it is uniform in terms of its value as fish habitat.

I have seen some of your results from the north arm in particular, and the north arm of the lake that I just pointed to tends to have lower value as fish habitat. I think that was one of the conclusions. It tends to be a shallower area, and the captures were reduced compared to some of the other areas. When you choose a water discharge location, you purposely go to the deepest part of the lake where you would tend to get better mixing properties. Some of those deeper basins can be disproportionately more valuable as fish habitat, so I have a little bit of a concern of taking this one percent area around the diffuser and applying that to the entire lake as if it is totally uniform in terms of fish habitat.

**MR. MARK DIGEL (Golder Associates):** There are a couple of questions there, so I will address the first one which was I believe your concern that applying a 20 percent threshold, which was really looking at effects to 20 percent of organisms in an eco-system to an area of the lake that is affected wasn't the way that 20 percent was intended. In terms of looking at that, that is true, and in fact what we did in terms of defining effects based not only on the proportion of organisms that could be affected but also the area of the lake within which those effects could occur, actually provides even more of a level of conservatism because you could argue based on effects to 20 percent of the organisms that you could be at HC20 concentration in the entire lake. That would be the point at which you could then measure effects to populations.

We used that HC20 and then to have high magnitude effects it would have to be above that concentration in only 20 percent of the lake, and that is a level of conservatism. Then to define the point where the effects would be negligible we reduced that further to a one percent of the area that could be above a concentration that could affect a certain low proportion, five, 10 or 20, of the aquatic organisms. What we were trying to do in the water quality assessment



was to make sure that our assumptions were protective of aquatic organisms, and if we were going to define an effect as negligible we had a high degree of confidence that there was that built-in level of conservatism that the effects would, in fact, be negligible.

The second part of the question as I understood it was, if we look at an area around the discharge, this one percent area where concentrations could be above the guideline and consider that to be uniform, there may be a higher proportion of sensitive habitat in that area, so that even though it is one percent of the lake it could have a higher proportion of sensitive aquatic habitat. For the purposes of the water quality assessment, we didn't explicitly consider the sensitivity of the habitat, but the results of that area that was above water quality guidelines or the benchmarks were carried forward into the effects on aquatic organisms including fish, so then the area that was the guidelines and the amount of more sensitive habitat in there, that area was explicitly considered in the effects on aquatic organisms, including fish -- which will be discussed tomorrow.

**MR. DAVE LEVY (Fisheries & Oceans):** I will look forward to carrying that discussion onwards tomorrow, but I think we should recognize that even though we are compartmentalizing the assessment process, the connections between many of the topics we are talking about are probably as important as some of the details of what happens within areas. My final question also for Mark. You mentioned that the sediments that would be going in would be suspended. There would be no settlement in the water after the discharge, and the implication of that is that the turbidity levels in the water would go up. I am wondering what the impacts of this increased turbidity might have either on plant production or say fish foraging.

**MR. MARK DIGEL (Golder Associates):** In terms of effects on aquatic organisms, I will leave that to the discussion tomorrow. In terms of the affect that the discharge would have on turbidity levels in the lake, the treatment to less than five milligrams per litre results in a very low turbidity, and a turbidity that is comparable to the turbidity that you would see in Snap Lake. If you look at a treated sample down to less than five milligrams per litre of suspended solids, it is a very clear -- it would look crystal-clear in terms of turbidity -- so don't expect that the discharge will have a substantial or even likely measurable increase in the turbidity in Snap Lake because it has a very low turbidity to start with. Then you mix it with the lake water and you are even lowering the effect of that turbidity. Just in terms of turbidity I wouldn't expect it to have an effect.

**MR. DAVE LEVY (Fisheries & Oceans):** Thank you, that solves my question.

**MR. MIKE BELL:** Good. In a few minutes I am going to ask you for some guidance because we are running a little behind and we have more people who want to ask questions than we have time to be able to do them. I would just ask so that people could get their questions answered if we could...the other thing I

want to make sure is this is very critical information. I understand that perfectly, so some things we can't limit so we will just try and keep going as best we can, and then I will ask you for guidance in a little while. Ann.

**MS. ANN WILSON (Environment Canada):** I just have some questions for Mark about the phosphorous that is lost in algae to the sediments. It was helpful to have the equation for phosphorous loss where it is equal to the concentration of algae in the water, times the fraction of phosphorous tied up in algae times the average settling rate. I am having a hard time understanding whether the loss of algae to the sediments is not outweighed by the increase in new algae bio-mass because we do have a constant new source of available phosphorous coming in, so we would have to assume that the settling rate is greater than the new production rate. Can you help me out on that?

**MR. MARK DIGEL (Golder Associates):** Could you just restate that question just so I make sure that I have it correctly before I answer it.

**MS. ANN WILSON (Environment Canada):** The loss of phosphorous bound up in algae bio-mass occurs at a set rate; at the same time you have new algae growing because you have a constant source of available phosphorous coming in with the effluent flow. For me to see that this is making any sense, that we are losing phosphorous, you would have to have a higher settling rate than you do of new algae growing. That is my basic problem. Do we really know how much new algae production there is going to be, and are we really seeing a net decrease in total phosphorous?

**MR. MARK DIGEL (Golder Associates):** So to see a greater loss of phosphorous from the water column, you can either have a higher settling rate or you can have more phosphorous, more algae to settle out. There is no reason to expect that the settling rate would increase because you have more algae in the water column. The base line, the calibration values for base line, which calibrated the amount of settling that you needed to match the total and inorganic forms of phosphorous in the water column was carried forward into the impact assessment, so the settling rate didn't vary. What results in a greater loss of phosphorous from the water column is the fact that you have more algae actually settling out. You have a discharge that doesn't increase the overall phosphorous concentration in the lake because you have two sources of water, both at about 10 micrograms per litre.

The total amount of phosphorous doesn't increase because of that, but you have a more bio-available form so you are able to stimulate more growth of algae and take that phosphorous out of the [inaudible] full phase and tie it up in the algae. Because you have more algae settling at the same rate, you have more of that phosphorous settling out of the water column, so the model is achieving a new balance based on the fact that you have the same amount of total phosphorous but more of it is available, so you can take it out and incorporate it into the algae. Because you have more algae you have more settling out. It is the system

creating a new equilibrium based on the fact that you've got more available phosphorus which will stimulate more total algae.

**MS. ANN WILSON (Environment Canada):** That does make sense to me. There are a few details I wouldn't mind exploring in a sidebar with Neil and Don after we finish up at 5 or something. One other quick question on the phosphorus model. It assumes all the algae which settles to the bottom, the phosphorus in them is not available at all. Have you run an model iterations with some of it being available or most of it becoming subsequently available?

I know a lot of it will be lost from the lake ecosystem, however some of it will be taken up by grazers and enter the food chain. I think we'd be overstating it to say that none of it would be available.

**MR. MARK DIGEL (Golder Associates):** Everybody is prompting me now because I have such a chronic problem with that. Your question is, the loss, the phosphorus that settles out and collects in the bottom, the model assumes there is no release of that back into the overlying water column. Your question is, don't you expect that a portion of that be taken up by grazers and reintroduced back into the water column.

That is certainly true, but what the model is calibrated without including the effect of things like grazers that would reintroduce things back into the water column, so in fact the net settling rate or the loss rate into the sediment may be lower than it actually is, because in reality you would have some settling out and then a certain amount of that coming back into the water column. So to calibrate the actual concentrations in the lake, you are in fact looking at a net loss of nutrients to the sediment.

To be able to calibrate, to get the model to reproduce what is in the water column, it is that net loss that the model has to represent. So the model is representing the net loss rather than having a greater amount going into the sediment and a certain proportion of it coming out. Does that answer your question?

**MS. ANN WILSON (Environment Canada):** I will leave further discussion for a sidebar maybe. Thank you.

**MR. MIKE BELL:** Just before we proceed, when you are having sidebars we would like some record of the conversation and a resolution. So when you are doing these types of things make sure to bring these things back to us, okay? Written notes are fine, but as long as we know what is going on. The next person is Steve, nutrients modeling.

**MR. STEVE HARVEY (Environment Canada):** This question would be directed towards Mark. One of the simpler questions Mark, I'm sure. When you presented your information on the model's initial presentation there, the first part of the presentation, one of the graphs you showed was the volume of water that would

be coming from the mine through the treatment plant, and that would then translate into an input to the model. That value, at least what I saw on the graph, was the expected value. Did you run the model with the one and two standard deviations level higher for flow rates?

**MR. MARK DIGEL (Golder Associates):** I just wanted to confirm the flow rates that were used. We modeled the expected flows. We have not modeled larger flows.

**MR. STEVE HARVEY (Environment Canada):** That answers my question. Thank you.

**MR. MIKE BELL:** Julie.

**MS. JULIE DAHL (Fisheries and Oceans):** I guess one of my questions has been talked around and addressed in the previous questions asked, but I will see if there is anything remaining here. I was wondering whether or not the phosphorus modeling took into account a change in the algo community as a result of an increase in phosphorus, and whether that change in algo community would have an affect on settling rates. Were you anticipating that the community will not change? For example, there would be no increase in blue-greens, or no increase in algae that may have a greater or lower settling rate?

**MR. MARK DIGEL (Golder Associates):** The modeling did not consider changes in the algo -- we didn't predict changes in the algo community. The modeling is based on total phydo-plankton and the settling rate is based on a total settling rate for phydo-plankton. In terms of the secondary effects on increased algo production on changes in the algo community, that is something that I think Rick Schryer would have to address in tomorrow's session.

**MS. JULIE DAHL (Fisheries and Oceans):** One other question I had, you were talking about the increase in settling rate of the algae to the sediment so the phosphorous would go to the sediment and it would be unlikely that you would have low oxygen conditions that would allow the release of that nutrient from the sediment. We have had experiences with other arctic lakes where similar pre-addition assessments were done to say that the lake could assimilate a certain amount of phosphorus input and what was in fact found was there was a lot of nutrient released from sediments after the fact. They did find that the increased algo bio-mass going to the sediment resulted in an increase in biological oxygen demand which set up conditions of very low oxygen near the bottom which did release phosphorus from the sediment.

Are you confident that this is not something that is going to happen in your scenario here?

**MR. MARK DIGEL (Golder Associates):** I can't speak to other assessments and the impacts that they provided, but I can say yes, I do have a high degree of confidence on the potential effects of undissolved oxygen concentrations have

been predicted conservatively, and with the expected changes in alga concentrations and the release of other substances that could break down and consume oxygen that we have included that in a conservative basis and I am quite confident in the predicted maximum changes in oxygen levels from Snap Lake.

**MS. JULIE DAHL (Fisheries and Oceans):** Thank you. I had one other quick question about the total suspended solids. You were saying that discharge to the lake would be at approximately 5 milligrams per litre. I also thought I heard that was essentially the ambient or background concentration in Snap Lake, and you were anticipating at 5 milligrams per litre that whatever was coming out of the discharge would not settle. If what is coming out of the discharge is very close to what is ambient in Snap Lake, how could it not settle if Snap Lake, at an ambient concentration of 5 milligrams per litre obviously does have settling occur, otherwise there would be no sediment on the bottom.

**MR. MARK DIGEL (Golder Associates):** It is true that there is settling in Snap Lake otherwise you wouldn't have an accumulation of sediment. What we are getting with the mine water treatment is a system that is much different than a natural stream. A natural stream, a natural runoff into the lakes will introduce solids, a certain proportion of which will settle. The mine water treatment process essentially removes all of those settle able solids before it is discharged into Snap Lake, which is why at concentrations of less than 5 milligrams per litre we don't expect any substantial amount of settling. The concentrations are, as you mentioned, comparable to the baseline concentrations of suspended solids in the lake.

**MS. JULIE DAHL (Fisheries and Oceans):** So you are saying that the only material that would be settling out of Snap Lake would be that material that comes in from runoff, and that out in the middle of the lake none of that material would settle unless it came from another source that would have been at higher than 5 milligrams per litre?

**MR. MARK DIGEL (Golder Associates):** There is a couple of things. Essentially that is correct, that the water treatment process removes the settle able solids before they get into Snap Lake. In terms of watershed inflows, in these types of areas the total suspended solids concentrations in the streams running into Snap Lake, although higher than in the lake, are still very low. The accumulation of sediments in arctic lakes occurs very slowly and a lot of the sediment that accumulates is in fact not inorganic that is runoff, it is organic material that is either runoff into the watershed or developed in the lake itself.

**MS. JULIE DAHL (Fisheries and Oceans):** But if it is organic produced from within the lake itself, you are saying that unless that internal production exceeds 5 milligrams per litre, none of that material will settle?

**MR. MARK DIGEL (Golder Associates):** No. What I am saying is that the mine water contains inorganic suspended solids. Those solids would range in grain size from anything from sand size particles down to clay size particles. The water treatment, the filtration, the whole process of the flocculation and then finally filtration, removes preferentially the coarser fractions; those that will readily settle, and then with the filtration you remove the majority of solids down to a very low concentration. Less than 5 milligrams per litre. The solids that are able to pass through that filter are very fine and are essentially not settle able solids or they would have been removed as part of the treatment process.

This is different from what happens in terms of solids in Snap Lake in terms of organic solids or inorganic solids introduced through surface inflows into the lake.

**MR. MIKE BELL:** At this point, I need some direction Julie before proceeding. It is about a quarter to and we were going to try to consolidate the questions to find out where people stood in relationship to whether the concerns led to issues and this type of thing. We still have a number of people who basically want to speak and we are going to be backed up by this afternoon. What I would suggest we do at this point is continue the discussion process. We have about four more people who want to speak, try and resolve some of these things after at 1:30. Simply go back and try and find out where people stand and then try and move into the presentation this afternoon by De Beers. Is that going to complicate your life too much if we take a bit of time this afternoon?

**MR. ROBIN JOHNSTONE (De Beers Canada):** We are very happy to basically roll with the flow. The only thing I would comment on is that it is likely to compromise the ability of interested parties to ask questions on the North Lakes issue this afternoon. Can I suggest that one opportunity there is would be that there is an hour and a half allocated on the schedule for lunch which provides people with an opportunity to discuss some of these issues and possibly report back? We do have to respect that there are a couple of presenters here that have had their minds working for a while now, so we wouldn't be able to take up all of that hour and a half, they would need some down time.

**MR. MIKE BELL:** Comments from other people?

**MR. NEIL HUTCHINSON (MVEIRB):** I just point out that I don't want to downplay anybody else's concern, but it looks like the schedule slows down after 3:00 this afternoon. There might be time to carry on the discussion and push this afternoon right through to 5:00.

**MR. MIKE BELL:** What I would suggest then is we continue for the next 15 minutes, then you have the option of speaking to people outside about your questions if they haven't been answered, or we can take a little bit of time this afternoon from 1:30 to 2:00 so we push the presentation off to 2:00 and we start at 1:30. I would ask people to come back as soon as they can. We will just

continue a little bit here. We have ten or 15 minutes and we will just continue to noon. Julie.

**MS. JULIE DAHL (Fisheries and Oceans):** Thanks. I am finished.

**MR. MIKE BELL:** I didn't intimidate you or anything, did I? No. Bob.

**MR. BOB SCHELAST (NSMA):** Just one of the issues and I think it is better discussed tomorrow is back on the alga community and any potential change in community structure. So I will defer that until tomorrow which should ease the schedule a bit.

A couple of comments/questions. First on the toxicity benchmarks. Was any consideration given to -- and in light of the fact that there will be some nutrient loading to the lake, was consideration given to looking at potential stimulatory effects on test species such as *S. lemnae*, rather than their acute and chronic endpoints focused I think primarily we are focusing on inhibitory or toxic effects rather than stimulatory.

**MR. KEVIN HIMBEAULT (Golder Associates):** In our assessment we strictly looked at inhibitory effects as you stated.

**MR. BOB SCHELAST (NSMA):** A couple of comments. I concur with DFO's comment on the one percent of the lake that is affected, and I believe some of the assumptions that were made on the distribution of habitat and species throughout the lake, and this is something we can discuss further tomorrow. Just one point I want to throw out there relating back to potential stimulatory effects and enrichment. There may be increased food supply which may make that area more attractive to mobile species such as fish. As well, potentially we may see temperature differences. There may be some thermal effects that may act as an attractant to fish and potentially make them more vulnerable and susceptible to an effect being within that one percent area. Again, this is something we can discuss further tomorrow.

Just a question of clarification. The phosphorus loading from the sewage treatment plant was not included in the modeling? Is that a correct statement?

**MR. MARK DIGEL (Golder Associates):** I can actually talk about two of those questions. One of your comments was on temperature differences in the discharge. One of the concerns was that the temperature of the discharge in the winter could be warmer than the ambient temperatures in the lake so one of the things that was incorporated into the design was a commitment to ensure that the temperature difference between the discharge and the ambient lake concentration was sufficiently small that you wouldn't get a substantial temperature difference, enough that could have an effect on aquatic organisms. That was specifically addressed in the design considerations for the discharge.

In terms of the phosphorus loading, the modeling included the total phosphorus loading from the project, so it included the phosphorus in the mine water and it also included the phosphorus in the sewage treatment plant discharge.

**MR. BOB SCHELAST (NSMA):** Thanks for the clarification on phosphorus loading. From an earlier slide, and it could have been just me, it could be suggested it was just from the mine water, but thanks for the clarification.

**MR. MIKE BELL:** Steve. Just one comment Steve, we have about eight or nine minutes and then we will...

**MR. STEVE WILBUR (Dogrib Treaty 11):** Well, I know it will take longer than eight or nine minutes because I have about nine questions, so we will go one at a time and see where we get. The first one is addressed to Kevin. I guess Don addressed this earlier. From my perspective I was a little unsure how klydocerins were assumed to be the most sensitive species. I guess it just came from a diagram you had up there in which you plotted percent of species affected versus whatever allowed concentration.

When I looked at the graph I saw the only ones plotted at low concentrations were the klydocerins. How do we know, for example, other species (fish and so forth) were not -- there are no plots at the lower end -- how do we know they weren't sensitive at the low end?

**MR. KEVIN HIMBEAULT (Golder Associates):** The plot is actually a plot of the data that is available, so there is fish in that plot but they are not sensitive at that lower end. They are sensitive at the higher concentrations, so that is why you don't see a fish species down at that lower end. They are not as sensitive as the klydocerins, so their chronic effect values were up in the 20 and 100 ranges versus the klydocerins, which were found down in the decimals or the ones, or whatever. That is how the plot lays them out.

**MR. STEVE WILBUR (Dogrib):** The Y access was the percent of the population affected. The plot showed that -- you mentioned fish at 50 percent of the population affected at certain concentrations. My question is, that is going to affect an awfully high percentage of fish, why don't we have... that is the plot I am looking for, if fish aren't plotted at a lower end, how do you now they are not sensitive at a lower percentage?

**MR. KEVIN HIMBEAULT (Golder Associates):** The plot here, where it is showing on the Y access, is the percent affected, but it is also the cumulative proportion of the community. We take each toxicological data point and the response of a species is on the bottom, so if the lowest concentration effect for fish -- for example and I don't know what species this is -- it's here at 1,000 and this is for a specific species. That was the lowest effect concentration for that species of fish. They weren't found to be affected at any concentrations lower than that.



The same thing as you go down. I think there is a lower one here. That is also a fish species. It is a different fish species than the one above, so you are looking at the assemblage of the community and they get less sensitive as you move up on this line; but as your concentration increases, if our concentration was here we would be basically affecting a hundred percent of the community. That is what this plot shows here.

I guess in summary I am saying the clodersirines are most sensitive, they are down here, and the reason they are down here is because they are more sensitive. The fish aren't as sensitive as them so they plot up higher. I hope that clarifies it for you.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I am assuming that Don is comfortable with it, and if he is comfortable with it I can be comfortable with it. The explanation doesn't help me but I will move on. I have a question and Dave and Mark discussed this earlier, about the percent area and the essentially the benchmarks. I have a concern as well that the benchmark for area, and the area assumes that the lake circulation is complete and that we have today [inaudible]. I guess from your explanation, you were assuming that you have some conservatism by reducing the benchmark to one percent in order to yield a conservative value. If most of our species, or species diversity, is exhibited in a very small percentage of the area or zone of the lake, how can we make [inaudible] something valid?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Thanks for your question, Steve. I think it is obviously an issue that people have had. Our conversation is probably best addressed in the package of aquatic resources tomorrow around the issue of, is that one percent the most sensitive one percent of where all the organisms and the habitat is. We prefer to leave that until tomorrow as part of the package. We will have a talk over lunch time and see whether we can bring that information forward. I'm not promising anything.

**MR. MIKE BELL:** Okay. Can I just interrupt and just suggest that we now break for lunch and come back at 1:30 p.m. If it is possible for people to meet over lunch at any time to get some answers to questions, that would be extremely helpful in terms of our schedule. If we can't do it there, maybe there is a possibility of meeting after 5:00 p.m. tonight just for a little bit of a period of time to get answers to questions. I know that Marc and Tim had a couple of questions, so if you can try and do these things. After lunch I would like, if everyone would come back at 1:30 p.m. precisely we will allow 1:30 to 2:00 p.m. just to wrap up this section, and I want to go back and find out if there are any issues coming out of the concerns. We will see you at 1:30 p.m. Thank you.

-- Break

**MR. MIKE BELL:** What I would like to suggest we do at this point is continue with the questions until about 2:00 p.m. At 2:00 p.m. I would like to have a

consolidation from the people who have asked questions to find out if their concerns have moved on to the level of issues and if so could they express those. We hope to do that in about 15 minutes. We may not get all the questions in between now and 2:00 p.m. Hopefully, as people tell me, the discussion afterwards should be less than the discussion now. In other words, there seemed to be more concerns in this area than there will be later on. We will see, so we may be able to deal with some questions after we finish the section of north lakes water quality; then after that I think basically we are going to have to go with people consulting with people directly. Once again, if you had side bars and raised issues and concerns so we have some kind of record of it, it would be helpful if you would tell us what the issue was you discussed and whether or not it has been resolved.

That seems to be the way we will go. Are there any questions about the agenda for this afternoon? Okay, I would just remind you that I have Steve, Marc, Tim, and you wanted to have one or two questions again. We will try and go around this way and see how far we can get. Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Thank you. I just wanted to clarify that I did get together with Don and Kevin afterwards regarding the plot I had a question with, and I realize now how the plot was constructed and what it means. I still have a concern on the use of the geometric mean as it applies to a threshold for a particular species. I will just leave it at that.

**MR. MIKE BELL:** Okay.

**MR. STEVE WILBUR (Dogrib Treaty 11):** This question I guess is kind of related to a number of issues, and it was brought up earlier. I just wanted to make sure that the point was made and it has to do with assumed flow rate that went into the modeling and it affects the loading calculations conservatively, especially with regard to phosphorous. When I heard the answer that the flows that were used in the modeling were just the expected flows and there was no uncertainty sensitivity performed, that gives me some concern particularly because of our discussions last night regarding the uncertainty concerning the amount of mine water that might be contributing to flows. I just want to maybe make a comment and somebody can respond to this, what would be the affect if the flows were increased and it seems like a pretty simple thing to model, and would you consider that?

**MR. MARK DIGEL (Golder Associates):** I am going to set myself a target that if I can get through the afternoon without forgetting saying who I am I will be happy! It is correct that in the modeling the effects on Snap Lake we did use the expected flows, and in terms of looking at the implications of a higher mine flow it's important to keep in mind that the loading and the flows aren't directly related. If we were to increase the inflows into the mine, where is that water going to come from? The majority of that water would come from the overlying lake and the majority of the mass in terms of metals, and to a certain extent nutrients,

comes from the connate groundwater. As we increase the flows we also increase the proportion that comes from the lakes, so the concentrations are going to be decrease and the proportional increase in loading is going to be smaller.

With respect to nutrients, when we look at the concentrations of ortho-phosphorous that we included in the model we included the concentrations that would be represented in the mine water without any removal of that ortho-phosphorous form in the treatment at all. If we look at the pilot test results for that one particular sample it showed that the treatment process can remove not only the particulate fraction of the phosphorous but also that ortho-phosphorous component. In that particular sample the ortho-phosphorous was reduced from 20 micrograms per litre down to about five, and that five would represent half of what we assumed in the modeling, so the combination of the fact that we did assume conservative concentrations in the mine water and the fact that if you increase flows you wouldn't proportionally increase the loading, I feel that the modeling we did was conservative; and if you increased the flows you wouldn't have a proportional increase in the effects in Snap Lake.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Thanks, Mark, a couple more follow-ups on that same issue. It seems you have given me more of a qualitative answer rather than a quantitative one when you talk about the amount of phosphorous that is going to openly get into the mine water. I guess you are saying that the proportion is going to decrease because we have Snap Lake as a higher contributor. Do we have more of a quantitative feel for the decrease in that, so that could be applied more systematically into the model framework?

**MR. MARK DIGEL (Golder Associates):** Certainly the qualitative answer is what can be provided today at this hearing. The question really is though, what was and is appropriate in terms of looking at effects of the project. We have looked at expected mine water discharges in what we believe is quite conservative in terms of the concentrations, so we believe that the potential affect on Snap Lake has been adequately addressed in the environmental assessment and in the modeling. There are all kinds of scenarios that you could look at in terms of lower inflows, higher inflows and more treatment, but I think that the assessment we have done does provide a good characterization of expected affects of the project with an appropriate level of conservatism.

**MR. STEVE WILBUR (Dogrib Treaty 11):** You mentioned that the mean of the phosphorous that you used was 10 milligrams per litre. Is that correct?

**MR. MARK DIGEL (Golder Associates):** It was 10 micrograms per litre.

**MR. STEVE WILBUR (Dogrib Treaty 11):** How many samples is that based on for the mean?

**MR. MARK DIGEL (Golder Associates):** I don't know the exact number, but was approximately 30 samples of the groundwater was the basis of the ortho-

phosphorous concentration that was used in the groundwater inflow to the mine. Ken DeVos, who was responsible for the site water quality calculations, has some information to add.

**MR. KEN DEVOS (Golder Associates):** When we calculated what was coming out of the mine we looked not only at the groundwater inflow, I think there were eight samples from the granite unit which makes up the majority of the mine, that defined the phosphorous inflow for the groundwater input proportion of the component. We also looked at what we were observing in the advance exploration project and we adjusted the concentrations that we would expect to see in the mine based on the -- I can't remember the exact timing of samples but we had either weekly (I think it was weekly samples) or more frequent. I would have to check the exact frequency. We took samples of the discharge during the advance exploration project and adjusted the concentrations based on those values.

**MR. MIKE BELL:** Steve, I just want to ask you how many questions you have left. I would like to try and see if maybe some of them could be put off until later in the day so we can get a couple of other people in. How many questions do you have remaining?

**MR. STEVE WILBUR (Dogrib Treaty 11):** A couple more.

**MR. MIKE BELL:** Go ahead.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I guess some of these issues that seem important to me with respect to the level of conservatism. It seems that they are using a mean value and they are applying an expected flow rate, and to me that is a little dangerous when you are trying to predict things over a long transfer loading, especially when you don't have a large data set. That is my point, and that is why I am concerned about that, and that is why I asked whether we could approach the model again with some more conservative values.

**MR. MIKE BELL:** Do you have an answer to your questions pretty well now, or is this an enhancement by further information. Have you been able to come to a conclusion about your questions?

**MR. STEVE WILBUR (Dogrib Treaty 11):** I just presented my conclusions, so I think any further elaboration I could maybe ask Ken or Mark on the side if they any more supporting evidence for them.

**MR. MIKE BELL:** Thank you. We will go back to get your summary in a few minutes. Mark.

**MR. MARK DAHL (Environment Canada):** Our question is with regard to the mixing zone. The EA report indicates the chronic effects to zero point and will be found in a 230 metre diameter area, which constitutes roughly one percent of the

lake. Is there any way to reduce that zone? What treatment could be applied to reduce that zone?

**MR. MARK DIGEL (Golder Associates):** I just want to make sure that I understand the question correctly. You mentioned a 230 metre zone. In fact, the area that was calculated by the model was based on the actual maximum concentration at any time in the mine during the operation that could be above a site specific benchmark. The 230 metre was just used more for illustration purposes to say that if you took a 230 metre radius around the discharge that equals approximately one percent of the lake. I just wanted to distinguish where that 230 metres comes from.

In terms of reducing affects so that it affects a smaller proportion of the lake, is that the main part of your question?

**MR. MARK DAHL (Environment Canada):** Yes it is.

**MR. MARK DIGEL (Golder Associates):** The first point is that if you are above a general guideline, or above a site specific benchmark within that one percent at Snap Lake, we are very confident that the impacts to aquatic organisms in the lake will be negligible. For most of the substances, the actual area that would be above benchmarks would be significantly lower than one percent. In the case of cadmium for example, the concentrations would be below the benchmarks at the boundary of that 60 metres, which is sort of a minimum resolution where we can resolve and predict concentrations in the lake.

The other factor is that for the purposes of the impact assessment we only assumed that the treatment would remove suspended solids, and then the forms of the metals that were associated with the particulates, so the treatment process is expected to remove some additional metals so that the effect that we predicted in the areas that we have predicted could be above site specific benchmarks is a conservative estimate; and when you account for the expected reductions associated with treatment you would expect those areas to be reduced further. Based on the impact assessment results, I don't see a reason to look beyond the level of treatment that is proposed as part of the project. I just don't think the effects warrant it, and we haven't looked at it in the EIA for that reason.

**MR. MARK DAHL (Environment Canada):** From our perspective, the way to approach treatment would be to use the best available technology and find out where your end of pipe release was and then size your emission zone to suit as opposed to saying, our negligible level is roughly one percent and we are factoring in the level of treatment that is necessary. Sometimes it comes across that that is the way that it was approached. What you just said sort of said, well it is negligible at this level so we don't really need to go to any better treatment.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The main issue comes down to the treatment that is available also, and that is a key part of considering the

treatment options that we had. Tom Higgs discussed yesterday basically what options we had for increasing the treatment performance if you like. One of the difficulties in determining what the best available technology is is that we are proposing to build a mine in a remote location and while there are other forms of technology available the likes of the waste stream associated with them means that they are not practical for the environment in which we are proposing to build the mine.

**MR. MARK DAHL (Environment Canada):** Thanks.

**MR. MIKE BELL:** Okay. Tim.

**MR. TIM BYERS (Yellowknives Dene):** Yes, I thought I had three questions here but now looking closer at the agenda I see that two of them are more appropriate for tomorrow, so that leaves me with one. This is addressed to Mark. You had said that for cadmium you are using the CCME guideline of .055, and further on you stated that you looked at cadmium guidelines with a hardness of 50, then you readjusted that to hardness of 180. Does this readjustment capture the expected increase TDS that you are likely to find in Snap Lake from the mine operations?

**MR. MARK DIGEL (Golder Associates):** The short answer is yes, and a little bit longer answer is that the hardness of 180 was selected because with the mine discharge the hardness increases, and then for a significant part of the operation it reaches a relative steady state at about 180 milligrams per litre of hardness. That is when you have the maximum discharge coming out of the mine. So it was appropriate for illustration purposes.

The model actually predicts the changes in hardness, both the distribution within the lake at any point in time, as well as the changes in concentration or hardness from sort of week to week, year to year in the model.

So when it calculates whether a concentration could be over a guideline or a benchmark, it actually recalculates that benchmark based on the hardness at that particular time and that particular point in the lake. So at any point in time the model is calculating whether you are above or below a guideline based on the actual predicted hardness at that time and at that position in the lake.

**MR. TIM BYERS (Yellowknives Dene):** Did you look at anything with hardnesses above 180, the guideline there would be for cadmium?

**MR. MARK DIGEL (Golder Associates):** As you increase hardness you reduce the toxicity and we continued that relationship up to a hardness of 180. Anything about 180 could potentially further reduce the toxicity, but we didn't account for any further reductions at hardnesses above 180, and we did that to be conservative because the relationship between hardness is developed primarily within that range, and so to extrapolate it beyond that range we had less confidence in, so we would rather use a more conservative approach which

would be to use the threshold concentration at 180 to represent effects at hardnesses of 180 or greater.

**MR. TIM BYERS (Yellowknives Dene):** Thank you.

**MR. MIKE BELL:** Jean.

**MR. JEAN UREMCO (DIAND):** In your conclusions with regard to environmental impact from the mine water influent coming into the lake and its mixing beyond the 60 metre initial mixing zone, I think a very important part of that model that you use has to know the current strength, the current direction within the lake system.

I would like to know, when you calibrated that model, did you actually use measured current values from the lake or did you allow the model to make its own prediction of those values?

**MR. MARK DIGEL (Golder Associates):** We didn't use measured current values for Snap Lake. We initially let the model find its own values but then we calibrated those are adjusted those such that the currents were within the ranges that we would expect and that have been measured in other water bodies. For example, the work that was done for Diavik in Lac da Gras, though it is a bigger lake, they actually measured currents and tried to calibrate to that.

The difficulty is that the model predicts average currents and you can calibrate the magnitudes to what you know you would get or what you have measured in a water body to actually get the model to perfectly reproduce the currents at any one point is difficult. What you are trying to do with the hydrodynamic model is accurately represent the overall flow pattern in the lake. The experience of our water resources engineers is that you can, particularly for the purposes of an environmental assessment, is provide a good characteristic of circulation in the lake with a good understanding of wind and pathymetry without actually having measured values within the lake.

**MR. JEAN UREMCO (DIAND):** So you had what you feel was a good baseline measure of the wind regime and the lake?

**MR. MARK DIGEL (Golder Associates):** That is certainly not my area of expertise, but the air quality and our water resources people spent a fair bit of time coming up with a representative wind conditions, a timed series of wind conditions for the project and I believe they had a good level of confidence that the wind information they had was representative of the wind conditions in the Snap Lake region. But beyond that, I can't comment in any more detail.

**MR. MIKE BELL:** We will try and come back to Steve's further questions later in the afternoon. Don has expressed concern later in the afternoon, so we will try to deal with those questions then. I am sorry I kind of terminated things, but I am trying to move along. Did you have questions later? Mark Lange.

**MR. MARK LONGE (DFO):** I think I was skipped altogether and probably mixed in with three other Marks around the table.

**MR. MIKE BELL:** Okay, so we will try to get the three later. On the basis of what we have had, I would just like to basically go through and see if we -- we have had a number of concerns, requests for information. I am wondering at this point as we go through whether or not the information has solved the concerns that people have or whether people see and wish to articulate some issues. If they could just say briefly what those issues might be and what they were dealing with we can move through them quickly.

I realize Steve has some areas we've dealt with and some we haven't. On the matters that have been dealt with, Don McDonald?

**MR. DON MCDONALD (DIAND):** I have one question that I really would like to ask right now because it would help us to design how our team is going to further participate in the whole process after these technical sessions are done. Can I ask that question now? It will be very quick.

What I am hearing around the table is a number of people expressing an interest or a need to have some of the analysis that are conducted as part of the EA redone, refined or done again with some different assumptions or scenarios considered. The question I have, and I think it is for you, Robin, to what extent is there a willingness on the part of De Beers to consider undertaking some further analysis?

**MR. JOHN McCONNELL (De Beers Canada):** I guess, you know my concern is I have seen this before and it can go on forever. You are going to suggest something for further analysis, then we are going to have someone over here say they want further analysis, then someone over here is going to say, that is all good stuff but we'd like it run a little more conservatively. It just drags out this process. I mean, we are two years into an application now. What you are suggesting could add years.

**MR. DON MCDONALD (DIAND):** I understand that concern fully, the reason I ask the question the way that I did is because what I am hearing from people around the table is that they have some concerns that they think are real and need to be addressed, and I see one of two options taking place. One is that the concerns get identified and we say, if we run these scenarios then maybe those concerns go away, or alternatively then each of the teams goes away and they conduct their own analysis and they conclude the results of those analysis in their technical reports. I am fine with either way, I just wanted to see where you all sat on that question so we could design our process accordingly.

**MR. JOHN McCONNELL (De Beers Canada):** I guess the answer is we are quite satisfied with the work we've done today. We think we've done a very good job and as a result of these discussions we may want to go back and run some of



these things again, but it would be to have a response to the technical reports when they come out at the end of February.

**MR. DON MCDONALD (DIAND):** That's great. Thank you very much, I appreciate that. So the question now in summary...

**MR. MIKE BELL:** The issue in summary. Is there an issue?

**MR. DON MCDONALD (DIAND):** Yes, Indian and Northern Affairs has a series of issues that we need to carry forward and conduct some further analysis to resolve and conclude such things as the nutrient modeling as it relates to the baseline levels of phosphorus that were incorporated into the model. We have still some concerns about the site-specific benchmarks and we feel we are going to need to run through a series of analysis to go through the impacts of selecting different benchmarks on the results of the assessment.

We also have some concerns about the assessment criteria that have been applied and we are likely to go through the process of identifying alternate assessment criteria and determining how that would affect the outcome of the process. We are going to talk about chloride and total dissolved solids tomorrow. There are some issues related to that also associated with the benchmarks in that we don't currently have site-specific benchmarks for those substances.

We also have some issues related to the assumptions about the levels of metals and phosphorus that may be emanating from the mine, and as a result of that we are going to need to evaluate the implications of some alternate assumptions related to those things.

**MR. MIKE BELL:** So my assumption is you are going to go back and do some work yourself, do the technical report and after your own analysis you will basically come out with some issues that you will direct.

**MR. DON MCDONALD (DIAND):** Yes, there is an interim step in there as well. What I heard from De Beers is that you are essentially comfortable with the analysis that you have put forward in the EA and that is a reasonable position. We are still hopeful that we can come back and spend some time with you and your consultants to resolve certain issues that we think can be resolved once we have done some preliminary analysis and we can talk about those and see if the issues fall off the table or if we need to carry them forward into the final report.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Don, having heard that list, as we have always said we are certainly interested in talking. I think I would add another step to your list of steps and that is to basically provide us, rather than with a general list, what your specific issues that you are looking for for Christmas so that Santa can deliver.

It is really important that we have a clear understanding, so rather than say that we have some questions about the assumptions, if we can have a definitive list of

what assumptions are you questioning, what criteria do you have issues with? That would certainly help us in our ability to understand whether we can deliver the information to you or whether it is a fundamental difference we will have to let the board decide on.

**MR. LOUIE AZZOLINI (MVEIRB):** So what I am hearing here is that there is a commitment by De Beers and INAC to get together and exchange information, or you would want something from INAC first to which you would respond before the submission of the technical reports?

**MR. JOHN McCONNELL (De Beers Canada):** Well, we heard Don's list. It is exactly the same list that was submitted to the board two weeks ago. There are no specifics to his questions. For us to respond to anything we need something specific. Not a list of issues, because they have issues with everything. We need specific questions and we will try and answer it.

The preferential way, if he talks to a guy like Mark Digel outside of this meeting and maybe he can get some of the answers.

**MR. MIKE BELL:** To summarize, my sense is they basically have indicated that they will talk to your consultants. We are talking then about putting forward some specific questions to you in terms of a response. Just one question that you asked previously, do we have an idea of a timeline in which that will occur? Don? Timelines to get this matter resolved? Are we talking about the next month or what?

**MR. DON MCDONALD (DIAND):** Ideally, what we would do at this stage is to conduct some further analysis within the next few weeks and then have those discussions with the De Beers folks and their consultants and try to get these things resolved certainly by the first couple of weeks in January.

**MR. MIKE BELL:** Okay, good. Thank you very much.

**MS. JANET HUTCHINSON (NSMA):** I am just wondering if the parties would be willing to agree to post that information, the analysis that they do or the information that is exchanged between any of the parties and De Beers and any consensus that is reached on the website, just so the other parties can access that in preparing their technical reports.

**MR. DAVE OSMOND (MVEIRB):** I am wondering if what happened last night with regard to the hydro-geo aspects could not be repeated again, maybe this evening or some other evening when it is convenient, because it looks like Don is assuming the responsibility for coordinating a lot of concerns that he heard around the table here, and I don't know whether that is particularly fair to all. Maybe it would be better for us to be able to discuss this in an open forum as a bunch of toxicologists water resource managers around the table, just afterwards. Because there are some differences of opinions here, and as I have been listening there is a whole lot of questions that come up about other aspects

here. I feel it would be very useful for us to get that stuff out on the table before assumptions are made on modeling that you may go ahead and do, Don. I just wonder if that is a possibility.

**MR. JOHN McCONNELL (De Beers Canada):** We are quite willing to host another evening of discussions in our offices if that will help move things forward. I get the impression from Don that it is probably not going to help in solving any of his issues, because he needs to go away and do some further analysis and modeling.

**MR. DON MCDONALD (DIAND):** The sense I get is that there are certain issues around the table that I am hearing that could be resolved in some evening sessions if we were to do that. There are certain things that I need to conduct some further analysis to be able to -- particularly the sensitivity analysis relative to the benchmarks that were selected and the levels that are predicted for the lake, and how those might change.

**MR. MIKE BELL:** Is there merit then to a meeting this evening when the consultants are still here?

**MS. ANNE WILSON (Environment Canada):** One, we have already semi-set up is with Mark Digel who is leaving a little later in the evening, at 5:00. That is the phosphorus modeling, and Neil Hutchinson would like to attend that and myself, Don maybe and perhaps Fisheries, whoever else is interested.

**MR. MIKE BELL:** Okay. Why don't you try to get together with the folks at 5:00 and we will see what happens from there, okay?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Travel agent for Mark Digel. Mark has actually decided to enjoy another night in beautiful Yellowknife, so we have this evening to discuss the issues that you would like.

**MR. MIKE BELL:** What time this evening?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Same time, same place. 6:00 p.m. at the De Beers Canada board room on the third floor of the Scotia Centre.

**MR. MIKE BELL:** And you will bring back a record of it for the meeting tomorrow like you did this morning? Good. I want to move along quickly. Neil.

**MR. DAVE OSMOND (MVEIRB):** Neil is away from the proceedings this afternoon for other responsibilities, he is still here and will be here tomorrow. I think Neil requires some clarification that will come out of the meeting that they plan for 5:00 and he will be attending that meeting from what I understand, and that is all I can tell you. He got a lot of clarification I know from the sessions; he found them very valuable. There is one issue that he still would like to discuss further as part of the session that he is planning later.

**MR. MIKE BELL:** So he went away from the meeting happy, not sad, but he is going to be sad if he comes at 5:00 and no one is here, because it is my understanding you just moved it to 6:00, right? If you could...

**MR. MARK DIGEL (Golder Associates):** I had discussed with Anne Wilson and Neil at the beginning of the lunch break getting together at 5:00 p.m. and I know that particular time worked for Neil and Anne. I know that Robin, on my behalf, has offered that I can be here all evening. I can't speak for Anne and Neil so I am happy to meet with Anne and Neil at 5:00 p.m. if that works better for them, or if they are available at 6:00 p.m.

**MR. MIKE BELL:** Good for you. So there is a 5:00 meeting and a 6:00 meeting. Good. Okay. Moving right along. Dave.

**MR. STEVE WILBUR:** I just wanted to comment. If Anne and Neil are discussing issues that others may want to discuss at 6:00 then we may miss some of their input. That is my only comment.

**MR. MARK DIGEL (Golder Associates):** I don't think the intent, the meeting at 5:00 p.m. was that anybody be excluded from sitting in and listening.

**MR. MIKE BELL:** I feel like I am scheduling banquets or something. You guys figure it out. People are meeting at 5:00, people are meeting at 6:00. Everyone is welcome. Dave, is there still an issue here?

**MR. DAVE LEVY:** I'm satisfied with the use of toxicity data to define hazard concentrations. I am not satisfied with the definition of threshold effect area, however I am willing to defer judgement on that until tomorrow when we have the aquatic habitat session, and I am very satisfied with the response related to turbidity increases.

**MR. MIKE BELL:** We have a couple of terrific meetings tonight that would help clarify some of your issues. Anne.

**MS. ANN WILSON (Environment Canada):** I am confident all will be clear by 6:00 tonight.

**MR. MIKE BELL:** Okay. Steve.

**MR. MARK LANGE (Fisheries and Oceans):** Just to interrupt here, just to make sure you haven't forgotten this third mark as well. I have yet to raise my questions.

**MR. MIKE BELL:** I realize that. We will deal with those later. Julie. You were asking about phosphorus modeling, change in community that will affect settlement rates.

**MS. JULIE DAHL (Fisheries and Oceans):** I too think that some of the questions from the phosphorus modeling will be resolved tonight.

**MR. MIKE BELL:** Bob.

**Bob:** The issue on phydo-plankton community or the plankton community chain effects we will deal with more tomorrow. Some of the discussions on the phosphorus model obviously have a linkage back to that.

**MR. MIKE BELL:** Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Essentially since I only got through about one-fourth of my questions I feel unhappy right now. Knowing that we will be able to question them later, I think some of them are related to one another so they may resolve themselves.

**MR. MARK DAHL (Environment Canada):** I am satisfied with the explanation for mixing zone, but I have a couple of questions that I will address on the sidebar.

**MR. MIKE BELL:** Jean.

**Jean:** My concern was the quality of the hydrodynamic and mixing model versus what they concluded, and I am not sure whether I have still an issue, but I am just going to go away and review the documentation again. I wondered if I could have the possibility of me phoning your modeler if I have questions somewhere down the road?

**MR. MIKE BELL:** Okay? Good. So the ones that didn't get through all their questions are Mark, Steve and Don. We will try to deal with those a bit later. Now we would like to turn to the next presentation.

**MR. SEVN BOHNET (DIAND):** Two things. One, to answer Janet's question from earlier, anything analysis that we conduct or continue we will make available, provide it to De Beers and to the public registry as required. On the side, just from hearing and listening to people what is going on here, I have a bit of a concern as to what the purpose of this technical session is if everything keeps getting bumped off to a side meeting. I know there are certain things that people need to go back and reconsider and so on, but Steve has identified -- he has questions that are outstanding. We have a couple more questions that are outstanding and I was under the impression that this was the forum in which those would be addressed. I don't get the feeling that that is happening right now. Thank you.

**MR. MARK DAHL (Environment Canada):** Just to add to that, I am a little confused with the process right now. The questions I had to raise were part of the DFO questions, part of the presentations that were brought forward at 10:00

this morning. Are you suggesting that we hold on to these and go to yet another presentation before I get to ask these questions?

**MR. MIKE BELL:** That is what I was suggesting and that is what I suggested earlier. But, I am open to suggestion. If people would like to stay here and deal with the questions and continue the questions, I am happy to do it. I mean, I am facilitating trying to do what you are going to do. There is a cost factor. If you ask a lot of questions here, because some consultants will be leaving, there won't be as many questions for later on after the next presentation. So I need direction. Do you wish to continue with this process or do you wish to go to the next presentation? Comments, please.

**MR. MARK DAHL (Environment Canada):** It is getting increasingly confusing as we move from one presentation to another to keep recalling some of the details from the original presentation upon which I had questions, so I would favour concluding any comments and questions to the presentations that have occurred in the morning already, doing that before we moved on. That is my recommendation.

**MR. MIKE BELL:** Any other comments?

**MS. JANET HUTCHISON (NSMA):** Mike, I would just like to indicate that I think the appropriate process is to have these technical experts speak to the issues for each presentation before moving onto the next one. Just to reiterate the comment we made yesterday, the NSMA would like to see a more flexible approach that is focused on adequate discussion of the issues rather than a timetable.

**MR. MIKE BELL:** De Beers, how do you feel about it?

**MR. JOHN MCCONNELL (De Beers Canada):** We are quite flexible. We just have to play musical chairs.

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** We are only here until this evening to speak on groundwater issues mainly, so the agenda for this afternoon is groundwater. So it is now or never. If we get...

**MR. JOHN MCCONNELL (De Beers Canada):** Would you like Robin to act as your travel agent?

**MS. JULIE DAHL (Fisheries and Oceans):** I would just like to say that for continuity, can we just wrap up the issue that we are sort of still in the middle of talking about? I understand NRCAN's need to talk about the groundwater, but perhaps another 15 minutes or so will finish it.

**MR. MIKE BELL:** Okay, I think what we will try and do is finish the issues we are involved in and try and make sure that we have enough time to deal with that. I am going to try -- go ahead. It's up to you. I can set a time limit here in terms of

what we have to do, because we are trying to reconcile a lot of things. I would ask you if we can try and finish this up in the next half hour, then take a break and have the presentation at that point. Now to questions: Mark, Steve, Don -- who else? Those were the three that I remember. Good. let's go. Mark.

**MR. MARK LANGE (Fisheries and Oceans):** First question is on the toxicity, water quality toxicity. Have we completed that table shuffle or should we wait a little bit.

**MR. ROBIN JOHNSTONE (De Beers Canada):** If you want to speak with Mark you are going to have to talk very loudly at the moment.

**MR. MARK LANGE (Fisheries and Oceans):** I will wait a moment then.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Mark will be back in a minute.

**MR. MIKE BELL:** Let's continue please.

**MR. MARK LANGE (Fisheries and Oceans):** Actually, this question might go out to Kevin, to all the Kevins in the world. Relating to toxicity data when establishing the water quality benchmarks, there was a comment, I think made by Kevin earlier that the data for specific species toxicity was pulled out and made relevant to Snap Lake and I heard the Snap Lake area, but not all species. I am just wondering if we could define that a little better, the Snap Lake area. Does that include just Snap Lake or are we looking at the watershed or all other possible arctic species? Just a quick comment on that.

**MR. KEVIN HIMBEAULT (Golder Associates):** Basically we are limited by the toxicological data set that is available to us. There is a lot of data on standard species that are used. What we did is we utilized an approach where if a species was known to occur in Snap Lake then we kept that in, there was no doubt about it we would keep that data point in. If a family of a fish, for example the **somodidays** we kept all that data in because there is lake trout there and they fall within that same group.

Ones that we would remove would be things like warm water fish species like **cencharkids** and various species like that. That was basically the limit to the decisions. If there were species known to be in the northern arctic regions we would keep that in the data set, but there would have to be relevant toxicological data that would pass the screening, for one thing, that we could use. I hope that answers your question.

**MR. MARK LANGE (Fisheries and Oceans):** I believe it does, though you commented just on fish, that approach extended to inverts and other aquatic organisms?

**MR. KEVIN HIMBEAULT (Golder Associates):** Yes, that is true.

**MR. MARK LANGE (Fisheries and Oceans):** Thank you for that answer. A second question, I forget who it goes to. It is on oxygen winter modeling. The model presented earlier had an output - first baseline oxygen levels were reported to be found around the five to eight milligrams per litre. The model output predicted Snap Lake oxygen level concentration being in the three to seven milligrams per litre range. I think there was a question earlier on as to where this drop in oxygen would apply to. I think -- I will ask my first question as a point of clarification, that I heard that this concentration of oxygen would typically only be found in the deeper basins of the lake. Did I hear that properly?

**MR. MARK DIGEL (Golder Associates):** Yes, that is correct.

**MR. MARK LANGE (Fisheries and Oceans):** Just wondering, what that model output is telling us, I am wondering if you could clarify that a little bit more. Is it saying that in the deeper portion of the lake at any time in the winter, oxygen concentrations could vary from three to seven, or is it telling us that half of the year it is possible that the oxygen concentration, the deeper portion of the lake would be three? I guess I am looking for a little bit more information on the model output.

**MR. MARK DIGEL (Golder Associates):** The five to eight milligrams per litre was based on the baseline winter sampling where dissolved oxygen profiles were taken in a number of areas of the lake, trying to focus on areas where we expected a range of depth, but particularly trying to find some of the deeper depths, because our experience in lakes in general is that in deeper parts of lakes you tend to have more limited circulation because in lakes, even in the winter you do have a residual current. The currents are very small, but the water doesn't sit completely still. It is still moving very slowly.

So in the majority of the lake, you get enough circulation and enough mixing that you don't get these substantial - significant I'm using in a statistical sense there -- substantial oxygen reductions. Those tend to be restricted to deeper areas where you've got more limited circulation so you've got a deep hole or a deep pocket where you can have limited circulation so the reduction in oxygen that occurs in the lower part of the water, because your organic material tends to move down in the water column, and you also have the organic material in the bed which consumes oxygen, so its restricted to those deeper levels where you would have oxygen levels in the baseline conditions down in the five to eight milligram per litre range. It is only in those areas where you would expect concentrations that could be one to two milligrams per litre lower than that, which is the three to seven milligrams per litre.

**MR. MARK LANGE (Fisheries and Oceans):** So in those deeper zones of the lake, the model is simply suggesting that oxygen concentration would range between three to seven. We don't know if it were likely to occur more at the beginning of the winter, at the end... there is no more detail than what you have presented. Is that correct?



**MR. MARK DIGEL (Golder Associates):** In terms of the timing, we know from studies of what happens to oxygen concentrations over the course of the winter is that this doesn't occur at the beginning of winter and stay steady, this one to two milligrams per litre would be progressive over the course of the winter. So you would expect the maximum concentration, so the one to two milligram per litre, basically in the early spring prior to break up and prior to the **inaudible** which tends to proceed the break up.

The other question is in terms of the areas. The best way to address that would actually be to -- there is a pythometry map for the lake and the best way to address that would be to actually sit around a table and pull out the pythometry map and we could identify the areas on there that are deeper and we would expect to have oxygen concentrations that could be down in the range that we talked about, in the three to seven, five to eight range.

**MR. MARK LANGE (Fisheries and Oceans):** Thank you for that answer. I'll just give you a heads up right now as to a question I'd like to delve into tomorrow. From my read of the literature, typically lake trout require an oxygen concentration of greater than five milligrams per litre. I guess I'm getting a suggestion that the deeper over wintering trout habitat would I guess -- quality would be decreased from above five milligrams sometimes, at least half the time perhaps, below that criteria. So my question tomorrow would be, what are the impacts on over wintering lake trout habitat. We'll leave that to tomorrow when we discuss effects.

Another question that I have is on the plume delineation. The two next questions here are following up on some of Environment Canada's inquiries. I am wondering if De Beers could describe how the plume that was coloured in green in an earlier slide, was delineated. Was it delineated as a function of currents in the lake, and if so, did it include the way that a plume of containing a high content of total dissolved solvents tends to move towards the deeper water.

So I guess I have questions as to how the geographic or spatial delineation of the plume was and if it included some TDS modeling. I know the effects of TDS is something that we are going to discuss tomorrow -- I am not asking on the effects, I am just inquiring about the techniques used, I guess.

**MR. MARK DIGEL (Golder Associates):** It is actually a good question. The one percent area that is shown on the map represented an actual modeled area that was predicted by the RMA model, accounting for lake circulation in Snap Lake, so that represents a maximum area that could be above the threshold under open water conditions.

The discharge itself has a higher concentration of TDS than the lake water. Over time the lake water TDS will increase as a result of that, but the concentration in the mine water discharge remains higher than in the lake.

During the diffuser which causes an initial mixing and sets up an initial mixing with the discharge, with the ambient lake water, provides -- depending on the flow -- anywhere from a 12:1 to a 30:1 initial dilution. What that means is the discharge will -- the turbulent conditions created in that pull in water from the surrounding area and provide an initial dilution of 12 parts of lake water for every one part of discharge water. That is the whole point of a diffuser.

So this tends to equilibrate TDS concentrations between the discharge and the ambient water so that the difference in TDS concentrations is substantially reduced. So under open water conditions, there is enough turbulence in the water column to maintain that fully-mixed condition and so the RMA model is appropriate for predicting mixing within the lake.

In the winter, you have an ice cover and the mixing characteristics are somewhat different. You still get that initial dilution that is created by the diffuser structure, and that is that 12:1 or up to 30:1 depending on the amount of discharge, but beyond that there isn't the turbulence to maintain that even though it is a slight difference in density between the mixed discharge, if we can call it that, and the surrounding ambient water.

What the core mix model and what the hydraulic engineers, from their experience, tell us is that even though the density difference is very small, you are going to get that initial mixing. Then, as the discharge moves away it is going to in effect settle back down so you have slightly higher TDS levels in the moving away and moving down away from the discharge area. That was included in the impact assessment.

So when we looked at winter conditions, we only accounted for that initial mixing. So under still conditions, that initial mixing you get from the diffuser can occur more predictably and more effectively, but beyond that initial mixing zone you can't account for any additional turbulence to keep that water mix.

So the assessment was based only on achieving that initial dilution or mixing that you get associated with the diffuser and no additional as you move away, whereas during the open water season it accounts for the fact that you have lake currents, wind driven lake currents that are going to continue to move that around and continue to keep it fully mixed from top to bottom in the water column.

**MR. MARK LANGE (Fisheries and Oceans):** Your explanation helped, I am still a little confused. I am worry if we continue on in this discussion too far -- although I would like to. Let me just do this then. The image I guess I pictured in my mind was the RMA model describing this sort of green patch of fluent, if you will. That model would work well in the summer. In the winter you can't model all that mixing, or at least that model is not the best tool to use to explain mixing. So I am picturing potentially a layer of water with a higher concentration of TDS moving into the deeper portions of the lake. Is that a possibility?

**MR. MARK DIGEL (Golder Associates):** Yes, that is what would happen. But I want to emphasize the fact that when you are talking about higher concentrations, if you take TDS in the discharge that is maybe towards the end of operations, or for a large period of operations when the discharge is high that is maybe twice or three times what it is in the lake, or five times what it is in the lake, and you mix that 14:1 with the lake water, your resulting -- or 12:1 -- your resulting concentration difference actually becomes quite small. So yes you are -- it does settle back down, but it only does so with a fairly small difference between TDS levels in that mixed water and in the remainder of the lake. The only reason it can settle back down is that there is just absolutely, or virtually no momentum in the lake to hold it up.

**MR. MARK LANGE (Fisheries and Oceans):** Okay, so yes it would settle, but the concentration of TDS is not that much higher than water that is already in the lake that has been mixing throughout the summer.

**MR. MARK DIGEL (Golder Associates):** That is correct.

**MR. MARK LANGE (Fisheries and Oceans):** One last question pertains to mixing zones. I guess the question actually refers to mixing zones, but the question has to do more with the boundary or the scale of impacts. Earlier on in the presentation there was a three-step process or assessment done and I would try to recall it here if I can -- correct me if I am wrong.

Basically if a parameter at the end of the pipe, or the discharge, was below guidelines then there was no further assessment conducted. The second step is, if a parameter at the 60 metre mixing zone boundary was below guidelines, then it wasn't assessed any further. If a parameter exceeded guidelines at the 60 metre boundary zone then you invoked your water quality benchmark approach to estimate what the impacts would be at the lake scale. Do I have that part correct first?

**MR. MARK DIGEL (Golder Associates):** Yes, that is essentially correct. What you are referring to as a mixing zone we refer to as essentially the maximum concentrations that you can predict in Snap Lake and that you would expect to see in Snap Lake because within that 60 metre area you are getting turbulent conditions and a high degree of mixing, so you would expect concentrations to be similar to what they are at the boundary. But because it is a turbulent zone, you can't reliably say what the concentrations would be. You know they are going to be less than they are in the discharge, likely similar to what they are at the boundary, but in a small spatial and temporal sense be somewhere between the discharge concentration and the concentration at the boundary. So that 60 metre is really because that is the maximum concentration that we expect to see in Snap Lake at the minimum resolution in which you can predict it.

**MR. MARK LANGE (Fisheries and Oceans):** Thank you for that clarification. I guess my question is, why the change in scale or boundary? Why the movement

from end of pipe to the 60 metres to the one percent? How is this arrived at? I guess I understand that in other legislation, mainly the U.S. legislation allows for assessment at the watershed level or the lake level. Why was it done in this instance?

**MR. MARK DIGEL (Golder Associates):** It certainly wasn't done for any legislative reason, it was done really to provide a systematic approach for looking at effects. I mean, the target for the project and for any discharge is to meet water quality guidelines prior to discharge into the receiving body. With that in mind, Tom described a water treatment system that provides a high level of suspended solids removal down to very low levels. It was felt that that represents a best practical technology for this area.

So the first step in the assessment is to say, okay, with that level of treatment which we considered conservatively, because we only accounted for removal of the particular forms of substances, we didn't account for the fact that you likely will and could pull out dissolved forms, but looking at that best practical technology, conservatively we said for how many of the compounds will that result in discharge concentrations that will be below guidelines. That is done for illustrative purposes, because we don't want to assess the minimum area or the maximum area where we say effects would be negligible. We want to -- it was first of all an internal target process, and you also want to illustrate that process in the system, that the first step was to say, okay, can we meet the guidelines before you discharge into Snap Lake? For a large number of the substances, the concentrations in the discharge, the maximum concentrations in the discharge are in fact below the guidelines before they enter Snap Lake.

So that was done purposely to illustrate the fact that the treatment does that for a number of the substances.

The next step is then to say, okay if it doesn't meet it before you discharge into Snap Lake, do the maximum concentrations that you would predict in Snap Lake, so very close to the discharge, are those below guidelines? And so most of the remaining substances we found that they were close enough to guideline levels in the discharge, are those below guidelines? And so most of the remaining substances we found that they were close enough to guideline levels in the discharge that when you account for that initial mixing and the build up over time, which is included in the modeling, the concentration will still be below the maximum concentrations in the lake will still be below guideline levels. So both of those provide us with a high level of confidence that the concentrations in the lake will be below guidelines and the effects of those substances will be negligible.

So it allows us to progressively identify where you would achieve concentrations that are below guidelines. For those remaining few substances where the maximum concentrations in Snap Lake could be above the general guidelines, then we needed to move beyond a general guideline that tells you a level at

which point you won't have an effect, and come up with a site-specific benchmark that identify levels where effects could occur. Because the general water quality tells you that if you are below that guideline, you can have a high degree of confidence that you won't have impacts. But because of the level of conservatism built into that guideline, it doesn't tell you if you are above that that you are going to have or you could have effects and that is why we developed the site specific benchmarks for those substances that could be above guideline levels in Snap Lake, and then the assessment was based -- for those substances -- was based on what proportion of the lake could be above the different benchmarks. That gives you a better ability to assess what the potential effects could be.

**MR. MIKE BELL:** Mark, do you have to ask those questions... Let me put it another way. Could you ask those questions afterwards at a sidebar so we can get a couple of more people in?

**MR. MARK LANGE (Fisheries and Oceans):** I am actually done, if I can ask the one final. Thank you Mark, for that explanation. I understand from the EA and better from your explanation now and the presentation this morning, as a matter of fact, the impacts or likely impacts at the scale of Snap Lake, what remains missing in my mind though is that for the one percent of the lake that is affected by the discharge, it is affected at a chronic level. If the goal for De Beers as you mentioned was to meet guidelines I am wondering why there aren't multiple options presented here for treating the water at that level, particularly for those parameters whose chronic toxicity is still apparent beyond 60 metres, mainly **cadmium**, copper, chromium.

Why different options weren't presented for us to look at to reduce as much as possible that zone of effect? That is all for my questions.

**MR. MARK DIGEL (Golder Associates):** The purpose of the impact assessment is to identify impacts to environmental impacts of the project, and to minimize those impacts to the point where they are negligible. And with the project design, with providing a water treatment plant that provides a high level of treatment, and making conservative assumptions with that level of treatment, if we have a high degree of confidence that the overall effects are negligible, then as a consultant we wouldn't recommend that a level of treatment beyond that would be necessary to protect the aquatic ecosystem.

The areas and the potential effects to sensitive aquatic organisms are for a limited number of parameters and a very small portion of the lake. They were modeled conservatively. My professional opinion is that the effects will be negligible and based on the assessment results further reductions or further treatment isn't required.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I just wanted to clarify that last comment. We get back to the idea of available technology, and as Tom discussed yesterday and perhaps we haven't made this clear enough is that

really, we assist the project on the plant we indicated in the project and the project description.

Why we chose that plant had been considered before we put that project description together. One of the steps that we went through was looking at what other treatment technologies were available.

But like Tom commented yesterday, besides essentially to paraphrase Tom, and again I might not do it correctly, besides tweaking the plant that we presently are proposing, the option was essentially to jump to a plant which created a very large waste stream. Approximately 10 percent of the water that would go through it on a daily basis.

On that basis, that really meant that it wasn't practical. So basically what you see is really our options. That is where the treatment plant that we've got, that is why we've got it. The best we could get there.

**MR. MIKE BELL:** I need some guidance again, folks. We haven't finished this. I would suggest we go for -- just a minute. Mark.

**MR. MARK DIGEL (Golder Associates):** I will just ask if you wanted me to summarize my points there.

**MR. MIKE BELL:** No, don't summarize yet, we'll summarize a little later. I need some guidance here. We have people who very much want to hear this presentation on water quality and groundwater as they are going to be leaving, so we've got to get this presentation in this afternoon and have a few questions afterwards on that. We've got some unfinished questions at this point. I would suggest we go until quarter after, take a break and start the next presentation at 3:30. I am trying to keep everyone happy here of those who want to continue and not break the continuity, but we do have a schedule to keep. Comments? Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** In the interests of time, I am not going to ask a series of questions that I had relating to the model. I appreciate Mark's concerns; he's raised some of the issues that I was going to raise and some other people did also. I would just like to point out that it is a fact that De Beers plans on discharging certain parameters above certain criteria into Snap Lake, and really what the model is trying to do is to help us determine how big an effect this is going to be over how big of an area. The modeling, I will emphasize, it helps -- it doesn't give us a foolproof answer, and particularly some of the scenarios, for example during the winter case as Mark was questioning how it was going to impact the modeling results.

I would like to also point out some of the other uncertainties I have with the model. One of the more obvious ones is the assumed lake area in the calculations. I noticed, Mark, that you assumed that the North Arm contributes fully in the circulation pattern of Snap Lake and also within your area calculations of Snap Lake. I was wondering if you could comment on if we excluded the North

Arm, because it doesn't look like it contributes a lot into the circulation of Snap Lake, how that would affect some of the results.

**MR. MARK DIGEL (Golder Associates):** The North Arm was not excluded from the assessment. The model was set up to calculate inflows and currents and outflows from the entire Snap Lake, so that included that North Arm, it included the main body of Snap Lake and it included all inflows and outflows from the lake.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I understand it did, I just was concerned that the percent area that you used to calculate the percentage of the threshold, that that area wasn't fully utilized. I think somebody else had said, that you said it is not utilized as much as the other areas. Would it be fair to consider that, the lake homogeneously?

**MR. MARK DIGEL (Golder Associates):** If you are talking about in terms of utilization by specific species then that is a discussion that would be better suited for tomorrow's agenda.

**MR. STEVE WILBUR (Dogrib Treaty 11):** That is fine. I have a question also regarding the model and the definition of the initial dilution zone or however you define it. As I recall, the core mix model which you use to define this zone, it assumes that you have an infinite supply of water coming in from all directions. It seems like this diffuser was located pretty close to the boundaries of 60 metres close to shore. And if the model is valid under that setting.

**MR. MARK DIGEL (Golder Associates):** The core mix model does consider the distance from shore in terms of the location of the discharge. You are correct that on the other side you can define it as an unbounded situation or you can define it as a bounded situation where you essentially have a channel. What the core mix model doesn't account for is the fact that you have a finite amount of water in the lake and so that over time the discharges, the release, could increase overall concentrations in the lake, which is why we didn't use core mix by itself.

That overall accumulation occurs over a period of years and the RMA model accurately tracks that overall increase in lake concentrations. So what we used core mix for was what it is good at, which is predicting the near field dilution at particular points in time. So it predicts an amount of dilution of the discharge with the ambient water. So the discharge concentration came from the site water balance work, or site water quality work that Ken described yesterday, and the ambient concentration or the lake concentration that that mixes with was predicted by the RMA model. So at any point in time when we look at the dilution calculation that we get from core mix, we use the results of the discharge concentration and the actual ambient concentrations in Snap Lake to do that mixing calculation. So we are not relying just on the core mix model, we are using the core mix model in concert with the RMA model.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Thank you. Just one more question on the model. In the dilution zone, in that turbulent zone where it is unstable flow, you described it as 60 metres. When we were looking at the Diavik situation where it was the same modeling and the same type of parameters, they described the zone as -- the predictability was broader. In essence, we didn't know and couldn't predict concentrations at all in this zone which could be as much as 60, 90 or even 120 metres. If you could comment on that.

**MR. MARK DIGEL (Golder Associates):** The zone in which you would have turbulent conditions and you couldn't predict concentration gradients is a site specific thing, so the 60 metre radius for Snap Lake is based on the specific depth and the location of that within the lake. Similarly, the Diavik situation is under different conditions than this discharge, so you would expect a difference between Diavik and Snap Lake.

**MR. STEVE WILBUR (Dogrib Treaty 11):** You had a plot earlier that described settling rate, and you mentioned it was dependant on concentration and TSS. I felt it more relates to grain size and essentially what passes through the filter has less of a chance of settling. But if your grain size distribution is proportionally distributed to a fine proportion, you are going to have a lot of potential clay fraction passing through and still have a high TSS. I was wondering if you could comment on that.

**MR. MARK DIGEL (Golder Associates):** I can provide a general answer, and then Tom can correct me if I am wrong or provide more detail. You are correct, the grain size distribution does matter, but the treatment process is going to preferentially remove the courser fraction easier than the finer fraction. So what you are left with after you treat down to a very low concentration is a very fine fraction, because that is the fraction that could pass through the filter.

**MR. STEVE WILBUR (Dogrib Treaty 11):** That is the fraction that I am concerned about. How big is that fraction passing through? We could still have a high concentration with a fine fraction.

**MR. MARK DIGEL (Golder Associates):** I will let Tom Higgs answer that question.

**MR. TOM HIGGS (AMEC):** This question of particle size distribution and the product going to the filter is of interest to me as well in terms of treatment. Certainly one of the things you may not be aware of is often we have to treat water that contains very fine material, clay size particles. That is why we go to the use of coagulants and flocculents to get those particles to conglomerate to a larger particle size so we can physically remove them in a treatment system.

That is part of the art involved in water treatment, is to be able to take a material that obviously has particles much smaller than the core size of the media you are using for filtration and take them out effectively. What is referred to as bed



filtration or depth filtration, the particles are conglomerated, they attach to the media -- they aren't necessarily physically removed because of particle size, and you produce clean water from what was otherwise dirty water.

So I don't think the issue of particle size is that important, it is more a case of what agents you are using to get those particles to agglomerate.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Thanks, Tom, that was a good explanation. I guess then what you are saying is no matter what the particle grain size distribution you are going to receive from the mix coming up out of the mine water, you can reduce the TSS and potential turbidity down to acceptable levels.

**MR. TOM HIGGS (AMEC):** Anyone who has ever lived in a municipality where their supply of raw water is from a surface water source, certainly there are lots of municipalities in the prairies where the surface water is used as the supply of raw water has clay size particles in it, and it is always the job of the water treatment engineer to come up with a treatment system that gets those particles out, because people find having dirty water unacceptable. So the art is in the mix of coagulants and flocculents used to remove those particles.

**MR. STEVE WILBUR (Dogrib Treaty 11):** That was good. I have a question. You mentioned PH would be adjusted at some point. I was wondering how that was going to be done.

**MR. MARK DAHL (Environment Canada):** That is another question for Tom.

**MR. TOM HIGGS (AMEC):** A PH adjustment obviously depends on which direction you are going, but typically for a drop in PH it is either acid or carbon dioxide. Carbon dioxide is quite popular these days for dropping the PH from a high PH to a low PH, and on the other side an increase in PH, the agent of choice is typically sodium hydroxide because of its ease of handling as a concentrated solution.

I would have to actually look at the consumption of free agents, in that case, to make a determination of what would be the best free agent in that case. But those are the normal chemicals used for that.

**MR. STEVE WILBUR (Dogrib Treaty 11):** So my question then is, have these adjustments been considered in the concentrations that go into the modeling or predicting, or would it have no effect on the...

**MR. TOM HIGGS (AMEC):** The actual quantity of free agents used for adjustments in situations like this is extremely small. In fact, operations where I am involved with carbon dioxide addition -- carbon dioxide obviously wouldn't add anything except carbonate to the water -- it is only a few PPM of carbon dioxide is added to drop PH. It is a very small quantity. The same is true for PH adjustments on the upward side. It is very, very, small. Ten milligrams would be

more than enough in most cases. It is not going to add anything significant to the chemistry.

**MR. STEVE WILBUR (Dogrib Treaty 11):** My final question. It relates to -- Mark I thought had some good questions relating to DO, and I just wanted to follow up a bit more on the spatial and temporal distribution of DO through time. I got the feeling that obviously we know the lake isn't static and its conditions are fairly dynamic. I was wondering, if we did a temporal distribution and pick a spot in time and show how DO actually evolved through time, particularly in certain locations where we may get these less than 5 milligram per litre zones, and ultimately if it is a limiting factor to species.

**MR. MARK DIGEL (Golder Associates):** In terms\* of the evolution of that decrease over time, it would be difficult to predict beyond what I mentioned earlier, that typically when the ice goes on you would have well oxygenated conditions throughout the water column, and as you progress through the winter - - and this happens under baseline conditions -- you have a progressive reduction in dissolved oxygen concentrations so you get your lowest oxygen concentrations near the end of the ice cover period.

How the ice sets up in the particular conditions going into that will affect the time distribution, so it is not something beyond that that could be predicted.

**MR. STEVE WILBUR (Dogrib Treaty 11):** The point is, are there any critical life stages that are affected by this at any particular time, and that maybe is addressed tomorrow, I don't know.

**MR. MARK DIGEL (Golder Associates):** I agree that I think that is a discussion that would be better deferred for tomorrow when we are talking about the aquatic organisms on a more specific basis.

**MR. MIKE BELL:** Thank you. It is 3:15. We will have a break for 15 minutes. We will try and fit in the other two somewhere along the line, but I will talk to you about that afterwards. The next presentation will be at 3:30. Thank you.

-- Break

**MR. MIKE BELL:** I assume the presentation, according to the agenda, will take about half an hour. Then, we will have questions after that. I want to make sure that we have time before the end of the day to summarize some of the concerns or some of the issues. I know Mark has a concern, I think Dave Osmond has a concern that summarizes what he is talking about. I have a question, and don't boo when I say this, okay? Is it possible to stay after 5:00 for people if we don't finish, or are people getting flights and all this type of stuff? I didn't get an overwhelming endorsement.

**MR. MARK LANGE (Fisheries and Oceans):** From the DFO team, we could stay past 5:00. We're not happy about it.

**MR. MIKE BELL:** Well I think just before we start I will cheer you up, because I am going to tell a brief story. Three days before Christmas Santa is churning it out in his workshop, he's really giving it, putting in 15 hours day. He's never getting to bed before 2 or 3 in the morning. Three days before Christmas he goes up to his bedroom at 2 in the morning, just gets into bed and there is a knock on the door. He gets up and he's furious because everyone knows that he is an old guy, everyone knows that he's got a big trip coming up and all this type of thing. So he puts on his bathrobe, jams his feet into his slippers and roars down to the front door.

He whips open the front door and there standing in front of him is a beautiful little angel all dressed in white. The angel is looking up at Santa with these big eyes, and the angel is holding this Christmas tree. The angel says to Santa: Santa, what should I do with this Christmas tree? That is the reason to this day that we have angels on the top of Christmas trees. The presentation please.

**MR. JOHN MCCONNELL (De Beers Canada):** You better be careful Mike, you see there is a tree over here. I will turn things over to Pat Tones and she is going to introduce the subject. Then we have I think probably four short presentations on the North Lakes.

**MS. PAT TONES (Golder Associates):** I don't know how I am going to follow a good joke like that. As you know, I am Pat Tones and I am your tour guide to the presentations over these last few days. I would just like to introduce the topics we are going to be covering for our North Lakes session. There are three presentations. The first of these is groundwater flow and direction, so this is primarily hydrogeology groundwater quantity. This is a short presentation and it will be followed by Ken DeVos who will look at groundwater quality and changes as the groundwater moves from Snap Lake towards the North and the Northeast Lakes.

Both of those are quite short presentations, but Mark Digel follows with the third one which he has entitled the North Lake Water Quality. So he really takes the material out of the first two presentations and combines it with his own information, because the groundwater eventually comes up through the sediments and there are changes as it moves through the sediments and up into the water column in the Northeast Lake. His is a little more of an umbrella presentation drawing everything together and bringing things to a conclusion.

We are all fairly familiar with this map by now. We have Snap Lake here. The underground workings, I've mentioned a number of times, there is no surface water connection but the deep groundwater will flow towards the North Lake and towards the Northeast Lake. Our other slides that we are going to have that have various diagrams are there, mostly along this access in this direction and there are some that are really focusing in this direction.

You will notice that as people have been presenting they usually have a slide that tells you where this information is in the environmental assessment report itself or responses to information requests. I've put just the outline here because the North Lake is a little different than the topics covered in the EA because we knew from the very beginning when we were sent to do baseline work that there was no surface water connection, so we really didn't look at the North Lakes in detail right at first. It was when we were very close to the end of the assessment process that we realized there was a deep groundwater connection that we should be looking at.

So the approach that we took in the environmental assessment was because of the amount of data we had collected and had available to us was rather limited, we took a very conservative approach. For example, we assumed there would be no change in the quality of the groundwater as it moved northward. So it is a very conservative assumption. In the EA, De Beers made the commitment that they would gather more information and provide it to you. So there was a lot of fieldwork done in 2002 providing new data, additional data, relating to the North Lake question. In October of this year a North Lakes report was put out and about a week later we had a technical session, a workshop in De Beers' offices talking about the new information.

So our presentations today are based primarily on the North Lake report and our most recent information, not as much on the Environmental Assessment which used the more conservative assumptions. This is the end of my section and I will turn it back over to John.

**MR. JOHN MCCONNELL (De Beers Canada):** Our first speaker is Don Charlie and I have introduced him before, so I think we will hand it straight over to you, Don.

**MR. DON CHARLIE:** Thank you, John. The purpose of this presentation is to provide information and clarification of groundwater flow, directions and quantities towards the North Lakes. We talked about this a little bit last night in our late night session and I am sure it is going to be a lively talk tonight too.

General conditions were talked about a little bit in our environmental assessment report. As Pat said, we used some conservative assumptions there on concentrations and flows. The main report is the North Lakes report where we have this updated data and we had some other responses to the information requests.

I am just going to go through what was done in the field. There were two deep **inaudible** installed, one here and one there between the two lakes. This is the North Lake there, the Northeast Lake is actually off the page here. There was also three **inaudible** installed beneath the permafrost, both to sample groundwater and to measure hydraulic heads.

This is a cross-section to scale on the permafrost. The permafrost here was about 225 metres thick, also about the same here in 0202. It also found the groundwater was discharging from Snap Lake downwards. Unfortunately the data from the North Lake was less conclusive because they were measured at different times and the water level of North Lake had actually risen.

You can see this would be what we would consider to be baseline conditions. You can see on this that we have a component of flow that is continuing off page. In the North Lakes report we actually state that there may be a component of flow that is going under the North Lakes and onwards to lakes that are located further to the North at low elevations, large lakes further to the north at lower elevations.

In taking it forward and predicting impacts and predicting groundwater quantities and flow directions, we actually ignored this component in the model. What that virtually does is that says that all the flow from Snap Lake and the mine is discharging to one of those North Lakes. We considered this to be a conservative approach in terms of the impact assessment. This is baseline conditions, as I said. You can see that there is no flow component here. We put the mine in, a portion of the mine is actually into the permafrost under the land mass north of Snap Lake.

During mining, what happens is because you are de-watering the underground mine you produce a draw-down flow. You induce groundwater to come towards the mine, causing a reversal in flow for a portion of this area here. This is just showing the reversal and flow up in to the Snap Lake mine.

Post-closure, once the mine has been flooded, the groundwater flow conditions re-establish and they return to near baseline conditions. There are some variations because of the preferred pathway caused by the mine being filled by slightly more permeable material.

Now what we used here was we used a numerical model to estimate flows and then we calibrated or adjusted the numerical model to the mass balance calculations. This shows what our estimates of flows are during mining. What will happen is that flow will actually come from the Northeast Lake, flow into the underground mine. Same with the North Lake. There will be a portion of flow that will flow into the mines from the North Lake. Snap Lake flow will still come from Snap Lake into the underground mine.

The flow in the other direction is basically uninterrupted. It is the same as it was before. This is at post-closure. What happens at post-closure is groundwater from Snap Lake flows through the mine and then flows to the Northeast Lake. This green portion here shows the amount that we predict will be going to the Northeast Lake, it is 12 to 51 metres cubed per day. That is about 10 gallons a minute. None is predicted to be going to the North Lakes. The reason for this is

the Northeast Lake is actually 6 metres lower than the North Lake. I will show it on the next slide and you can see that that makes sense.

Here is what will happen at post-closure. You will have flow going basically the width of the mine of the Northeast Lake. It will go under this portion of the North Lake because this is six metres deeper so it would preferentially discharge to this area. That is the end of the presentation.

**MR. JOHN MCCONNELL (De Beers Canada):** Our next speaker is Ken DeVos.

**MR. KEN DEVOS (Golder Associates):** Thanks, John. Before I go onto this presentation, Don alluded to a mass balance that was used to calibrate the results from the modeling. I just want to elaborate a little bit on the mass balance. Mark Digel is going to talk a little bit more on it.

What the mass balance was, in essence we looked at the used chloride and a number of other parameters and we looked at the concentrations in the groundwater and we looked at the concentrations in the lake water for the Northeast Lake and for several other lakes around the area with respect to chloride.

What we did was we used the concentrations in the lake to determine the influence of the deeper groundwater of those particular lakes. What we found and Mark will talk a little bit more again about it, what we found was that the concentrations in the lakes were very low. The highest concentration for chloride that was found was in the Northeast Lake at 1.7 milligrams per litre. The concentration in the deep groundwater is greater than 330 milligrams per litre. Based on that, we know that the influence of that deeper groundwater on the lake is very minor and it is dominated by the surface flows. And we looked at the concentrations in the surrounding lakes and they are all, with respect to chloride, below one milligram per litre which shows that those also are dominated by surface water.

So now, to get onto the purpose of this particular presentation, the purpose is to provide background and rationale for what we expect the changes to be in groundwater quality as the groundwater migrates between Snap Lake and the Northeast Lakes, or for that matter between groundwater in any other lakes.

The topic has been addressed in the North Lakes report, the workshop that was conducted to describe the report. The processes are described in several external references and in most geochemical textbooks you can find discussion of these processes.

What we will be talking about in the system in general we get recharge from the Snap Lake area, as Don described, that flows along and discharges to the Northeast Lake or continues along the flow path and discharges to some other lake. Conservatively we assume that it is all discharged into Northeast Lake.

And, we have changes in the groundwater chemistry along that flow path and these changes are what I will be talking about.

What we expect these changes to be based on the different types of interactions. We expect a decrease in the PH value as the water migrates. What happens is as the water migrates through the mine we end up with potentially alkaline conditions as it picks up the chemistry of the cement. There are some reactions that happen right with the cement, such as hydration, possibly some hydrolysis, that will reduce those PH values.

We then, the other thing that we can see along the flow path is equilibration with the bedrock over a period of time. This we also see a decrease, what we expect along the flow path is a decrease in concentrations. In this case I am talking about the specific parameters of concern that were identified in the environmental assessment. We expect decreases in aluminum, chromium and copper due to equilibrium reactions as the water migrates. What we don't expect is a change in the malleinum concentrations.

The mechanisms responsible for these expected changes are indicated here. One of the mechanisms would be reactions, and of those would be neutralization reactions, could be hydrolysis, it could be interaction with an residual oxygen in the groundwater flow system as it migrates and equilibrium reactions with the bedrock. Each mineral species has a stability field. A field where it feels happy with respect to PH and **reedox** conditions. As the water migrates it will interact with that bedrock and the water will change. The **inaudible** principle is the governing principle, but the water will change its composition to reflect the bedrock, and the bedrock will change somewhat to reflect the water composition. That, with the other types of reactions that we are looking at are absorption, in which case it is similar to what you would see -- while it is essentially velcro. The ion will stick to the fracture wall or stick to some surface. It is not a permanent reaction, it is not a permanent mechanism but it will slow the migration of the chemical component. The last mechanism that we expect to occur is precipitation. This would be -- a good example of this would be scaling of your pipes or hot water tank. When the chemicals migrate along the flow path they can either change due to reaction or there can be a change in conditions along the groundwater flow path that would cause the chemical to form a solid and precipitate out a solution. So it would no longer be carried along the flow path.

So these different mechanisms we feel are at work are based on geochemical principles. Important things to consider when looking at this system is the time frame. Our expectation is that the water is going to be in this situation, in this environment, for greater than 150 years and it is an isolated system. Given that we have very long time periods, we expect that the water will equilibrate with the bedrock and with the water along the flow path.

Just to reiterate that and to stress that that is very important, we have the time frame here for the equilibrium reactions to occur and we expect the changes to

groundwater changes that we've estimated and expect for this system are considered appropriate and we are confident in our estimations.

**MR. JOHN MCCONNELL (De Beers Canada):** Just in case you haven't heard enough of Mark yet, he is going to give three more presentations, but they are all short.

**MR. MARK DIGEL (Golder Associates):** I actually only have one more presentation. The purpose of this presentation is to provide more information on how the project could affect water quality in the North Lakes after mine closure. The changes in the North Lakes are controlled by the amount of groundwater flow to the North Lakes that Don talked about. Maximum concentrations in the groundwater and changes in those concentrations along the groundwater flow pathway that Ken talked about, as well as changes that could occur in the sediment or water. Finally, dispersion within the sediment of water that decreases concentrations within the sediment flow water.

I will go through each of these in turn, summarizing and pulling together some of the information that Don and Ken provided previously. As Pat mentioned, the effects on the North Lakes was addressed in a very conservative basis in the environmental assessment report and water quality effects were in section 9.4. The methods used are provided in appendix 9.7. There were two information requests related to North Lakes water quality which the responses drew information primarily from the North Lakes report.

This is just a representation of flow pathways. It is helpful in understanding how the North Lakes or deep groundwater flow passing through the mine workings could influence water quality in the North Lakes. So the two water bodies are Snap Lake and then the North Lake or the Northeast Lake.

There is no surface connection between Snap Lake and the Northeast Lakes, however deep groundwater from Snap Lake has the potential to migrate in and discharge through the bottom of the North and Northeast Lakes. In the case of the Northeast Lakes, a portion of that deep groundwater may flow through the mine, changing the chemistry of that groundwater prior to discharging into the Northeast Lake. The groundwater flow modeling has shown that deep groundwater into the Northeast Lake will not pass through the underground mine workings.

So this is the deep groundwater component of inflow into the Northeast Lake. As Ken mentioned earlier, that is a low proportion of the total inflows into the lake. The majority of the inflow is through direct precipitation and surface runoff with a certain component of shallow groundwater inflow. The major component of outflow is surface outflow from the lake with a very small potential proportion of groundwater outflow.



Just to reiterate, the groundwater modeling showed that no water passing through the mine workings will discharge into the North Lake and the modeling showed that of the potential deep groundwater inflows to the North Lake from Snap Lake, approximately 30 percent of the groundwater inflows will pass through the mine workings.

So water quality results were used to quantify the total amount of groundwater flow that could occur from deep groundwater flow into the North Lake and this is the mass balance that Ken discussed briefly. This is just a simplified schematic showing what effects the mass balance of, in this case, chloride concentrations into the Northeast Lake. This mass balance was calculated under baseline conditions because the limited data from the EIA, we collected additional information this year in 2002 to define inflow concentrations and rates into the Northeast Lake. So we know from the measurements we took this year that the average inflow concentration in surface inflows, streams and runoff into the Northeast Lake is 3.3 milligrams per litre. The rate of flow on an average annual basis is about 38,000 cubic metres per day.

This flows into the Northeast Lake and provides a source of chloride into the Northeast Lake. If we look at the Northeast Lake it has a relatively low concentration of chloride but it's higher than in the surface inflow. So the question is, how much of the deep groundwater can you add into that lake to bring the concentration from the 0.3 to the 1.7. That was the purpose of this mass balance, to quantify the maximum potential amount of deep groundwater inflow. This was done for chloride, it was also done with several other parameters that represent good tracers.

Why chloride in these other ones were particularly good was one, because they behave conservatively, so you wouldn't expect any precipitation of chloride or reactions that would reduce chloride. They are also found at much higher concentrations in the deep groundwater than in either the Northeast Lake or in the surface inflow.

So the deep groundwater concentrations were measured and the average concentration in the deep groundwater was 335 milligrams per litre of chloride. So to take that concentration, considering the overall water balance of the lake from 0.3 to 1.7 on an average annual basis, the maximum groundwater inflow, of deep groundwater inflow to the Northeast Lake is 160 cubic metres per day.

This calculation was done for chloride as well as strontium and another major ion, the name of which eludes me at the moment. The results of these shows that the maximum amount of total deep groundwater inflow to the Northeast Lake is between 40 and 160 cubic metres per day.

From the groundwater flow modeling we know that of the total groundwater inflow approximately 30 percent will pass through the underground mine workings and that is where we get this 12 to 15 cubic metres per day of inflow that would pass

through the underground mine workings with the remaining 28 to 109 bypassing the workings.

Just to reiterate, the groundwater for deep groundwater flow to the North Lake is that none of this water is predicted to pass through the underground mine workings.

As Ken mentioned earlier, ongoing kinetic test work has indicated that metal concentrations in groundwater within the paste backfill will be lower, substantially lower than predicted in the EA. As well, concentrations of metals and PH levels in the groundwater will decrease along the groundwater flow pathway between the mine workings and the Northeast Lake.

Within lake bottom sediments, the base and a proportion of the lake bottom sediments will typically have anoxic or oxygen-free conditions which will promote the de-nitrification of nitrate or the conversion of nitrate to nitrogen gas and oxygen. Similar chemical reactions and precipitation that Ken described could result in additional decreases of metal concentrations within the lake at the base of the lake bottom sediment.

An additional process that would reduce concentrations in the upper zone of the sediments is dispersion of the water as it passes up slowly through the sediment column and discharges into the overlying water column.

This mechanism is different between core sediment and fine sediment, so I will first discuss the dispersion in core sediment and in the overlying water column. In terms of the overlying water column, the groundwater inflow to the Northeast Lake will mix rapidly with the water column and concentration gradients are not expected to develop. This is given the low amount of inflow, 12 to 51 cubic metres per day spread over a large area of the lake.

Poor water chemistry within areas of core sediments will be similar to the overlying water column. So the dispersion that you get within the core sediment will result in concentrations in the upper part, in the biologically active part of the core sediment that are very similar to the lake concentrations, and then with depth the concentrations will increase to what we see in terms of groundwater concentrations. That's where, for those parameters where the concentration in the groundwater is higher than it is in the lake water.

In fine sediments, the dispersion is controlled primarily by the rate in which this water flows up through here and molecular diffusion in the fine sediments, so you don't get the situation in the core sediments where you've got the concentration being similar to the water column concentration. At the sediment water interface you would have concentrations equal to the water column concentrations, and then with decreasing depth your concentration is going to increase so that somewhere near the base of your sediment layer, concentrations are similar to

what you see in the groundwater that is moving up slowly through the fine sediment.

So when we put all of these processes together and we look at conclusions with respect to effects on the North Lake and the Northeast Lake first of all, the North Lake there would be no effect on water quality or sediment quality in the North Lake because none of the groundwater flow at post-closure conditions passing through the mine workings is going to discharge into the North Lake.

For the Northeast Lake, if we look at water column concentrations, water quality guidelines will be met for all parameters throughout the water column, so there won't be any development of density gradients within the water column. The rate of discharge and the area over which that discharge occurs is just too small to develop any kind of concentration gradient.

When this assessment was essentially a mass balance assessment, was completed without including the expected decreases in groundwater chemistry, so we used the same maximum estimates of groundwater chemistry from the EA to look at the potential effects within the water column.

For lake bottom sediment, the assessment area in the Northeast Lake based on the bathymetry in the area and the bathymetry tapes, the assessment area consists of approximately 85 percent core sediment and 15 percent fine sediments. Water quality guidelines will be met at the sediment water interface for all parameters in areas of coarse and fine sediments.

I mentioned specifically the sediment water interface because that represents an area at which some of the particular aquatic organisms, where they occur and where some of them over winter as was discussed in the environmental assessment. In addition, water quality guidelines will be met within the water areas with core substrate, and this specifically relates to areas of spawning habitat or other gravel areas that are used as over wintering habitat.

Poor water concentrations within areas of fine sediment could not be quantified, but are expected to be substantially lower than were predicted in the EA.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Mark. Over to you, Hal.

**MR. MIKE BELL:** Okay. I need some guidance again. It is now five after four. My question is -- and there are two things that are unfinished business; one from Dave Osmond and one from Mark that I wanted to make sure we get by the end of the day. A very brief statement from each of them. But before we get into that, I just want to -- we will do that at the end of this session. What I would like to do now is find out how long people can stay that will gear the number of questions we can handle. Do we end at 5:00? Do we end at 5:30? What time do we end? Dave.

**MR. DAVE OSMOND (Gartner Lee):** Don't forget that there is a phosphorus workshop or follow up meeting at quarter after five for some of us, anyway, up at the De Beers office boardroom.

**MR. MIKE BELL:** So basically what people are communicating to me is 5:00, right? Let me just deal with the two unfinished matters from the last session and then I will come back. I will ask you to be very quick and then we will list some questions. I have to say to you, not all the questions are going to get responded to between the 45 minutes we have, but we will see what we can do. I want Mark to give me a summary and I want Dave to give me a summary from the last session and then we will go onto this. Mark.

**MR. MARK LANGE (Fisheries and Oceans):** Summary to my first question, the first question was on toxicity and whether or not species for all the watershed, or all species in the arctic were used. My question and concern disappeared with that great answer from De Beers' consultants. My second question was on oxygen concentration. My question has been answered. I still have some concerns remaining that I am hoping we can address tomorrow. The question of TDS was answered and clarified. I still have an issue associated with that question that I am hoping we can address tomorrow in the effects. The final question of a water treatment plant and discharges, the answer to my questions helped clarify in my mind that there still is an issue for DFO in terms of how and why these mixing zones were selected.

What I would suggest at this point is, I've had an opportunity to poll this side of the room so we would recommend that DFO, Environment Canada, DIAND as well as NRCAN would be interested in pursuing with De Beers this conversation on water treatment options and I will leave it at that. That is my summary. It still remains an issue.

**MR. MIKE BELL:** Thank you. Dave.

**MR. DAVE OSMOND (Gartner Lee):** Throughout the conversations and discussions this afternoon, and this is very much in support of that last statement, was Mark Dahl made reference to how can we reduce the mixing zone? The answer back, and this was a standard answer all afternoon, was the areas affected assume no reduction of treatments of metals or treatment through the mine water treatment system. I am getting the feeling and I got the feeling from the presentation yesterday that maybe we are being a little bit overly conservative here, in that the treatment as I understood it, the treatment that was being suggested is proven technology for the water treatment facility. On top of that, there is contingency built into it, we heard about the contingency that is built into the mine, the mine water pond that is available.

I am just -- instead of not assuming treatment, why don't we assume treatment and that it is quite possible to assume the better treatment, plug that into your model and see what kind of reduced area of effect you get?

Now I understand that this will require some input from Tom and I invite that input, because I think this might reduce our pressure and our concern about this and the mandate of several of the agencies across the room. It will help meet their mandates. That is my request, or I would like some kind of a response on that approach.

**MR. MIKE BELL:** I think you've made your point. I don't know if you are ready to give a response, if you want to think about that overnight or not.

**MR. JOHN MCCONNELL (De Beers Canada):** We can either give a response now or we can bring it up tonight at 6:00. It is up to the forum here.

**MR. MIKE BELL:** Why don't you bring it up at 6:00 and report it to the forum? Is that okay? I am just concerned about the time and I know that people have to leave. Thank you for that. We will take that comment in the morning in terms of the response for the record. Is that all right with you, Dave?

**MR. DAVE OSMOND (Gartner Lee):** I would just like to hear a quick answer. We don't have to hold people to it, I'd like to hear a quick answer and then we can discuss it later tonight. I think everyone around here should be privy to this, so I'd like to hear a quick answer now. I don't think it's going to take all day.

**MR. TOM HIGGS (AMEC):** As I outlined yesterday, the process for selecting a system for treatment of water was not derived at in a trivial manner. It was an intricate process that was guided initially by ambient guidelines and a series of tests were done looking at a number of different options, four different options in total. We looked at quite a few precipitation alternatives using different free agents, including the use of sodium hydrosulphate to achieve lower metal levels.

The conclusion from that work which included pilot plant runs on three different flow sheets was that precipitation, either in the system that we have proposed which is basically direct filtration, or in a more complicated plant which uses a process called high density sludge, had really got to the limit of what we could achieve with precipitation process.

In other words, at the level we were testing at, the levels of copper and cadmium chromium that we were seeing in the feed, we were really coming to the limit of what we could do with that technology. The alternative, to go to lower values, requires membrane process. A membrane process, which is commonly referred to as reverse osmosis or other techniques like aqua filtration, they are able to achieve potentially lower values. They aren't a panacea, they still have an efficiency of sorts. I have put in a reverse osmosis plant at one particular installation, so I have some experience with what they can achieve. They are not perfect, they don't produce distilled water.

The problem with a membrane system is that it has a reject stream where all the materials that you've removed are concentrated in. That stream can be as much as 10 or 15 percent as the product water you are treating. Then you have to find

a process to deal with that reject stream, because at that point you've got salts at their saturation limits and in some systems you have to go to evaporation. You have to take that brine solution and turn it into a solid, because otherwise you have no way of getting rid of that salt material. You have a soluble material.

Obviously, at the flows we are looking at upwards of 32,000 cubic metres per day, it really is not practical to consider those sort of options. The capital cost of a reverse osmosis plant in the first place would be astronomical, and then the operating cost of operating that much reject stream would also be astronomical.

So what I said was we are really at the practical limit of what we can achieve with the current flow sheet. We can obviously have a design that is flexible, that allows us to deal with potential changes that occur during operation which is normal. We have the ability to add alternative agents if they do help us to improve performance.

I expect that the full scale plant would do better than what we've predicted at this point, because our predictions are still on the conservative side which they have to be. At this point I can't see how we can move any farther than what we have in terms of what our predicted quality is going to be. I think we are up against the technology limit at this point.

**MR. MIKE BELL:** Thank you. That was the short version. How many questions do we have on the last presentation, and we will just kind of go around. Your name is John Hebert? John, did you just want to make a comment on what your concern is?

**MR. JOHN HEBERT (NSMA):** My concern is the regional groundwater flow and how the flow goes from Snap Lake to the North Lake and Northeast Lake.

**MR. MIKE BELL:** Okay. Who else. Alex.

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** Similarly the regional groundwater flow model.

**MR. MARK DAHL (Environment Canada):** Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I have one question about the chloride mass balance.

**MR. MARK DAHL (Environment Canada):** Dave.

**MR. DAVE LEVY:** I want to ask a question about the assessment as far as -- or the type of work that was done in background studies in Northeast Lake.

**MR. MIKE BELL:** Okay. Any more? Let's take those. If we have time for more, we'll pick some more. John.

**MR. JOHN KEEPER:** What I would like to do is put two slides there to show my point of view and present that. What I have here is a cross section showing a conceptual model for three lakes. I want to explore here how the flow, what is the flow between the lakes and how it happens here.

There are a few things I want to call your attention to. The first is this **inaudible**. On the horizontal, we are talking about from here to here, about 16 kilometres. In the vertical, we are talking about 80 metres in height here.

The second thing is the lake elevations here. They are given in feet. Therefore, the difference between these two lakes is 30 feet, which is roughly 10 metres, which is roughly the same order of magnitude which we have seen between the lakes so far. So it is about 30 feet from here to here, and the distance here between these lakes is of similar order of magnitude. They are not exactly the same, but a similar order of magnitude there.

The thing to remember here, this is a conceptual model here. The main thing is that there are some recharge to the lakes. What I want to point out is that for this lake, for example, there is some flow that will go around underneath the lakes, and in this particular case will come to this lake here.

If we had some sort of another lake here, this lake would just go and bypass all the lakes until we found the recharge zone here.

The other thing to remember is that those flows are highly dependent on what materials you have here. They are dependent on the hydraulic conductivity. If you were to put a neck over here, which means a very permeable material, the lakes would just strictly feed this kind of aqua **fer** there, and the water would just move this way up here. So keep that in mind.

What I would like to do is basically explore these concepts when it applies to the flow from the Snap Lake to the North, or to the Northeast Lake here. These guys have used here a ratio for the horizontal, the hydraulic conductivity, the horizontal conductivity is much larger than the vertical conductivity in this particular scenario here.

The view that I have is this: Snap Lake is at a high elevation, six metres higher than the North Lake, the way it has been given to us. So water comes out of Snap Lake and it radiates outwards. My point is that the North Lake here, it feeds the system. I don't think that the water from Snap Lake is going to go up here.

The reason for this is that first, we have about 200 metres here of permafrost. We just consider this an impervious boundary here. The model has assumed a boundary for the flow at about 300 metres below ground level. So we have here about 100 metres.

And there are other lakes that could have a lower elevation here. So my view is that the water will come preferential all the way here and no water will go up to

the North or the Northeast Lake. I find it very difficult to justify that the water going 200 metres up to find the lake, and then has to come 200 metres down. I cannot find a way for this to happen in this particular system given the distance that we have.

So basically, the two lakes, the North and Snap Lake, about 2.5 kilometres, this part of North Lake is about 1.5 kilometres. Perhaps... I don't know, five kilometres or more, there may be another lake here with a low elevation. We have lakes there with low elevation.

So, this is the main thing. To some extent, the chloride concentration that De Beers talked about there makes sense. I don't expect to find any chloride here because groundwater is not in fact going there. So from my view, there will be no effect on the North Lake because of the flow coming out of Snap Lake and through the mine workings here. So this groundwater will basically go below it. This is my main point that I want to make here.

It has been shown in some of the slides that the groundwater would go up and then would go down here, and this is my divergence. I don't agree with that. I don't think it will happen. So there may be some implications on the results that will come out of here. I think the main one, that the chloride, the mass balance, is not valid because I don't think that groundwater is in fact going to the North Lake there.

This is one question that I want to present here. I will give this back and I will have a few other questions.

**MR. MIKE BELL:** John, are you able to... I am conscious that there are a couple people over here with questions that have to get on planes. They have to leave at 5:00. I am just trying to jockey these things around. John?

**MR. JOHN MCCONNELL (De Beers Canada):** Actually, I think that works out well, because there were a number of people at our session last night. I think before we respond we would like to hear from the other people that were at the session last night their response to this model.

**MR. MIKE BELL:** Okay. I just want to make sure we've got -- I know Alex is leaving, so I want to hear from Alex. Is it on this same similar subject?

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** Yeah, I find that I missed that part last night and I find your conceptual model quite appealing, and it sort of anticipates partially a comment that I was going to make, namely the hydraulic head measurements reported in table 4.3 of the North Lakes report do indicate a downward degree underneath the North Lakes.

Although Don mentioned the fact that the measurements of lake level and head were not simultaneous, so that casts a little doubt on it. Nonetheless, it would tend to support your conceptual model.



But I think stepping back a bit, it just seems to me the whole conceptual model is of regional groundwater flow at the site is still quite sketchy. That is all I have to say at this time on that subject.

**MR. MIKE BELL:** Can I just pursue this with other comments from last night, as John has suggested? People who were at that meeting, would anybody like to comment on that?

**UNIDENTIFIED SPEAKER:** Not a comment so much but a question. I am by no means as knowledgeable about this subject as other people who were in the room last night, but I do have one question that leaps out at me. If what you are saying is correct and the groundwater does bypass the Northeast Lakes, if there are any lakes further north that are of lower elevation, do you see the groundwater entering those lakes.

**MR. JOHN KEEPER:** Yes, I would see the groundwater enter some of those lakes. I don't know which lake in particular, but here is what I would expect: that at some point further north, the water will have to come out.

**MR. MIKE BELL:** Other comments from last night? I am just following John's lead on this one. Who else was there? Who else would like to comment on this issue?

**MR. STEVE WILBUR (Dogrib Treaty 11):** I would agree with Alex's comment that the current groundwater model is a bit sketchy. I would also agree with Joe's interpretation in terms of a regional model, it is closer to what is reality.

However, I think the issue becomes more of a moot point as we get further and further away from the mine with groundwater flow in terms of overall impact. So rather than delve into this, I don't consider it necessary to delve into it. It becomes less and less of a concern as groundwater flows further and further away from a source and ultimately becomes -- the constituents in the groundwater, in order to affect aquatic resources would be negligible.

**MR. MIKE BELL:** Other comments?

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** Just a supplementary. I mean, in addition to the ambiguous measurements in monitoring wells 0-2, 0-3 and 0-5 there is the fact that the key monitoring well, 0204 between the two lakes, your measurement has basically thrown it out. I think that is really, really unfortunate. It would be nice if you could go back and get a measurement there, because I think it would be critical at that location to get something that would validate your case.

It just seems that whenever there is a clincher measurement that you need, it is not there for some reason.

**MR. MIKE BELL:** That is kind of a broad statement. Be that as it may, I am not about to evaluate that statement. I am just trying to figure out where we go from here with this. Has everybody been heard who wants to comment?

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** My conclusion is just -- again, I will reiterate. The conceptual groundwater flow model for the area is sketchy at this stage.

**MR. MIKE BELL:** Just let me have a clarification. When you say sketchy in relationship to what we've heard, are you talking about invalid, or...

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** It is not demonstrated by data.

**MR. MIKE BELL:** Okay.

**UNIDENTIFIED SPEAKER:** I think it is the same point. The water levels that we have, they were derived from maps. If I understand you correctly, there is only one water level that was in fact surveyed. So there is some uncertainty on those water levels and what is going to happen there. If the model is not correct, then all your conclusions that come after that may be invalid.

**MR. MIKE BELL:** Louie.

**MR. LOUIS AZZOLINI (MVEIRB):** As I am famous for...what I understand Steve is saying is that if the groundwater model that John has presented is accurate, the actual -- and I am an impacts assessor, I think in terms of impacts -- the impact becomes relatively negligible.

If the model that De Beers is ascribing to which John is saying is not necessarily the case and the evidence is not there to substantiate it, but let's just say it is, De Beers is claiming that the effect is negligible.

And at the end of the day, while we are discussing the technical rigour of the work that is concluded, I have to report back to a board on what does this mean. I ask you two, what does it mean from a standpoint of, taking into light that if the water is all moving into East Lake or North Lake, or if its moving underneath it and through, what would you tell the board? That it is really important and they should be really worried about it and the impact potential is right off the map? Or...

**MR. JOHN KEEPER:** My view is that I am looking for the sound science behind the work that has been done. I have seen very little data to support what is there so far. To answer your question, I think that the impacts would be much less than what has been predicted.

The reason for this is I think that the length will be longer, the residence time would be longer, therefore it would have more time to calibrate. So in the end, the impacts would likely be less.

Nevertheless, I think that the reason for this is to look at the technical issues here, and I think that this is something important. So basically, if the framework is not good, it predisposes me to look at everything else with a grain of salt. So this is my view.

**MR. MIKE BELL:** Other comments on this part of the discussion? Dave.

**MR. DAVE LEVY:** Yeah, based on -- I wasn't there for the regional part of it, but I was there -- and I am not a hydro-geologist. I was accompanied by our hydro-geologist who had to leave this afternoon and it is unfortunate, but I think that was a very broad, sweeping statement that was just made.

One of the things that I determined last night was that estimates were made at the site, or the particular site on the Q value, or the amount of water. I don't care about input parameters, I just wanted to know how people felt about the accuracies of the Q values.

The Q values were based on part of a four-month advance exploration campaign where actual flow was measured and collected. That flow was compared to the conceptual model and it was extremely close. It was a little bit off so the model was refined to reflect that differential. That gave me a tremendous level of comfort, that it was sort of proof in the pudding at the site. Regardless of input parameters, the assumptions that were made seemed to fit.

Now, as far as the regional setting was concerned, Rob Dickins, who was the hydro-geologist representing the impact review board through Gardner Lee was satisfied with the assumptions that came out of the discussions last night, but I wasn't there to be part of that.

I talked with Rob and he agreed that he was satisfied. If indeed the new model is accepted, what we heard, it looks logical to me, but I think what was assumed was sort of a worst case scenario, as I interpret it, where all of the water that may have gone through the mine goes up to the nearest lake. Even at that, the impacts are, the volumes are pretty small, and the impacts according to the assessment are very low.

If indeed it goes further, more attenuation, more dilution I might add -- I would think. I don't know guys, I want to hear a hydro-geologist respond to this -- before it discharged in another lake.

As well, I would expect since Snap Lake is the highest lake in the system that there is a radial -- maybe even -- but a radial distribution of flow out from that Snap Lake area and it is not all going to one lake preferentially. That is the next lake lower down in the system. It just, to me, that is my sort of take on things. To

assume that everything is wrong, particularly at the site, I didn't feel that way after last night's presentation.

**UNIDENTIFIED FEMALE SPEAKER:** Snap Lake is higher than the other lakes, that is what we heard. We know from people being there the water flows outward and towards MacKay Lake through Camsell Lake. All we are thinking is that we want to know much more information on how this groundwater and the concentration of discharge materials will affect the growth of fish and the organisms that feed the fish, because there are lots of lake trout around that area.

So when we go to the hunting camps at MacKay Lake we want to know that there is going to be lots of fish all the time. I am not getting that regional scenario here at this stage and it is kind of interesting to see the groundwater, how it flows through this chart which I wanted to see yesterday.

The other thing is that as a First Nation that has no land claim in place, we're at the stage where we have always been -- or we're always at the stage where we have this fiduciary obligation with the federal government. The people who are sitting and doing the work for the federal government, we feel are doing the work for us. We want to feel comfortable. There has to be a comfort level that we feel. If they are not satisfied, the elders say we should not be satisfied just with data from the proponent.

I got the impression that some of the information that we got is just little tidbits of information and not the whole picture of what we should be seeing. The only time we get to see the pictures when they keep putting it up on the screen. I would like to see some of those pictures up on the wall so when we are thinking about something during the day we don't have to look only at what they can provide during the presentation.

The other point I wanted to make is that I think we were supposed to get a day-by-day information paper. Their presentation papers faxed to people, or was it emailed to people? As they are making their presentations, are papers available to us everyday? That is what I wanted to know. Thank you.

**MR. MIKE BELL:** Just my comment on that. I would request that Louie speak to De Beers about this matter about the presentations and about the first thing, something for the walls or something like that. So the two of you can discuss that and report back to us in terms of the status of the presentation papers and the possibility of -- I don't know what the technology is, but getting some pictures on the wall I think would be a helpful idea. Some of those are very good and we keep referring to them. I think people can deal with those.

I think we've heard a number of comments at this point around this -- one more?

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** Changing gear for a minute here, I have just a sort of small housekeeping thing. Just confusion,

it needs clarification. Table 5.1 on page 46 of the North Lakes Report, it could be a screw-up in the captions or something, but the table suggests that the total outflow from North Lake is 989,432 cubic metres per year. Just below, a few rows below, for Northeast Lake, it says the total inflow from North Lake is 1,296,908 cubic metres per year.

So I am just wondering how the inflow from North Lake to Northeast Lake can be greater than the total outflow from North Lake. Perhaps I am misunderstanding something here.

**MR. KEN DEVOS (Golder Associates):** That is my typographical error, I take full responsibility for that error. That is the total outflow that was used in the environmental assessment report. The actual value that was used for all the calculations in this North Lakes report is the 1,296,000 value.

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** Okay, if somehow the table could be revised.

**MR. MIKE BELL:** Okay, at this point John asked to hear comments from people last night who were around the table. I was wondering if De Beers would like to comment as we come to the end of the day on this issue?

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Mike. I will just maybe make a couple of comments. I think we have a number of professional hydrogeologists here. Certainly our team that has worked with this data a lot feel quite comfortable with the model we proposed.

Certainly in terms of interpreting the model, we were always in a bit of a catch-22, because I think if we had said that no water goes to the North Lakes, people would have said, "Oh, come on. Some water must go to the North Lakes." If we had said, "20 percent of the water might report to the Northeast Lake" people would have said, "come on. Maybe it's 50 percent."

So what we did is we said we are going to assume for assessing the environmental impact that 100 percent, and then we are going to base our impact assessment on that. I guess, you know it came out that there was very minimal impact. I think Steve supports that conclusion, or I think I am hearing that from everyone. The longer the water stays underground the less chance there is that it has an impact.

Maybe before closing there, I can just ask Ken Devos to elaborate a little bit on the slide that he put up and what happens to the water as it moves along under the ground. And in terms of essentially neutralizing it.

**MR. KEN DEVOS (Golder Associates):** Just as John asked, I will elaborate on some of the different mechanisms that come into play as the water migrates along the flow path. The first mechanism as indicated on this slide are reactions. Those reactions will have an effect, both in the mine as the cement hardens, and

that will have an effect on the PH. So you will get hydrolysis and hydration of the cement and that will lower the PH. As the water migrates along the flow path, you will have reactions along the flow path. Each mineral, as I indicated, has a stability field. A field where it is stable. As the water passes by those minerals, it will equilibrate with those minerals or it will react with those minerals.

One example of that sort of reaction is any remnant oxygen, any small amounts of oxygen in the mine water if they come in contact with iron will react with the iron and you will release a hydrogen molecule and that will help reduce the PH.

So there will be several PH reducing reactions. There will also be absorption reactions that reduce the migration and there will be precipitation or scaling reactions that could in effect slow the migration or stop the migration of several parameters. We are very confident that these reactions will indeed be taking place, and that with the longer time periods there will be more opportunities for the reactions to take place. The longer the water is in the flow system the more equilibration will occur.

**MR. MIKE BELL:** Alex.

**MR. ALEXANDRE DESBARATS (Natural Resources Canada):** I would just like to issue a clarification. There is a statement that I made earlier that could be construed a bit unfortunately that might have been interpreted as a criticism of De Beers hydro-geologists concerning the data that they were gathering. What I meant to say was that De Beers hydro-geologists really didn't get the data that they really needed to support their case. If the experiment didn't work the first time they probably should have worked harder to get it. I didn't mean to say that they deliberately didn't try to get the best measurement they could. If I had offended someone I apologize.

**MR. MIKE BELL:** Okay, what it seems to me is, just around to room to summarize this section, people are concerned about the accuracy of the model. They seem to be unclear as to what the inevitable consequences of having an inaccurate model are. Some seem to be there are minimal effects, others are concerned about the model itself.

So at this particular point, I would just say that people have to put in their technical reports so that we get a sense about how strongly they feel about this particular issue. I mean, we've been going up and down from this could cast aspersions on some of the other research, to it is a very conservative figure but ultimately the end product, the outputs people are arguing are rather minimal. I would just leave that up to you to reflect what your feelings are in your technical reports. I think that would be the logical thing at this particular point.

If I could just move on for one last thing here, and I am not forcing things too much, Steve, you had one question. Did you have a question or has it been dealt with?

**MR. STEVE WILBUR (Dogrib Treaty 11):** Yes, I did have one final question. That would be related to the mass balance of the chloride. I just wanted to ask Ken, when he was conducting the mass balance, and this is kind of a validity to the model or non-validity, did you independently compare the calculation of flow that you got from the **coadmass** balance with what the model predicted?

**MR. DON CHARLIE (Golder Associates):** Yes, that is described in the North Lakes Report, Steve, and we found that the model tended to overestimate the regional groundwater flow by about, say five times.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Which lends support to what everyone has been saying here. Thank you.

**MR. MIKE BELL:** Okay. There was one comment about -- Dave Osmond had a comment about background studies. Dave, did you get that dealt with?

**MR. DAVE OSMOND:** What I would like to know is whether or not this will be coming up in discussions tomorrow on the aquatic impacts, or are we leaving the North Lakes now? After today, we leave the North Lakes? If it is aquatic impacts, I'll leave it until tomorrow.

**MR. MIKE BELL:** My question -- I am assuming that we are leaving the North Lakes at this particular point, but ultimately people are going to have to talk about some aspects of it tomorrow, so... I don't know. You tell me.

**DAVE OSMOND:** Well, you can rule on this if you wish. My question is, why didn't De Beers look at instead of -- well not instead of -- along with **phytoplankton, zooplanktons, and benthic invertebrates**, why they didn't look at young of the year fish and spawning habitat in North Lakes as a background baseline report, or baseline study?

**MR. ROBIN JOHNSTONE (De Beers Canada):** That will be dealt with tomorrow, Dave, in aquatic resources. Aquatic habitat and organisms will be discussed, as they relate to the North Lakes in that section also.

**MR. MIKE BELL:** Okay. At this point I would like to wind down the proceedings for the day if that is alright. I wanted to make sure, there is a meeting at 5:00 followed by a party, and there is a meeting at 6:00 followed by a party. Somebody asked me to get the parties straight. Be that as it may, what is taking place at 5:00 and what is taking place at 6:00?

**MR. JOHN MCCONNELL (De Beers Canada):** It is my understanding that at 5:15 there is a meeting and the De Beers boardroom specifically relating to phosphorous, and at 6:00 that same group or more if they want are invited just to have a discussion on the whole aquatics area. Mark and Kevin will both be there. We have asked Greg Oryall to facilitate that discussion.

**MR. MIKE BELL:** Thank you. One last question.

**UNIDENTIFIED FEMALE SPEAKER:** I just would like some clarification. I thought that the 6:00 meeting wasn't going to be a catchall, but rather a meeting to discuss the development of the benchmarks, the sensitivity analysis, the assumptions, and things such as that. And that it wasn't going to be catchall for everything.

**MR. JOHN MCCONNELL (De Beers Canada):** I think it is what people would like to discuss when they get there. It is just making Mark and Kevin available to answer questions that didn't get resolved here today.

**MR. MIKE BELL:** Okay. Tomorrow at 9:00 precisely if we could start. I would like to thank everyone for their hard work today, and we will see you tomorrow morning at 9:00. Not 8:30, 9:00. Thank you.

-- ADJOURNMENT





# **MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD**

## **De Beers Snap Lake Technical Sessions**

**November 28, 2002**

### **Yellowknife, Northwest Territories**

**MR. MIKE BELL:** ...welcome everyone again today to global warming, and while we are waiting for people to come in I just thought I would mention something that has occurred to me as we have been sitting around looking at the strange phenomena and strange environmental situations, this is not the first time this has ever happened. Apparently there is a story about God speaking to Moses, and God said to Moses, "Moses, I have been looking at this situation in Egypt and I have got some good news for you and I have got some bad news for you. What do you want first?" And he said, "Lord, you had better give me the good news first." He said, "Okay, I'm quite upset with what the Pharaoh was doing to you and your people, and I have decided to do things -- I will give you the good news to make him let you and your people go. I am going to take the rivers and turn them blood red. I'm going to send in my hoard of locusts and I am going to eat up all his crops. I'm going to send my avenging angel, and we are going to kill the first born of every Egyptian family, and the Pharaoh is going to get so frustrated he is going to let you and your people go. And then I am going to lead you out of Egypt and I'm going to bring you up to the Red Sea. I am going to make the water stand up on that side, and I'm going to make the water stand up on that side, and I'm going to let you and your thousands of people, and hundreds of thousands animals, pass right through. And when the Pharaoh tries to chase you with his chariots and his soldiers I am going to crash down the water on that side, I'm going to crash the water down on that side and I am going to destroy the Pharaoh and his horses, his troops and his chariots."

"Then, Moses, I am going to lead you into this new land, it's called Canaan. It's a wonderful place, you'll love it. You'll take a look and I'm going to let your progeny increase and multiply like the sands of the sea."

Moses said, "Lord, that is really good news. It's long overdue."

"But, Moses, there is some bad news."

Moses said, "I am listening, Lord."

"Moses, you're the one who is going to have to do the environmental impact studies."

-- Laughter

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I thought they were supposed to be getting better, you know. Okay, we will start with introductions please.

I am Mike Bell, one of the animators, and I would just like to caution and ask everybody we usually go around in the morning to get everybody's name and organization on the record. So we will do that now.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini, note-taker.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Florence Catholic, Lutselk'e Dene First Nation.

**MR. FRASER FAIRMAN (DIAND):** Fraser Fairman, Indian and Northern Affairs.

**MR. DON MACDONALD (DIAND):** Don MacDonald, MESL, representing Indian and Northern Affairs Canada.

**MR. CHRIS SPENCE (Environment Canada):** Chris Spence, Environment Canada.

**MS. ANN WILSON (Environment Canada):** Ann Wilson, Environment Canada.

**MR. DAVE BALINT (Fisheries & Oceans):** Dave Balint, Fisheries & Oceans.

**MR. MARC LANGE (Fisheries & Oceans):** Mark Lange, Fisheries & Oceans.

**MS. JULIE DAHL (Fisheries & Oceans):** Julie Dahl, Fisheries & Oceans.

**MR. DAVE LEVY (Fisheries & Oceans):** Dave Levy, Consultant to Fisheries & Oceans.

**MS. PAT TONES (Golder Associates):** Pat Tones, Golder Associates.

**MR. RICK SCHRYER (Golder Associates):** Rick Schreyer, Golder Associates.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnston, De Beers Canada.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, De Beers Canada.

**MS. AMY LANGHORNE (Golder Associates):** Amy Langhorne, Golder Associates.

**MR. KEVIN HIMBEAULT (Golder Associates):** Kevin Himbeault, Golder Associates.

**MR. MARK DIGEL (Golder Associates):** Mark Digel, Golder Associates.

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**MR. NEIL HUTCHINSON (Gartner Lee):** Neil Hutchinson, Gartner Lee, representing Mackenzie Valley.

**MR. DAVE OSMOND (Gartner Lee):** Dave Osmond, Gartner, Lee, Impact Review Board.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Steve Wilbur for the Dogrib.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** Rachel Cr  peau, Yellowknives Dene First Nation.

**MR. GAVIN MORE (GNWT):** Gavin More, Government of the Northwest Territories.

**MR. LIONEL MARCINKOSKI (GNWT):** Lionel Marsenkowski, GNWT.

**MR. BOB SCHELAST (NSMA):** Mr. Bob Schelast, NSMA.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, legal counsel for NSMA.

**MR. BOB TURNER (NSMA):** Bob Turner, North Slave Metis Alliance.

**MR. MIKE BELL:** And the people in the back, would you please come up to the microphone and tell us who you are.

**MS. LISA BEST (GeoNorth):** Lisa Best, GeoNorth.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, De Beers Canada.

**MR. BRENT TOP (Golder Associates):** Brent Top, Golder Associates.

**MR. WAYNE JACKSON (Gartner Lee):** Wayne Jackson, Gartner Lee.

**MR. MARK DAHL (Environment Canada):** Mark Dahl, Environment Canada.

**MR. RED McDONALD:** Red McDonald, representing myself.

**MS. LORI MACEACHERN [inaudible]:** Lori MacEachern, [inaudible]

**MR. MIKE BELL:** Okay, thank you very very much. Yesterday we were dealing with the issue of water quality and we had several presentations, and then we dealt with north lakes water quality towards the end of the afternoon. Members had questions and I think we came to some resolutions. I was going to ask people if there are any presentations from last night, or comments about the meetings last night that somebody wants to put on the record.

**MR. NEIL HUTCHINSON (Gartner Lee):** I was asked by Greg Oryall to summarize the two meetings that we had last night. We met in the De Beers

boardroom and we spent some time talking about interpretation of phosphorous modeling and interpretation of toxicity benchmarks in areas of potentially affected habitat in Snap Lake. We had representatives there, Greg Oryall from AMEC, myself and Dave Osmond from Gartner Lee, Tim Byers from the Yellowknives Dene, Don MacDonald from INAC, Steve Wilbur from the Dogrib, Ann Wilson from Environment Canada, Bob [inaudible] from [inaudible] representing the North Slave Metis, Dave Levy representing DFO, Mark Digel from Golders, Kim Himbeault from Golders and Colleen English from De Beers.

We spent some time talking about the input parameters to the phosphorous models and variability in the groundwater phosphorous concentrations that went into the model, and how more conservatism added by considering extra input of mine water -- issues like this. I think we came to some agreement that increasing the volume of mine water would not necessarily result in a linear increase in phosphorous loading because extra flows of groundwater would probably include lots of lake water as well.

In my interpretation I think we reached some consensus that the model was not perhaps conservative enough in only addressing ortho-phosphate, so there was a recommendation that the model should consider other forms of phosphorous, particularly dissolved phosphorous. We also discussed a little bit the implications of mine water treatment on model results and how much we wanted to rely on the treatment processes.

I think we had a much better understanding of where people's areas of uncertainty were with the model, and I think we had a technical agreement that perhaps some more work could be done, but of course this hasn't been formalized in any way.

We then went on to talk about toxicity thresholds and much discussion around the use of a one percent of the lake area as an area in which to define potential impacts from the mine water discharge. We had discussions on various approaches between what the USEPA uses, which is what De Beers had adopted, and CCME (Canadian approaches) which is recommended by Don MacDonald and other Canadians on the panel -- we were all Canadians weren't we.

So there is technical disagreements on the weight that you put to individual toxicity studies in studying thresholds, and the implications of the habitat criteria that were used. In the end we had to come back and realize that one percent of the area of the lake is affected, we think no matter how you look at it, but what we thought was a technical recommendation would be to suggest that the modeling be redone and instead of presenting the output in the environmental assessment report as interpreted output, that is the boundary of the one percent affected habitat area that we have seen, is that the model should perhaps present actual concentrations of mine water metals in the lake water for cadmium, chromium and the metals of concern. This would then allow individual

reviewers to go back and use their own criteria, whether they wanted to use CCME guidelines or lowest levels from toxicity testing, or the habitat-based approach that De Beers and Golders had done. This would give everybody the same status on which to make their interpretations. I think that was our technical recommendation from that part of the evening.

Finally, I think the most significant part is that Don MacDonald invited all participants to consume all the lake trout that could be found in one percent of Snap Lake at his house this summer. Thank you, Don, for that.

I think that is all. It was a very informative discussion. I think all parties were non-adversarial and were truly interested in discussing things technically.

**MR. MIKE BELL:** Thank you very much. Are there any brief comments from others who participated? Does that sum it up?

**MR. DON MACDONALD (DIAND):** Just from the perspective of Indian and Northern Affairs Canada, the recommendations that came out of last night's meeting really are central to our assessment of the EA report. It would be difficult for us to stress strongly enough the importance of pursuing those recommendations.

**MR. MIKE BELL:** Thank you. I am not going to take any more comments...

**MR. NEIL HUTCHINSON (Gartner Lee):** I was just prompted to remind that all participants had been given transcripts of last night and they are asked to edit them and to get them back to Colleen and the final version will be made of the public record.

**MR. MIKE BELL:** Good, thank you very much. I am not going to lead you through the agenda today. You all have the agenda in front of you.

**MS. JANET HUTCHISON (NSMA):** Just a quick comment on some of the discussion towards the end of the day yesterday. It was brought to our attention that some of Mr. Piper's comments at the end of the day might have been interpreted as a global criticism of all of De Beers' work in the hydro-geology on this project, and I just wanted to clarify that that certainly was not the intent. The NSMA does have some concerns and they are set out in the rationale document, but Mr. Piper -- on his behalf and on behalf of the NSMA -- if the comments caused any offence we would certainly like to apologize for that.

**MR. MIKE BELL:** Okay, thank you very much for that. The first item on the agenda is the aquatic habitat and organisms presentation. Can we proceed with that. Okay, thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** Good morning. Again Pat Tones is going to give a bit of an overview of what we plan to discuss today, as she calls it the road map. The other thing we have done, we have split up our

presentations a little differently from what is in the agenda. We think it works better in terms of the time frame we have in the morning and the time in the afternoon, but I will let Pat explain what we have done in terms of splitting the day up, and then if it is not acceptable to deviate from this agenda we will go back to the original. She can maybe shed some light on why we have split things up as we have.

**MR. MIKE BELL:** Okay.

**MS. PAT TONES (Golder Associates):** Good morning, I am Pat Tones, and as those of you who have been here through all of the days so far realize, I have been acting as your tour guide introducing each session, and providing an orientation to the geography of the area relevant to water and aquatic organisms, and also orienting you in terms of what is going to come during the day. So the first two days were related to groundwater and then surface water quantity and quality. Now we are looking at the receptors of any changes that might occur, and these are the aquatic organisms and of course their very central aquatic habitat.

You are familiar with this figure by now. Just in case there is someone in the audience that hasn't been with us for the three days, we are here in Yellowknife, the Snap Lake diamond project is 220 kilometres to the northeast. If you go further north you would encounter the Diavik diamond mine and BHP's Ekati mine. The Ekati mine is about 100 kilometres north of the Snap Lake diamond project. Again, looking at it from a water point of view, they are individual different watersheds, so the Snap Lake diamond project is in the Lockhart River system which eventually empties into Great Slave Lake. The other two mines are in the Coppermine River system and it flows towards the north.

If you have been here through the three days you are also very familiar with Snap Lake and the project located on the northwest peninsula. Yesterday afternoon we talked quite a bit about the north and the northeast lakes:

I have another slide now because we are looking specifically at the watershed and the lake, and the organisms in the lake. Snap Lake is a headwater lake for the Lockhart River system. Therefore it has a very small watershed, the boundary shown here in green. In addition to the lake itself, there are a number of small lakes which were initially called inland lakes (therefore they are designated as IL) and then they are numbered IL5, IL6 and so on. There are a number of very small streams connecting these lakes to each other and to Snap Lake identified as stream 1, stream 2 and so on. You will encounter this terminology later on in the day.

Another point that I want to make is that the surface runoff, the mine water and water coming from the north pile are all treated, as well as the plant sewage is treated, and they are all discharged to Snap Lake through one common discharge point. That discharge point is located just about there at the end of the peninsula. Yesterday when we were looking at water quality we talked a lot about

the water quality affects of this discharge, but today some of that discussion will carry over into what are the affects on aquatic organisms, fish and fish habitat as a result of that discharge into the lake.

When we looked at the presentations we had, we realized that in the original schedule all the presentations but one were to be given in the morning, so there would have been quite a block of presentations with no chance to discuss them. We have moved a few to the afternoon to balance them out during the day a little better, and the way that we have done that is we have put a very short aquatic organisms and habitat evaluation section, which is really just an information piece to tell you how this process was done in the EA so we are all beginning with the same common knowledge of how the EA did the process.

Then the next two, bio-accumulation particularly of cadmium and salinium, and affects of TDS and chloride on aquatic organisms, we put those together in the morning. If we go onto the afternoon we are still looking at Snap Lake. So far all those are related to Snap Lake. We are continuing to look at Snap Lake water levels which was an issue raised, and this is our response to it. Then an area that I think is of interest to people because of the discussions yesterday, the phytoplankton community shifts -- is there a shift in community because of increased nutrients was an issue -- we are addressing it here. As soon as you start talking about increases in algae then that leads on to potential secondary effects of unification, so we thought it would logically follow right after that. We thought that the phytoplankton community shifts followed directly by potential secondary affects on dissolved oxygen seem to go together as a package.

All of those then complete the presentations on Snap Lake potential affects. There was one other issue that related to the criteria used in determining whether small lakes supported fish or not; whether they were sort of a habitat for fish or not. It stands by itself because it is on those small lakes that are located on the peninsula, so that is the last presentation of the day.

This is the structure that we are suggesting. We think it follows logically, technically, and it divides the discussion up a little better; but it is entirely up to you.

**MR. MIKE BELL:** Thank you. Can I just check with the group to find out if the re-arranged presentations are acceptable? Does anyone have a problem?

**MR. MARC LANGE (Fisheries & Oceans):** I am sorry, I missed the slide just before that to see what was in the morning. Could you go back before I comment?

**MS. PAT TONES (Golder Associates):** In the morning we have aquatic organisms and habitat evaluation, just a short information piece describing the method that was used to do the evaluation in the EA. Then the bio-accumulation of cadmium and salinium is a response related to an issue that was raised, and



likewise the next one, TDS, primarily chloride effects on aquatic organisms, is a response directly related to another issue that was raised.

**MR. MARC LANGE (Fisheries & Oceans):** Thank you for that. We were considering at DFO doing a five minute presentation based on the habitat evaluation and aquatic organisms, so I was prepared to do it in the afternoon, but I guess what I would suggest is that we go with this amendment. I would ask if I could have my presentation right after your first presentation just to get some continuity.

**MR. NEIL HUTCHINSON (Gartner Lee):** I just wanted to clarify; the original agenda the first item was Adequacy of Base Line Data. It is not explicitly broken out in your two slides. Is it included in one of the other classifications or topics?

**MR. ROBIN JOHNSTONE (De Beers Canada):** The agenda reflects issues that were raised, but we don't have presentations for everything. That doesn't mean that it's not to be addressed. That is where it's the responsibility of interested parties to raise their issues, so by no means is this an idea to divert that process.

**MR. NEIL HUTCHINSON (Gartner Lee):** Thank you for that clarification. It's not my issue so I would encourage anyone that has it as an issue to raise it.

**MR. MIKE BELL:** Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** For the changing of the morning and afternoon sessions, I was just thinking along the same line as the other question -- fish habitat criteria and all that loss, what happens to the rest of the items that are on the agenda already? Are we going to be doing both, or are we getting rid of some items that we were supposed to talk about already?

**MR. ROBIN JOHNSTONE (De Beers Canada):** By no means are we reducing items, Rachel. Again the onus is on the individuals that raised the questions in the initial program to identify what those issues are, and we will discuss to them. The intent of this reorganization was that we considered that there were several topics in this organization which would really cram the morning. The mornings would basically have two and a quarter hours to discuss five topics. Given the weighting of the information we thought that it would put us in a situation where we were yesterday where there would be a lot of material carried over to the afternoon. That was strictly De Beers' intent.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** I just wanted to make sure that we don't miss out on anything that was already slated for today. Thank you.

**MR. MIKE BELL:** Okay, may we proceed. So the agenda is acceptable, thank you. I have had concerns expressed to me that so much is jammed in that it is difficult for people to express issues, so this seems to respond to that request that we split things up a little more and keep more time for discussion, so thank you. John.

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**MR. JOHN MCCONNELL (De Beers Canada):** We do have two new speakers to the group this morning, so to save time I thought I would introduce both of them. First up will be Amy Langhorne with Golder. Amy is an aquatic biologist specializing in fish and fish habitat. She has been working on the project for the past couple of years and has been intimately involved in the environmental assessment. The second speaker -- he has gone now -- is Rick Schryer. Rich is also an aquatic scientist with Golder. He has actually been the technical lead on the environmental assessment covering a broad range of topics, but today he will be speaking specifically on aquatics. Over to you, Amy.

**MS. AMY LANGHORNE (Golder Associates):** Thanks, John. As Pat indicated, based on the discussions yesterday we felt that it would be worthwhile to provide an overview of the aquatic organisms and the habitat assessment methodology so that we get everybody on the same page and we have a common understanding of the process that we went through to evaluate linkages that were identified either from other aspects of the project carried forward from water quality or hydrology, as well as aspects specifically identified for aquatic resources.

The environmental assessment report in section 9.5.2 does identify the methodology used in habitat evaluation -- or actually in aquatic organisms and habitat assessment.

This diagram is a simplified linkage diagram of the one presented in the EA. Specific differences between this and the EA are the combination of all project activities into one box. We have simplified it to include under that heading project activities, those that were carried forward from other disciplines evaluated in the EA that have linkages to aquatic resources or water quality and hydrology, as well as affects or potential linkages to project activities such as blasting, sedimentation or construction of infrastructure that may not have had an evaluation in any other section of the EA.

Four key ecological end-points were evaluated for linkages to project activities. These included non-fish aquatic organisms and that is a grouping of phytoplankton, zoo plankton and benthic invertebrates, fish health, fish habitat and fish populations.

As you can see, and this was demonstrated in the linkage diagram in the EA, there are inter-connections among these end-points, so that there are potentially direct effects for water quality to non-fish aquatic organisms. There is also the potential for a direct effect from water quality to fish health. There is also an indirect pathway through the food chain from non-fish aquatic organisms to fish health. There is the direct pathway to fish habitat, something like blasting, sedimentation, infrastructure construction. There is also an indirect pathway -- if you have an effect to non-fish aquatic organisms you may have an indirect effect to fish habitat through change in the quality or quantity of fish food resources.

To fish health we have a direct effect; water quality, non-fish aquatic organisms here is the indirect effect to fish health, direct effects to fish habitat and indirect effects.

Finally the potential for a linkage between an effect to fish health and an effect to fish habitat are evaluated for an overall assessment of fish populations, so we are looking at ecological end-points.

I will walk you through an example of this. I think it will illustrate it and have it clear in everyone's mind. I will briefly work through hexavalent-chromium. This was identified in the water quality section as having a low environmental consequence. Because of that it was carried forward to aquatic resources and habitat. Initially then in that assessment the potential effects to non-fish aquatic organisms are assessed, and by that I mean we take -- we don't look at the environmental consequence from water quality -- we simply take the predicted concentration of that constituent, so hexavalent chromium.

At this point we are also independent of spatial extensor location, we are simply looking at the concentration. We assumed that species potentially existing in Snap Lake, sensitive species as well as sensitive life stages, are present and are exposed. A discussion is then presented in the EA of relevant information, chronic effects. We provided an additional discussion of those chronic effects thresholds, the acute aspects to all life stages, and we also give that environmental context; how does that relate to this particular end-point?

Once that has been completed and we come up with an environmental consequence description for it, again that constituent (hexavalent chromium) in the concentration is predicted, was evaluated directly in relation to fish health, all life stages independent of spatial extensor location. We were simply looking at the concentrations assuming that fish are present, sensitive species and sensitive life stages are exposed. If there is a potential affect to any life stage of fish or species, then a further evaluation was conducted relating to where that potential impact would occur in Snap Lake. So how sensitive is the habitat and what is the likelihood of sensitive life stages occurring in that space.

Finally, once that was evaluated we moved to the final end-point, the fish population assessment, so then you are looking at in this particular case hexavalent chromium through non-fish aquatic organisms affects the fish health, direct and indirect, so through the food chain as well as direct effects on fish, and evaluating that in the context of a measurable population or ecological threshold affect. That is the basic overview of the process.

**MR. JOHN MCCONNELL (De Beers Canada):** Now we will move on to Rick Schryer's two presentations.

**MR. RICK SCHRYER (Golder Associates):** Thank you, John. Good morning everyone. The first presentation I will be giving today focuses on the potential

issues around bio-accumulation of salinium and cadmium. We wanted to clarify the issues in relation to cadmium and salinium in the discharge waters, bio-accumulation of cadmium and salinium in fish in Snap Lake, the potential fish health affects of these two elements and the potential human health affects of eating fish that have taken up cadmium and salinium.

This topic was addressed in the environmental assessment report in sections 9.4 and 9.5, and in two responses to information requests.

Cadmium was screened out of the assessment process because concentrations in the discharge water were less than the water quality benchmarks. However, we proceeded with the calculation of potential bio-accumulation of cadmium because this issue was raised for this particular session.

For salinium -- initial salinium analyses of mine water discharge were invalid. We found that atomic absorption showed that most of the salinium concentrations were in and around the analytical detection limits. Once we clarified that problem, we found that levels of salinium were in and around the detection limit, which was around .4 micrograms per litre, which is substantially less than the CCME water quality guideline of one microgram per litre; hence it was screened out of the process.

For cadmium, the degree to which a fish can take up cadmium from the water can be calculated using what is called a bio-accumulation factor or a BAF. The BAF is equal to the concentration in fish of cadmium versus the concentration in water. Site specific bio-accumulation factors were calculated using base line Snap Lake water and fish tissue, in this case we looked at liver and muscle concentrations of cadmium. Fish tissue concentrations during the project were predicted and the concentration in fish was a bio-accumulation factor times the predicted maximum annual average mine water discharge concentrations. What we need to remember here is that we used the actual end of pipe numbers to calculate our bio-accumulation factors, so before they even get to Snap Lake those are the numbers in the discharge that were used to calculate these figures to be conservative.

With the results we looked at fish tissue concentrations. We compared them to no affect levels for growth, reproduction and survival of lake trout and rainbow trout.

The predicted fish tissue concentrations were then compared to what are called risk based concentrations (RBC) here for human and wildlife. So risk based concentrations are safe concentrations that are based on toxicity data for human and wildlife fish ingestion rates. They are not guidelines but they are meant to provide a concentration of safe exposure. So if we look at the results of the analyses we find that for our predicted fish tissue concentrations in milligrams per kilogram we have, in the muscle tissue we have .1 and .2 for either muscle or liver tissue, and this is both lake trout and around whitefish.

In the ill effects level that we calculated for fish health, where we might see a potential chronic effect, was at two. The risk based concentration for humans or wildlife eating fish was 1.4 milligrams per kilogram, so you can see that we are almost in an order of magnitude higher in our numbers here than the actual values that we obtained.

So in conclusion then, there is no effect on fish health due to the exposure to salinium because the predicted water quality concentrations are well below the CCME water quality guidelines, and there is no adverse effect on fish health or human health, and even wildlife health, due to uptake of cadmium because we are again well below the predicted levels, or below any magnitude for any risk based concentrations.

My second talk this morning concerns total dissolved solids. The purpose of this talk is to discuss the potential effects of the increase in total dissolved solids levels in Snap Lake on its water quality. In the EA we discussed this in section 9.5 and in three responses to information requests.

The impact assessment process was that we obtained the water quality modeling results from Marc and then determined the ionic mixture of the effluent. It is very important to remember, when considering potential effects of total dissolved solids, you have to know the ionic or chemical composition of it. TDS is just a general term that refers to dissolved salts in water. The composition can vary widely from being dominated by chlorides, sulphates or bicarbonates, but you have to know the ionic composition of it in order to be able to assess its potential toxicity. Once we knew that, then we reviewed the available literature on effects of major ions in aquatic organisms and then we completed the impact assessment.

From 1998 to 2001, based on water quality observations, we found that TDS levels in Snap Lake ranged from less than 10 to 70 milligrams per litre. TDS concentrations are predicted to increase in Snap Lake to a maximum average concentration of about 330 milligrams per litre. As I mentioned in my previous slide, you need to know what the major constituent of that TDS is in order to consider its potential effect. In this case, as Ken DeVos mentioned, the major ion we are dealing with is chloride, so it is the major constituent of it. The maximum predicted chloride concentrations within Snap Lake will be 137 milligrams per litre.

There is no CCME guideline for the prediction of [inaudible] chloride. An [inaudible] guideline for chloride was recently developed for British Columbia. In their review of product toxicity tests they found that, when they reviewed the results for zoo plankton, [inaudible], invertebrates and fish the lowest observable effect of concentration (or LOEC) was for [inaudible] at 735 milligrams per litre. Based on this, a guideline of 150 was developed and essentially they added a safety factor of five to that figure of 735 and rounded it off to 150. There are

guidelines for chloride in Quebec and with the USEPA, and they are both 230 milligrams per litre.

As you can see, the most conservative guideline we have is the one that was recently developed in B.C. and the levels in Snap Lake will be below that guideline, so we are predicting that there won't be any effects to the aquatic organisms due to chloride levels in Snap Lake because we are below even the newer guideline than we had before.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Rick. So it is back over to you, Mike.

**MR. MIKE BELL:** Marc.

**MR. MARC LANGE (Fisheries & Oceans):** I propose that I will hand out this...

**MR. RICK SCHRYER (Golder Associates):** We have a different computer with a floppy drive, but we can set it up in four minutes and let Marc go ahead with his presentation.

**MR. MIKE BELL:** Okay, this is not the official break but we will take five minutes.

--- Short Break

Before Marc starts I just want to introduce a couple of people in the room. Julie Green is with us from the CBC. I see Dave Nickerson is here also. We would like to welcome Dave and Julie. Is there anybody else? There are a couple of other people here that I don't think we have seen. Could you tell us your names please, come up to the microphone. Would you just use the microphone and tell us who you are, all of you, so we can get your names on the record.

**MR. JONAS SANGRIS (Yellowknives Dene):** Most people I don't think they know me, I'm Jonas Sangris from the Yellowknives Dene First Nation. I was a former chief.

**MR. MIKE BELL:** Good, I recognized you. Who else is with you?

**MR. PAUL MCKENZIE (Yellowknives Dene).** Paul McKenzie, Yellowknives Dene First Nation.

**MR. OREST MARTIN (Dettah):** Orest Martin, Land & Water, Dettah.

**MR. JAMES SANGRIS (Yellowknives Dene):** James Sangris, Yellowknives Dene First Nation, Land and Environment.

**MR. MIKE BELL:** Thank you very much. Marc, over to you.

**MR. MARC LANGE (Fisheries & Oceans):** Thank you to all, ladies and gentlemen, for giving me time to present some of the issues from the Department of Fisheries & Oceans. You will see your next map there of the De Beers' site, we stole that from your EA.

First of all maybe I will start out with saying that we have had a pretty fruitful discussion with De Beers and their consultants throughout the week. At lunch yesterday there was some agreement reached as to how to proceed with some of our issues, and after my presentation I will let De Beers comment on their commitment towards this. What I am presenting today shouldn't be new to De Beers because we have been talking about this this week, but the reason I am bringing it up is to make sure that the whole group is aware of what our issues were and how we plan on resolving them.

This slide is just a summary of the terms of reference for the De Beers Snap Lake project, and basically the issues were productive capacity and aquatic systems, impacts on fish and fish habitat, fish habitat loss and alteration, rare sensitive fish species and habitat, mortality as it relates to fishing pressure, impacts on underground blasting and finally impacts on aquatic food webs and ensuring that information is provided that would help us fulfill our no net loss objective or principle.

The four issues that DFO had when we walked into this week's session were as follows. We had some issues with fish habitat assessment and the no net loss accounting, followed by three others that include chronic effects on the water treatment plant discharges, groundwater contamination and changes in nutrient supply, and those last three issues we have been discussing quite a bit throughout the week. There remains some issue there for us, but we have been happy with the exchange so far.

On the issue of aquatic fish habitat assessment, and no net loss accounting, basically we are looking at these three points here. We are looking for an evaluation of all aquatic habitat the fish may depend on directly or indirectly to complete their life cycle. We are looking for additional evidence on the determination of fish presence and absence, and we feel that is critically important to evaluate all fish habitat in the mine footprint; also noting that an absence of fish at the time of sampling is not necessarily conclusive that the area is not fish habitat. Those two points reflect more the direct fish habitat which fish use directly to complete their life cycle. From the indirect perspective -- there is a bullet missing here -- the type of information we are looking for is the amount of supply of good quality water coming out some of the small water bodies under the mine footprint, information on nutrients that maybe coming out of the system, organics or even invertebrates, so we feel that these systems may provide for indirect fish habitat and we are looking for further evidence to support or not support that.

Our main issue is on the -- we have some uncertainty as to the adequacy of assessments done for the IL lakes and streams, particularly pertaining to fish sampling effort and timing.

The second issue is on -- once these habitats have all been identified -- is ensuring that they are adequately quantified and accounted for; and finally should there be a net loss in fish habitat and once the habitat has been identified and quantified we would expect the proponent to look into ways to offset those impacts, mitigate them or propose compensation. We feel it is particularly vital to present this information during the EA so that all data be presented so that readers of the EA can independently conclude as to what is and what is not fish habitat.

We have a slide again pillaged from the De Beers' EA just showing all the water bodies, streams I guess identified in "S" and inland lakes identified as "IL".

Basically our understanding of the results presented in the EA are that between mid-June and roughly mid-July 1999 lakes in IL2-IL6 I guess there was some bathymetry and shore habitat assessments conducted, For stream there was a habitat survey during peak and low flows and an inventory observation of fish, as well as some egg sampling. Again in July 2001 IL6-IL9 were sampled with gill nets by angling, minnow traps, sand nets and electro-fishing. The results from the EA say that IL2, IL3 and IL5-IL7, are marginally suitable small bodied fish habitat exhibiting some capacity to over-enter small fish; and IL4, IL8 and IL9 are not fish habitat. None of the streams were found to be fish habitat under the direct footprint of mine. We are basically looking for additional information to support these conclusions.

On the next slide I have again got the figure from De Beers. On the top here I have a 1:50 NTS base map. In yellow in these areas are the lakes that were sampled by De Beers. The green highlight is the streams that were sampled and the pink area are the water bodies that, at least from the map, is pretty much the information I can garner now where some of the water bodies, lake or stream in this lake that were not sampled.

The type of information that we are looking for, at least for the fish survey for the no net loss requirements, that all streams, lakes and ponds including those that are [inaudible], within the project footprint be assessed for the following information: survey observations during fresh [inaudible] when water levels are at their peak, to conduct observations both during the day and at night or dusk/dawn, that many sampling methods be used including electro-shocking, minnow traps, saline and visual observation, and that an effort level of at least 48 hours per water body be expended.

Maybe I should also highlight that during the discussions this week with De Beers some of this information appears to be available or collected, so we are looking forward to seeing some of this information.

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For habitat surveys the kind of information we are looking for is information on sub-straight, asymmetry, aquatic vegetation, maps of the water bodies including those that are ephemeral. This is getting back to some of the lakes that we felt were missed from the NTS map sheet; and it is possible these water bodies just don't exist but we are looking for some information that will definitely demonstrate that they don't exist if that is the case.

We also tend to prefer that this information be presented in some sort of visual manner or in a geographical information format to help quantify the aerial extent, so the surface area of those water bodies, and individual fish habitat patches within the project footprint and adjacent to it.

Just in finishing off, or conclusions I guess, is that we want to ensure that the environmental assessment identifies all project impacts on fish habitat. We want to make sure that all impacts to fish habitat be quantified and accounted for, and that any of these impacts be mitigated and/or compensated where possible. That's it, thank you.

**MR. MIKE BELL:** Thank you. I just need some direction here. Can I assume that you have had your break? Okay, we can just basically keep on going. I don't hear any boos or anything like that. People are free to get up and walk around whenever they want.

First of all, at this point does De Beers wish to respond to this or can we just go ahead? John.

**MR. JOHN MCCONNELL (De Beers Canada):** I have a number of questions. Either we can do it now or we can do it later, I will leave that choice up to you.

**MR. MIKE BELL:** Is it directly relating to Marc's presentation?

**MR. JOHN MCCONNELL (De Beers Canada):** Yes, totally related.

**MR. MIKE BELL:** Why don't we get your questions and then we will go and move to concerns. How long do you think it will take, John?

**MR. JOHN MCCONNELL (De Beers Canada):** It might take a little while, maybe 10 or 15 minutes.

**MR. MIKE BELL:** Please proceed.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess I would like to take it to a little higher level of discussion than what was presented here. I probably should be more informed about the various processes, so I am going to ask some questions just so that I can understand exactly where DFO is going on this. It would seem to me that there is a difference between assessing environmental impact and DFO's policy on no net loss. I am just curious about DFO's

interpretation of that and I guess I am asking, are they trying to bring their policy and what has been a separate process in the past into this process?

**MR. MIKE BELL:** Response please.

**MR. MARC LANGE (Fisheries & Oceans):** Sure I can attempt to explain that. I guess from our perspective we don't see in this EA a difference between assessment of environmental impacts and the no net loss accounting or habitat policy speaks to, I guess for two reasons; one being that the terms of reference specifically required that the no net loss principle be utilized and that information be provided for no net loss accounting. The second being that the type of information required for no net loss accounting and environmental impact assessments is quite similar, it just involves quantifying the habitats that are likely to be lost and proposed that those losses be offset. In the end, Fisheries & Oceans requires that information before it would entertain going to the permitting phase. We feel that the best venue to present that information is during an environmental assessment.

**MR. JOHN MCCONNELL (De Beers Canada):** Was this process under BHP and Diavik? I guess that for that matter, I think the policy of no net loss is one that DFO has across the country and I guess I am asking whether this is something that is regularly brought into the environmental assessment phase. Is there a precedence for this?

**MR. MIKE BELL:** Can Louie respond to this if he wishes to?

**MR. LOUIE AZZOLINI (Review Board):** The environmental assessment process is the Board's review process, and the Board set out the terms of reference. The terms of reference make reference to the no net loss policy. In the case of De Beers that specific item was not included in the terms of reference. I can't speak for DFO whether it is an across-Canada policy, but in terms of the Board's terms of reference there were specific requirements to do or abide by, or whatever term you want to use, DFO's policy. Now how they interpret that policy is something that they have authority to do.

Also the Board, at least the Board staff, and DFO entered into an agreement -- I don't remember the exact date -- in an attempt to harmonize the processes so as to make the environmental assessment and regulatory process more efficient, and essentially it says that to the extent possible the environmental assessment will attempt to capture the assessment requirements of DFO so as to make the entire process more efficient for developers. We have attempted to do that in other environmental assessments that the Board has undertaken.

With respect to BHP, the answer is no, but in response to concerns about inefficiencies and duplicating regulatory processes DFO and the Board has attempted to streamline the process and to bring it under one umbrella.

**MR. MARC LANGE (Fisheries & Oceans):** Can I just seek clarification. I thought I heard Louie say that the no net loss principle and DFO policy was not part of the terms of reference for the De Beers project. Is that you meant, or did you refer to BHP?

**MR. LOUIE AZZOLINI (Review Board):** I am referring to the BHP extension project.

**MR. MARC LANGE (Fisheries & Oceans):** Thank you. Just to add to that as well, I don't think that the process undertaken with the Sable Pigeon assessment of separating the EA with the no net loss assessment was a particularly good idea. I don't think it was well coordinated between DFO and the proponent. It hasn't worked very well because generally the public hasn't been informed about what is going on in the background between fisheries assessments and habitat assessments and how those are compensated. In addition, I think it has also led to increased time during the regulatory process to deliver on a permit. I think that if BHP were here they would probably comment on that as well. It is a more efficient process to do it as we suggest in the EA.

One more thing. That process of including no net loss accounting and compensation was included fully in the Diavik EA.

**MR. MIKE BELL:** Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** From what I understand we have just been given a presentation and I thought we were going to get a chance to ask questions about the presentation. I wonder what De Beers is trying to do now. I think that Golder Associates should know something about the no net loss policy. We have been dealing with that no net loss policy for the last two years now. Maybe some people are not really familiar with it, but the presentation talks about mortality of fish and fish habitat loss which we are interested in. We are also interested in groundwater contamination and how it might affect fish. If there are going to be changes in the nutrient supply, I wouldn't mind hearing some discussion on these matters because we are very much interested in fish and the life of the fish in that area. Thank you.

**MR. MIKE BELL:** Just a clarification. At this point we are simply trying to clarify the relationship of the discussion between the presentation of De Beers, the presentation of Marc and De Beers. As soon as John has finished his questions, we will basically open it up to everybody and we will deal with the issues that Rachel has raised, and she'll be able to raise them again.

**MR. JOHN MCCONNELL (De Beers Canada):** I agree with you, Rachel, we shouldn't perhaps be carrying on this conversation when we are trying to deal with technical issues here today. I guess, Louie, I would like to see a copy of your agreement with DFO. I assume it is on the public record, and we shouldn't have trouble getting copies of that. It is the first time I have heard of it though.

I guess the other issue related to this is, I think the issue of compensation which Marc brought up there is not covered under the terms of reference. We were asked in the terms of reference to provide an overview of how our project related to DFO's no net loss policy. As a matter of fact, I think if you go back to one of the information requests from DFO trying to request that the issue of compensation be brought under the EA the Board rejected their information request. That is the high level. If we want to come back to the lower level, in terms of providing information which I understand we have for environmental assessment purposes we certainly have no problem with submitting that. If it helps DFO in their evaluation with respect to their no net loss policy, that is great as well.

We just want to make the point that these are two separate processes, and that the terms of reference do not address compensation under the DFO's no net loss policy.

**MR. MIKE BELL:** Okay, I think we are dealing with a policy issue here between organizations, and I think it is more appropriately dealt with between the organizations in a side bar or something like that. We can bounce around back and forth on this, but I think we should at this point get to the issues that were in the presentations, and then take it from there. It is my understanding, therefore, that there will be ongoing discussions between DFO and what is in the terms of reference, what is in the no net loss framework and all these types of things. It is somewhat beyond what we are trying to deal with at this point, but extremely relevant to everything that is being said.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess perhaps, Mike, we need Louie to make a comment on my last statement; whether or not that is his understanding as well from the Board's perspective.

**MR. LOUIE AZZOLINI (Review Board):** Essentially you are looking for an interpretation of the terms of reference, and my understanding of the terms of reference is that information was to be provided in terms of how the project would affect the environment, and in this case to use, let's say the methodology, that would be employed by DFO for determining habitat loss. The issue of compensation, as they define it, is not within the Board's legal purview. That is within DFO's purview. My understanding is that the Board has no authority to tell DFO how to do their job, but it can make recommendations for mitigation or remediation. DFO's responsible Minister has an opportunity to review those recommendations or suggestions once the Board's report is sent to the Minister itself. In short, the Board is not in the business of telling DFO how to do their job. The Board is in the environmental assessment business and it is using the DFO methodology to assess impacts.

**MR. MIKE BELL:** Okay, can we open it to concerns? For anyone that is new, the process we have been using is simply to go through first and find out and make a list of what concerns people may wish to raise, and then after we have

the list, the list will give us a sense of how much time and how many issues we have; then basically we will go back one by one. Don.

**MR. DON MACDONALD (DIAND):** We have three issues that we would like to address this morning, one related to the base line data, two we have a question related to the bio-accumulation assessment and then a third issue related to the effects of TDS.

**MR. MIKE BELL:** Okay. Who else?

**MR. DAVE BALINT (Fisheries & Oceans):** I have some questions regarding the effects of TDS on lake trout.

**MR. MIKE BELL:** Okay.

**MR. DAVE LEVY (Fisheries & Oceans):** I have some concerns about the net loss accounting that is presented in the EA report, and secondly about base line data collection in and adjacent to the project footprint area.

**MR. MIKE BELL:** Okay.

**MR. BOB [inaudible] (NSMA):** A couple of questions regarding the bio-accumulation of metals in fish tissues.

**MR. MIKE BELL:** Okay. Steve.

**MR. STEVE WILBUR (Dugrib Treaty 11):** I have a few questions relating to base line and the TDS assessments, but it sounds like other people have those too so my questions could fall off the table.

**MR. MIKE BELL:** Okay, we will put you on the list and basically if they have been answered you won't have to. Okay. Anyone else? Julie.

**MS. JULIE DAHL (Fisheries & Oceans):** I guess I have a clarification/question on the approach taken to the assessment for cadmium.

**MR. MIKE BELL:** Bob.

**MR. BOB TURNER (NSMA):** I have comments on base line methods and TK, and probably habitat assessment and mitigation.

**MR. MIKE BELL:** Okay.

**(UNIDENTIFIED MALE SPEAKER):** Base line work on the northeast lake.

**MR. MIKE BELL:** Okay, somebody else?

**MS. RACHEL CRAPEAU (Yellowknives Dene):** The base line data that was collected, we are interested in that information as well, and the bio-accumulation of metals.

**MR. MIKE BELL:** Okay. As we around, there are numbers that are dealing with base line data, and it would be better if we could deal with them altogether so basically, as Steve mentioned, some of his concerns may be covered so we will open the discussion when we are dealing with base line data to people who have questions on base line data and try to move through it quickly that way. We have plenty of time for the discussion, so I am not trying to push people or anything like that. Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Just a point of clarification and I apologize that we didn't make this clear earlier. The overview that was provided around methodologies this morning was just that, it was an overview. The detail on habitat criteria is really in this afternoon's small lake habitat presentation. There are two options. We can bring it forward to deal with it this morning, or we can leave it where it is. I think that that would provide more detail around what we did and give people more clarification on how we approached habitat, and then as it relates to the concept of no net loss. It's up to the folk here.

**MR. MIKE BELL:** What is the sense of the room? Would you rather have the presentation on habitat now and then just skip it this afternoon, and keep going? It is audience participation folks. I need a yes or no or a maybe.

**(UNIDENTIFIED MALE SPEAKER):** I will just give you DFO's yes.

**MR. MIKE BELL:** Okay. Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I would appreciate some continuity. It sounds like the questions are going to be begging the question, so I would appreciate that presentation.

**MR. MIKE BELL:** Okay, would that be alright with De Beers, the presentation now to give us further information then we will have the questions? Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** We are only too happy to do that. It will take a minute and a half to do so.

**MR. MIKE BELL:** But no more breaks. Okay, you may talk freely or do whatever you do for a minute and a half.

**MS. AMY LANGHORNE (Golder Associates):** I will try to run through this relatively quickly so that we will still have time for questions this morning. The purpose of this presentation is to clarify the criteria used to evaluate fish habitat in the small lakes within and near the project footprint. This topic was addressed in the environmental assessment report in section 9.5.2, appendix 9.9, appendix 9.12. There were also a number of information requests related to habitat criteria.

The process we went through in evaluating fish habitat, both direct and indirect I guess, in small lakes. Stepwise, first we established criteria for small lakes and streams in relation to their ecological contributions. We determined which lakes likely have the potential to be directly or indirectly affected by the project, so linkages to hydrology, water quality, air, infrastructure construction -- we assessed the habitat of those lakes identified, as well as habitat throughout the Snap Lake watershed. We compared the features of the lakes with the established habitat criteria.

Potentially affected water bodies included those directly affected by infrastructure. As I mentioned the sedimentation ponds or the water management pond for example. Lakes located within a sub-basin where infrastructure is also proposed. There you have a linkage to runoff alteration. Also those lakes in close proximity to mine activity.

As we have seen a couple of times today, the map identifying the boundaries of the project, the lease boundaries basically, and you can see a number of lakes and streams identified on that. As Mark indicated, this was based on the 1:50,000 NTS maps. He did indicate a number of purple areas where he felt that there wasn't enough information presented for the assessment. He also indicated that there are discrepancies between what you see on the 1:50,000 NTS maps and what you actually observe on the ground. This interpretation of the locations of the inland lakes and streams is meant to not discount those habitat because they were presented in other areas of the EA in terms of landscape; but to recognize those that either we observed as a ephemeral flow, pathways or actual channels.

This is a closer-up view to show the actual relationship between infrastructure and some of the small lakes identified. Up here this is IL6, over here this is IL7, down here is IL9. These are three lakes potentially directly affected by infrastructure. IL8 over here is in close proximity to mine activity, as are IL3, IL4 and IL5. Out of these then, from the NTS maps there were linkages of potentially ephemeral channels. When you look at the topography, as well as the vegetation classifications for those, a number of areas can be eliminated as flow paths.

We will get right to the small lakes habitat criteria. What were we using to evaluate the potential, in this case, for fish bearing capacity? Two key criteria were assessed. First of all, the depth. If a water body was identified to be less than two meters maximum depth, the criteria used was not capable of providing an over-wintering habitat. These lakes freeze to the bottom, become anoxic and provide no opportunity for that.

Lakes in two to three metres of depth were assessed as having marginal over-wintering potential. What we meant by that is, these lakes likely freeze to the bottom for most of the lake and likely become anoxic most winters, but there is the potential that there could be a winter where they do not become completely

anoxic to the bottom. Then lakes greater than four meters we identified as having over-wintering available.

But that alone doesn't eliminate the potential for a lake to provide fish habitat. You could have a small water body directly connected to Snap Lake with good spring/summer/fall access, fish could get into it and get out prior to over-wintering and still utilize that area. You need to evaluate the connection of any of those small water bodies to other water bodies that have the potential to sustain a fish population year around.

Is there a passable channel? If it is present, could fish move through it? In other words, are there obstructions on that? Also, what is the persistence of the flow in that channel? What is the length of time water is present, and what time of the year is that water present? You may have a very small basin with a very quick peak spring runoff in a matter of days, and then that channel becomes dry for the remainder of the year; or that there is sub-surface flow and there is no channel occurring that would be passable by fish.

The third criteria is the observation or capture of fish, and as Mark identified that is not a stand-alone criteria. You cannot negate the possibility of fish being there just because you didn't capture them. What I would like to say to that is that the methodologies we used and the assessment criteria put in place did capture fish in small lakes but not the ones that we have identified as non fish bearing lakes when you include the other criteria. The methodology did capture small fish and not just one or two -- generally 17 or 18 lake trout in a small lake where we identified that there was fish habitat. The observation and capture then is used as an indication of habitat utilization at that point.

The second component is the evaluation of the actual stream itself, and the potential for that to contribute to the ecological processes in question. Then you need to evaluate the physical characteristics of that flow path. Is there a channel? Is it sub-surface or shallow groundwater flow that is draining the lake? What are your observations of the depth, width and obstructions on that channel? Again to the stream persistence or stream flow, you are looking at the sub-basin size and looking at the flow pattern that you would expect in that sub-basin in relation to hydrologic function and channel hydraulics. In other words, based on the size of the basin and terrain, how much flow would you expect? When was it likely to occur and is it sufficient to create an active channel and how long would that last?

This isn't a new approach to evaluating water sheds. Sub-basins or any kind of water shed is governed by the terrain, the soils and the other physical features of it, so the amount of water flow that could occur in that basin and the pathway that it will take based on gravity to get out of that basin.

We did a similar approach to assessment for Diavik; also basins were sized. A large number of those were monitored for spring peak duration, and we identified



that in general you would need a sub-basin size greater than approximately three square kilometers until you would start to see a channel developing out of a sub-basin. It is not to say that you don't have water flowing out of that; you don't have enough water congregating to move down to develop a channel.

I will move on to one example. This presentation today is not meant to present conclusive results for all of the lakes assessed, but I would like to go through one example to give you a better idea of how a particular lake was evaluated. In this instance we are talking about IL6. This is a small lake in close proximity to the north pile. It is also one proposed as a sedimentation pond so it becomes part of infrastructure. The habitat evaluation completed indicated that there was a maximum depth of 2.5 meters, the size was 2.8 hectares, the symmetry was completed, shore-line habitat and mapping completed, fishing was completed as well and no fish were captured or observed.

When you look at the evaluation effort, which is some of the questions that Marc has asked, fishing, gill net, minnow traps; and there were some additional effort put in in 2001, saline. The habitat assessments were completed in the spring and summer of 1999. We had four different biologists visit in the spring and summer of 1999. In the summer of 2001 another crew of biologists visited the lake, and in the spring of 2002 -- this isn't included in the EA obviously because the EA was

-- Break in Recording

Comment:

Observations of the depth width and obstructions on that channel. And again to the stream persistence or the stream flow you are looking at the sub basin size. Looking at the flow pattern that you would expect in that sub basin in relation to hydrologic function and channel hydraulics.

In other words, based on the size of the basin and the terrain, how much flow would you expect; when is it likely to occur; and is it sufficient to create an active channel and how long would that last?

So this isn't a new approach to evaluating watersheds. Sub basins or any kind of watersheds is covered by the terrain, the soils and the other physical features of it. So the amount of water fall that could occur in that basin and the pathway that it will take based on gravity to get out of that basin.

We did a similar approach to assessment for Diavik. All sub basins were sized and a large number of those were monitored for spring peak duration. We identified that in general you would need a sub basin size greater than approximately three square kilometres until you would start to see a channel developing out of a sub basin. It is not to say that you don't have water flowing out of that: you don't have enough water congregating to move down to develop a channel.

So I will move onto one example. This presentation today is not meant to present conclusive results for all of the lakes assessed, but I would like to give you one

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example to give you a better idea of how a particular lake was evaluated. In this instance we are talking about IL-6, this is a small lake in close proximity to the north pile. It is also one proposed as a sedimentation pond so it becomes part of infrastructure.

The habitat evaluation completed indicated there was a maximum depth of 2.5 metres, the size was 2.8 hectares, bathymetry was completed, shoreline habitat mapping was completed. Fishing was completed as well and no fish were captured or observed. So when you look at the evaluation efforts, which are some of the questions that Mark has asked, fishing gill net, minnow traps and there was some additional effort put in in 2001.

The habitat assessments were completed in the spring and the summer of 1999. We had four different biologists visit it in the spring and summer of 1999. In the summer of 2001 another crew of biologists visited the lake, and in the spring of 2002 -- this isn't included in the EA obviously, because the EA was submitted -- but we were doing further assessments on the North Lakes. Again, another biologist went to look during the spring runoff period at the outlet from this lake.

The stream, this is a photo of that flow path out of IL-6. No defined or visible channels through the on the ground surveys as well as the aerial investigation. There was dispersed flow through vegetation during the peak runoff, and there were also areas of complete subsurface flow. In other words, we have flow underneath a layer of boulders and it is like shallow groundwater flow.

Based on our assessment then, the potential for access through this channel for fish to migrate was eliminated. This small lake and outlet path are in a sub basin that is approximately 0.89 square kilometres. Runoff conditions expected to be short-term spring flow, one to two weeks with a peak duration lasting several days depending on the year. This picture was taken in the spring of 1999 under a high flow runoff, relatively high flow runoff condition year.

So conclusions then. The criteria were established to determine the fish bearing status of these small lakes. Lakes that will be affected by the project footprint were determined to be non-fish bearing through this process, the ones directly affected by infrastructure.

Contributions of non-fish bearing lakes to the Snap Lake fishery were evaluated as having a negligible contribution due to the low seasonal and disbursed flows. Now when we talk about this in the EA context, these are taken forward to the ecological end point, so you are looking for a measurable effect in the ecosystem. So something you could detect above the natural variability in the ecosystem. A change to the fish population or some other aspect that you could measure. And that's it.

**MR. MIKE BELL:** Thank you, Amy. Okay, we've got a list already. Why don't we go down through the list and get the particular questions or concerns at this

particular point, then as usual at the end of the session I will try and go back and try and get a summary in terms of what we are dealing with.

Given the fact that we have had one presentation from the afternoon, depending upon how the discussion goes this summary may take place after lunch as opposed to before lunch, because we have moved one presentation from the afternoon forward, so I am assuming we have reduced the time that is going to be needed in the afternoon. Don.

**MR. DON MACDONALD (DIAND):** What I thought I heard around the table was an interest in -- for example, if we are going to start with baseline data that we could go around and conclude the discussion on baseline data and then move on to the next topic. Is that reasonable to assume?

**MR. MIKE BELL:** Yes, and that suggestion was made previously. So even if we are starting with you, if somebody else wants to ask a question on baseline data we will take your question on baseline data and kind of move it around. That is assuming that once you have the answer in his question you don't ask the question yourself. So we will deal with baseline data first.

**MR. DON MACDONALD (DIAND):** Excellent. From our perspective, the baseline data is required to serve two primary purposes. One is to support the environmental assessment so that is to support the impact hypothesis that are being generated as part of the EA process, and then secondly, to support impact assessment as we get into the operational phase of the mine.

We have reviewed the baseline data that has been collected by DeBeers and we think they have generally done a pretty good job of that and conclude that overall the data is likely to be sufficient to support the EA process with one caveat, and I think we have covered that off in the recommendations that came out last night relative to the baseline conditions for phosphorus.

The second purpose of the baseline data is to support impact assessment. Generally we feel that the baseline data that has been collected thus far is not yet sufficient to support that process and we have had some internal discussions about that, and frankly we feel like we as a department and as a federal family have been somewhat deficient in terms of clearly identifying our expectations for proponents.

So I want to let DeBeers know and others around the room know that INAC would like to work together with Environment Canada and DFO to start to identify what our expectations are in terms of baseline data and then share that amongst the other groups here in the room to get some further input to that process.

**MR. MIKE BELL:** Baseline data. Dave.

**MR. DAVE LEVY (Fisheries and Oceans):** This was one of the concerns I raised previously. It had to do with the determination of a water body to be non-

fish bearing, particularly the smaller IL lakes on the project footprint area. Mark said in his presentation the presence of fish is very critical in terms of how we classify fish habitat, so we need to be convinced that there has been a very serious effort to document the presence of fish if they might occur.

In your presentation you talked about a number of observations. Were those capture observations or were they visual observations?

**MS. AMY LANGHORNE (Golder Associates):** As I indicated in the description of our evaluation criteria, the observation or capture of fish were not used alone to determine fish bearing status. In other words, they are a supplemental observation. As Mark indicated correctly, you cannot use that to determine that fish don't -- if you don't catch them it doesn't mean they are not there. So, observations or capture were part of our assessment but they were not a standalone criteria for the determination.

**MR. DAVE LEVY (Fisheries and Oceans):** So if you don't observe fish visually, you are acknowledging that they might still be present?

**MS. AMY LANGHORNE (Golder Associates):** Yes.

**MR. DAVE LEVY (Fisheries and Oceans):** I think the sampling that was carried out for baseline was somewhat inadequate. I think if I were looking for fish in a shallow lake I would want to at least make an effort for 48 hours per water body. I would like to take observations during the day time as well as at night. I would bring some strong lights with me in the middle of the night to see if I could see anything, particularly if the lake was only two or three metres deep. Further, I would utilize hydroacoustic sensors because then I would have a very clear idea of whether or not there was something in the water column. That is the type of data that I think would be required for you to state very strongly that there are no fish present in these small lakes.

**MS. AMY LANGHORNE (Golder Associates):** One point on that is that we did evaluate a number of water bodies. We did capture fish using the methods in the lakes, in several of the lakes, and we did fish the one to two metre depth lakes where we felt they would still freeze to the bottom in the winter. So the methods that we used did capture fish, but not in all water bodies.

**MR. MIKE BELL:** Go ahead John.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess another question from a layman, I am just curious. Is there a DFO guideline on determining whether there are fish in a small lake? Is there something published by DFO?

**MS. JULIE DAHL (Fisheries and Oceans):** Unfortunately, we do not have a guidelines document like that. It is definitely something we have envisioned developing as part of a baseline protocol that would help to do that assessment, but no we don't have a guidelines document per se for that.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess I am surprised, to me that is critical to any determination of no net loss.

**MR. MIKE BELL:** Just a second. Dave.

**MR. DAVE LEVY (Fisheries and Oceans):** The diversity of fish habitats across the country makes it -- it is very hard to generalize. The other point is, if I was carrying out this assessment I would be talking to some of the First Nations communities who live in those areas who really have a good understanding of what is present in those water bodies and I think their advice would be extremely valuable here.

**MR. MIKE BELL:** Question here -- Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** The information that we are getting, is that all information just from Golder Associates?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I would just like to touch on a comment from David and follow on from Rachel. That is that the information is from Golder Associates, a group of professionals who in our opinion carry basically did their professional job on collecting the baseline data. I think the key thing is that while the information was reported from Golder Associates, that as Dave indicates, there is a need for traditional knowledge. Community members were present on the surveys and were a key part of that team and we were very grateful to have them along.

So that gets slightly to the traditional knowledge angle. I think beyond that, on the traditional knowledge front, we did not have any site specific recommendations beyond the information provided in the Lutselk'e Traditional Knowledge Report.

**MR. MIKE BELL:** Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I am wondering also then, there was a young guy who did work in Snap Lake and this was before it became DeBeers. When he collected fish it was interesting to note the size of the fish because the young man who did the work came to Dettah and he delivered the fish to my house. I noted that they were all mostly -- not a big size -- but they were 12 to 17 inches in size. What I did was I just noted the amount of fish that he brought, because my request to the young man was if you are going to do the collecting of fish I want to see what you collect and you have to bring it here so I can show it to the elders. So he did that.

We were interested in working with him some more because he thought that he was going to be going back to Snap Lake and doing some more work. It is too bad that the young man was not contracted again because Golder Associates took over. My experience with the process of the work going on at Snap Lake was that we weren't being asked to be part of the work, the baseline data

collection work right from the beginning of the spring fish head towards the fall time.

If that had been the case, I would feel much more comfortable that the baseline data collecting information was something that would give me comfort. That is why I was wondering if some of the baseline data information that was being presented included the information done by the small company from B.C. did the work before the company became DeBeers. Thank you.

**MS. JANET HUTCHISON (NSMA):** Just a question for DeBeers. When you say that members of the community were present at the surveys, could you just clarify which communities?

**MR. MIKE BELL:** Excuse me, we have two questions on the floor at the same time. We will deal with Rachel's question first about the person that was involved previously and then we will deal with Janet's question.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess, Rachel, you are right. I mean, the company name changed from Winspear to DeBeers but Golder has been involved in the baseline data collection going back to 1998. So in terms of Golder's work on the site, nothing changed when DeBeers took over.

**MR. MIKE BELL:** Janet, clarification for your point, do you want to ask your question again, Janet?

**MS. JANET HUTCHISON (NSMA):** Robin, you were referring to the presence of community members during the surveys and I am just wondering which aboriginal communities had members present in the surveys.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Janet, I do not at this present moment have the names of individuals in front of me with regard to the fisheries surveys, so I can't provide that information. I prefer to check that before I provide it.

**MS. JANET HUTCHISON (NSMA):** Thank you. Just for the record it is my understanding that no one from the North Slave Metis community was involved, but if that is not the case I would appreciate receiving that information.

**MR. ROBIN JOHNSTONE (De Beers Canada):** And I can't confirm or deny that, so I will leave it for further clarification.

**MR. MIKE BELL:** Further questions, baseline data? Dave.

**MR. DAVE OSMOND (Gartner Lee):** I wonder if Golders could put up the slide regarding the lakes close to the footprint of the mine? This one here, it is 9-5-3. Infrastructure might be helpful. That's good, I think we can see it there. Now Amy, it is Dave Osmond, incidentally, from the Impact Review Board. The lake systems that I am thinking of are those drained by stream F-27, these ones right

in here and the footprint goes around them, as you can see. I notice also that there is no major infrastructure in them. I believe Amy there is a road that comes down. There is the airstrip here, there is a road that comes down around here and goes to a bulk emulsion plant and there is explosive storage in here which is probably in bunkers.

But the infrastructure associated with them, one of my problems is that I don't have a good contour map -- you can do that for me? Thank you. Because I am just concerned about the vulnerability of those lakes.

**MS. AMY LANGHORNE (Golder Associates):** The road that you are talking about Dave, this here is the tail end of that lake. Okay, the road was specifically sited to go along the height of land, that is why it is where it is. It was also sited to avoid any potential for stream crossing or encroachment on water bodies. In addition, the interception related to that amount of footprint was evaluated in terms of hydrology and the potential for a change in runoff to that watershed.

**MR. DAVE OSMOND (Gartner Lee):** Excellent. And the same applies in the explosives storage area? That's great. I just needed that clarification. I don't know whether to talk to North Lakes at this point. It seems very site related now, and North Lakes might want to wait to another time? Is this an appropriate time to talk about North Lakes work?

Okay, the work at Northeast Lake specifically. I raised this yesterday and wanted to have it on the table. I just wondered that despite the likelihood of fish communities similar to Snap Lake, Northeast Lake wasn't inventoried, nor was the impact assessment directed to end of the year fish, nor egg or spawning grounds, in spite of the fact that 85 percent of the likely discharge when the mine is closed, from the groundwater flow path which was a point of discussion yesterday, 85 percent of the discharge area would be through habitat that lake trout, I would think, would prefer to spawn on. It is coarse substraight, which is what you said in the report.

I was just wondering why impacts were done on zoo plankton, phytoplankton, everything but what I think might be most significant in the poor water associated with the interspecies of boulders and so on.

**MR. MARK DIGEL (Golder Associates):** Dave, in terms of the water quality assessment, we did evaluate concentrations not only in the water column but expected concentrations in the poor waters with area of core substraight. We did that specifically with that concern that their discharge water coming up in areas of spawning grounds and over wintering habitat, et cetera. The assessment showed us that water quality -- and these are the Canadian water guidelines -- would be met within the water column and within the poor water of core substraights.

**MR. DAVE OSMOND (Gartner Lee):** And that was related to toxicity, to fish life history forms such as eggs and young of the year.

**MR. MARK DIGEL (Golder Associates):** Thanks for that clarification, because you are correct that the Canadian water quality guidelines are intended particularly for the metals which are of most concern, are intended to protect the most sensitive life stage of the most sensitive species.

**MR. DAVE OSMOND (Gartner Lee):** I wish that had been stated in the impact assessment, because I didn't remember any kind of reference to lake trout or fish or eggs or whatever. But indeed, what I am hearing was you indeed did apply this to eggs and young of the year.

**MS. AMY LANGHORNE (Golder Associates):** Yes we did, Dave. Just a point of clarification. It is in the North Lakes report, the supplemental report. In the EA, because we had no site-specific data on that lake, we assumed as the most conservative estimate we could that anywhere the groundwater was coming up was spawning or rearing habitat. That was a basic assumption, to be the most conservative we could possibly be. In the EA that is what we stated. In the North Lakes report we have clarified that a little bit because we have more information on substraights, but then we also looked at the poor water chemistry.

**MR. DAVE OSMOND (Gartner Lee):** Thank you. For the record then, my concern regarding the lakes on stream S-27 have been addressed. Also, that indeed there was assessment done on young of the year and fish spawning habitat and my concern has been addressed as well.

**MR. MIKE BELL:** Thank you. Baseline data. Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I would just like to follow up on what Dave's concern was and this relates to baseline data in general. I don't feel comfortable that the lakes on S-27 were adequately covered, simply because maybe I haven't seen it in the EA, but it seems that we are looking -- it is not an ecosystem approach. We have looked wholly -- it seems the focus is just on fish and maybe the other organisms have been addressed.

I guess from a perspective of food supply, if indeed these lakes are impacted in any manner from a food supply perspective then ultimately that could affect downstream fish. That is one point.

The other one is about any lakes that area affected by infrastructure and it seems like the assessment was just focused on identifying fish, and would the fish be able to migrate from those lakes in and out. If there was no connectivity that was deemed then as less of a concern.

I think that maybe fish can't migrate but bugs can migrate and they provide an important food supply to the fish in downstream waters. So from an ecosystem perspective, I would like to know exactly what Golder has done to evaluate these small body waters from the directly and indirectly affected lakes and streams.



**MS. AMY LANGHORNE (Golder Associates):** To address first of all the first part, S-27 I will give you a better idea and then some of this applies to the rest of your question. The criteria that I presented you are right, specific to that fish-bearing aspect of the ecosystem. In addition to that we looked at runoff in the sub basins, so delivery of water and nutrients to Snap Lake. We did look at water quality in these small lakes, and we did look at the potential pathways for effect into these small lakes, which would be sediment release, air deposition, dust, that kind of thing. Those aspects were evaluated through other linkages and they are in the aquatic resources assessment section. In answer then to S27 and that sub-basin over there, we assumed that there were fish present in that system, and then the eco-system approach is, what is the potential for an effect to the water quality through air deposition, dust, sedimentation or hydrology; and that was assessed. The same applies then to the other sub-basins. In addition to that basic fish habitat assessment, air deposition, dust, runoff; those were all pathways that were evaluated for changes that could affect the aquatic ecosystems.

Comment

**MR. STEVE WILBUR (Dogrib Treaty 11):** Thank you. So specifically were other aquatic organisms surveyed in those lakes such as zoo plankton and such?

**MS. AMY LANGHORNE (Golder Associates):** No they were not surveyed. They were assumed to be present.

**MR. MIKE BELL:** Sorry, I was just waiting to see if Steve was finished. No, I didn't think you were. Go ahead, Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I am thinking. With reference to the other small water bodies that provide, that did not have -- you assumed they did not have fish or determined they did not fish -- did you also assume that they had other obviously micro, macro and food supply to other larger water bodies?

**MS. AMY LANGHORNE (Golder Associates):** Yes we did, Steve, and then to look at that in the eco-system perspective you are looking at the size of two things; the size of the sub-basins or the amount of interception that we are talking about. What is the loss if you isolate an area of a water shed and don't allow that water or contribution to reach Snap Lake, how much of the area are you isolating? In this case we are intercepting 1.7 square kilometers which, when the area of the Snap Lake water shed is taken into consideration (which is 67.9 square kilometers), it is approximately 1.4 percent of the water shed where there is full interception.

Did I answer your question completely, or is there another part that I didn't quite get?

**MR. STEVE WILBUR (Dogrib Treaty 11):** I just want to be clear that your assessment is based on -- you are assuming that these water bodies supply a component of food supply or whatever -- they are important components in the

eco-system to Snap Lake. But you are discounting its importance due to its small size in comparison to the size of Snap Lake.

**MS. AMY LANGHORNE (Golder Associates):** Not exactly. In answer to that, what I will say is that we are looking at ecological end-points, so in effect that would be measurable at an eco-system level, something beyond natural variability. Our thresholds are based on being able to measure an effect. In addition, the other point I was going to bring up is that a second assessment to look at a broader bio-diversity aspect was undertaken in the ELC, the ecological land classification section of the EA and that included shallow water, deep water, seeps and bogs, so in terms of the landscape and the amount of those types of habitat that are going to be affected by the project footprint, and the amount of those types of habitat that will then be available post-project, there was an assessment of that change.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Thank you. I just have one more clarification on this sampling strategy and base line characterization from a spatial distribution with reference to referenced lakes, and this kind of moves into what Don was talking about earlier I think about evaluating changes over time as the operations continue. If we haven't evaluated for example zoo plankton or whatever, how do we know that we are actually seeing changes happening in some of these water bodies? You are assuming that, you have made the statement that you don't think it is -- I will stop right there with that question.

**MS. AMY LANGHORNE (Golder Associates):** Could you clarify the question?

**MR. STEVE WILBUR (Dogrib Treaty 11):** I was referring to Don's two-prong interest in what the environmental assessment base line data is for, and one is to evaluate whether we can predict impacts. The other essentially is a follow-up from that during operations where we are going to be monitoring impacts. If we haven't collected enough base line information about a certain organism or part of the eco-system, how can we know that we have effected from a negligible standpoint or low, or whatever, later on down the road? With reference to these lakes you have assumed that these things are there, how do we know what impact is really going to occur there?

**MS. AMY LANGHORNE (Golder Associates):** In answer to that, and I think this may address some of Don's, the way Don brought it up as well, is that we have presented the information to allow the first step, the environmental assessment. Once you have completed that step, then you have identified those aspects where you have a potential for an affect. Once you have identified where there is a potential for an affect, then and only then really can you identify what detailed information you need to be able to define a monitoring program that could measure that change. So until you have gone through that first step of identifying where you expect a linkage to lead to an effect, until you have done that you can't collect or design a monitoring program that would be able to measure and monitor that through time.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I would like to disagree on that statement primarily because one of the rationale behind establishing or characterizing whether it is a biological or physical process is that you go and collect the data -- you can't assume that you know where all the impacts are going to occur and as a matter of fact you are going to be collecting base line data outside the area of influence, so you have a control point to be able to essentially test some of these hypotheses of potential impact. I guess in my mind I would be more aggressive in collecting data in more areas, in areas of potential impact and areas of potentially minimal and areas of no impact to be able to really establish, develop and build a good monitoring program for operations.

**MR. MIKE BELL:** Okay, next question. Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** That is all my questions. I will stop there.

**MR. MIKE BELL:** Okay.

**MR. TIM BYERS (Yellowknives Dene):** Kind of touching further on the direction that Steve was leading with his questions, I am still not clear on one thing and that is... Basically my question is, were streams, ephemeral or otherwise, evaluated as far as their potential as a food source for downstream water bodies, either phyto or zoo plankton? I would think that a stream supplying a goodly amount of food organisms would be considered part of the fish habitat perhaps.

**MR. RICK SCHRYER (Golder Associates):** To answer your question, I guess, in two parts, the first answer would be yes we did survey those streams and we did assess their potential to make a contribution, just the streams themselves, to -- let's say it is following into Snap Lake or contributing to a fishery. With these ephemeral streams, they only flow for one or two weeks in the year and then essentially stop as Amy said because of the small size of the water shed, the drainage area. It is very difficult to have an established aquatic community in a stream like that that only flows in the spring and then freezes solid in the winter time. There is essentially not an aquatic community there that would contribute much of anything to anything downstream. We did collect water quality samples and nutrient data on those streams to get an idea of what their potential was to make a contribution.

**MR. TIM BYERS (Yellowknives Dene):** I am wondering then, as part of your evaluation of what constituted fish habitat, would some of those streams that you felt did provide nutrients in some fashion be factored into the total area of fish habitat possibly being impacted?

**MS. AMY LANGHORNE (Golder Associates):** The short answer is yes. To describe that again we are looking at ecological end-points, so we are looking at some way to detect a measurable change in the eco-system. That is where the

levels of disturbance and areas of intercepted flow in relation to the rest of the Snap Lake water shed come into the assessment.

**MR. MIKE BELL:** Okay, Tim?

**MR. TIM BYERS (Yellowknives Dene):** Thank you.

**MR. MIKE BELL:** I am still on base line data. Bob.

**MR. BOB TURNER (NSMA):** I would just like to make some comments for the record in regard to the monitoring methods that Golder has used in regard to angle fishing. We do not agree that that is a very useful or accurate method for gathering base line data, and we do not believe it is an ethical practice for recording base line data as well. That has been recorded on previous environmental assessments. As far as we as an aboriginal group, we do not believe that the use of angle fishing should be used for gathering base line data or any data in regard to environmental assessments. I believe we are supported by other aboriginal groups as concerns through their elders. I would just like to put that on the record.

**MR. MIKE BELL:** Okay. Rachel, did you have a question on base line data?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I was just looking for information prior to what Golder Associates started to work on. I think the elders wanted to comment on the habitat for fish, how it is going to affect the future fish spawning areas and lake food for the fish. Isadore mentioned that he wanted to speak on that tomorrow when he is here. Today and yesterday he had to go to Rae. The fish that were fished out prior to Golder doing their work, I think Isadore wanted to comment on that tomorrow too. Thank you.

**MR. MIKE BELL:** Any other comments on base line data? Don.

**MR. DON MACDONALD (DIAND):** I just wanted to follow up on Steve's point and provide a note of clarification that from our perspective the base line data really should provide the information that supports both the environmental assessment process and the base line information needed to assess impacts subsequently once we are into the operational phase of the mine. The reason we think that is so important is that once we get into the construction phase you have to ask yourself the question, are we really getting base line data any more? That is why we feel it is important for us to provide some guidance in terms of what our expectations are, but having not provided those previously we would feel it is somewhat unfair to expect that De Beers would have met our expectations without explicitly stating what they are.

**MR. MIKE BELL:** Good point. Go ahead.

**MR. DAVE BALINT (Fisheries & Oceans):** My understanding of invertebrate surveys that were undertaken in Snap Lake, there were four samples, and you

could perhaps comment on that. Three were taken in littoral areas and one was taken at a water quality station. Perhaps I am wrong, but were any samples taken in profundule or very deep areas because of the potential impacts from the effluents?

**MS. AMY LANGHORNE (Golder Associates):** There were I believe five open water sampling stations for benthic invertebrates and three near-shore sampling stations for qualitative collections. In order to allow comparison among the sample sites where the benthic invertebrates were collected, they were standardized by depth, as well as habitat type. So the depth of those sites was between seven and eight meters.

**MR. DAVE BALINT (Fisheries & Oceans):** Were there any samples taken in the deepest areas of the lake?

**MS. AMY LANGHORNE (Golder Associates):** No, the samples were collected in depths between seven and eight meters to standardize habitat.

**MR. DAVE BALINT (Fisheries & Oceans):** Would you expect that there would be any different communities at depth in that lake compared to other reference lakes?

**MR. RICK SCHRYER (Golder Associates):** The answer would be no, not really, simply because most of the benthic invertebrate communities that we have seen to date in the reference lake and in Snap Lake are dominated by coronomides and we would expect that trend to continue in essentially any of the similar-type lakes that we would survey.

**MR. DAVE BALINT (Fisheries & Oceans):** One further question on invertebrates, can you give us an estimate of bio-mass of the invertebrate population in Snap Lake compared to reference lakes?

**MR. RICK SCHRYER (Golder Associates):** Dave, I will have to check whether or not that figure is available in the EA and get back to you. I can't remember off the top of my head.

**MR. DAVE BALINT (Fisheries & Oceans):** Okay, we will work with them on that.

**MR. BOB [inaudible] (NSMA):** A quick comment and a question. I concur with some of the previous comments made regarding monitoring programs. There are several monitoring designs. A common one is a before and after control impact design which does require a substantial pre-operational data base to make comparisons to, and in terms of monitoring tools fish may not necessarily be the best monitoring tool. Invertebrates or water quality -- again there are several options. My question is, Amy, you have referred to ecological end-points. Just be a little more specific on what ecological end-points were used in the EA in your analyses.

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**MS. AMY LANGHORNE (Golder Associates):** When we are talking about the ecological end-points we are talking about non fish aquatic organisms as a receptor, fish health, fish habitat and ultimately then fish populations.

**MR. BOB SCHELAST (NSMA):** Those end-points weren't obviously applied to all the water bodies that you studied. You did go through some screening and discounted some, or didn't apply them. I am just curious on how you screened out.

**MS. AMY LANGHORNE (Golder Associates):** The linkage diagram provided in section 9.5.2 provides a description of how a potential project activity led to each specific ecological end-point that we evaluated. If you would like I can walk you through that at another point, but it is provided in the EA.

**MR. BOB SCHELAST (NSMA):** Thanks.

**MR. MIKE BELL:** Base line data, other questions? Tim.

**MR. TIM BYERS (Yellowknives Dene):** I would like to address this question to De Beers first off. I am wondering if there was any fish work done pre-Golder for Winspear, either university or other consultants in the Snap Lake area.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Let me get that right, Tim. You are asking what work was done prior to De Beers and prior to Golder working for De Beers. Is that correct.

**MR. TIM BYERS (Yellowknives Dene):** That is right.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I understand that Alan Knight Piesold did some base line work on wildlife and I am informed on fisheries. I don't know the details of that information. I understand though that that information was reviewed in preparation of the environmental assessment.

**MR. TIM BYERS (Yellowknives Dene):** Further to that, I guess if I could direct that question to DFO. Has DFO done any fish work in the Snap Lake area prior to this?

**MS. JULIE DAHL (Fisheries & Oceans):** No, DFO has not done any specific studies in Snap Lake.

**MR. TIM BYERS (Yellowknives Dene):** Thank you both.

**MR. MIKE BELL:** Can I assume that we have finished questions on base line data and we can move on to some other things? We have 15 minutes for a few more questions. I think that would be a yes, you have to jump in quick when I get tired. One more.

**(UNIDENTIFIED MALE SPEAKER):** Just a quick comment and a question. The comment is with regard to involving TK in base line data. I guess we would like to ensure that the Board feels that is a very important component in future gathering of base line data for other projects, and I guess making sure that TK is fully incorporated in habitat assessments as well. Since there seem to be concerns as to that involvement presently, will De Beers pursue to incorporate TK in future monitoring and mitigation methods within their project?

**MR. ROBIN JOHNSTONE (De Beers Canada):** As De Beers states in the EA, and as stated previously at a pre-hearing conference, it is the intention of De Beers to develop monitoring programs in conjunction with communities, regulators and government that will reflect and incorporate traditional knowledge and community members.

**MS. JULIE DAHL (Fisheries & Oceans):** Before we leave the topic of base line data, I just would like to say a couple of concluding statements on behalf of DFO. First of all, it's our understanding and our view that overall the environmental assessment report that De Beers has put together is of very high quality. People have identified that there are maybe some areas where they would like revaluation or other such things, but generally we feel it is well done. We don't want to leave people with the impression that we feel that their base line assessment for the fish habitat work is completely wrong, completely inadequate or completely off-base. We don't want to leave people with that impression at all.

We are simply saying we don't have all the data that DeBeers used in their decision making process. We understand that they have a lot more data than what they have presented, that there was a little bit of a screening process that went forward and only certain things made it to the accounting stage and we are asking to see some of that data that we had asked for.

If it does appear that perhaps the baseline data was inadequate because they didn't do after all a lot of the things that we would have expected in an assessment, then perhaps an assessment of inadequacy of baseline may be done at that time.

We just want to conclude here that the terms of reference specifically asks for an assessment to lake and habitat and how no net loss will be achieved. We are asking for items that are pertinent to the EA. We must understand that habitat compensation is inherent in the no net loss principle and the calculations of no net loss. That is where the term comes from, impacts and offsetting impacts, hence compensation.

The information for the environmental assessment under the review board process is the same as what DFO requires for our process and our determination of no net loss. We don't want to see this go to a separate process whereby this EA is concluded but DFO can't make their conclusions and we have to undertake some EA like process in order to get the information that we need.

We want to make sure that our requirements are there to fulfill our mandate under the Fisheries Act, and so we are trying to get that achieved now. Through discussions that we had with DeBeers and their consultants earlier this week we thought we had an understanding on the way forward through this and we thought it was a relatively simple approach and it was not outside of the scope of the terms of reference. Some of the comments that we have heard this morning, we are not so sure about DeBeers commitment now and we are a little confused by what we have heard.

**MR. JOHN MCCONNELL (De Beers Canada):** Thank you for your compliments about the environmental assessment. I am sorry I clouded the issue with that discussion, but you know we certainly have no problem making information that will improve the impact assessment available. Our concern was trying to bring the issue of compensation under the terms of the environmental assessment. You've indicated that that is not what you are trying to do, you are just trying to assess the impacts on the Snap Lake area.

I think your discussions with Robin this week in terms of making other information available, certainly we have no problem with doing that. In terms of a mechanism for doing that, perhaps its appropriate to submit it to the board as an appendix to the environmental assessment. But I guess we will need a little more clarification on the type of information you are looking for before we submit anything.

**MS. JULIE DAHL (Fisheries and Oceans):** Thank you and we have talked about providing that to DeBeers for clarity.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I do have one clarifying concept here about the baseline data. A lot of the what I considered baseline data that we were looking for is what was presented by DFO in terms of their no net loss, so I consider some of the essential data the same. That is baseline data. If that is being made available by DeBeers to DFO I hope it is being made available to everyone so we can all evaluate that.

**MS. JULIE DAHL (Fisheries and Oceans):** Let's be clear that this is not just for DFO. This is part of the EA process and it will be part of the public record.

**MR. JOHN MCCONNELL (De Beers Canada):** Again, Steve, I am not sure what the proper mechanism is for making it available, but I throw out the idea that we would submit it as an additional appendix to the environmental assessment which would go to the EIRB and then they would post it on their website and put it on the public record.

**MR. MIKE BELL:** We have ten minutes, maybe we can go through one question.

**MR. DON MACDONALD (DIAND):** This is related to the bioaccumulation of cadmium. Rick, on this slide there is essentially a tissue residue benchmark of 1.4 milligrams per kilogram wet weight, I think, for cadmium. For human health and wildlife. Can you recollect what the source of that benchmark was?



**MR. RICK SCHRYER (Golder Associates):** The source of those was the USPA data. That is where they had originated from.

**MR. DON MACDONALD (DIAND):** The reason I am asking this question is that the number is the same for human health and wildlife and that surprises me, given that the risk levels used for wildlife are typically quite different than those that are used for human health, although the end points are typically the same the total daily intake rate of fish and fish products tends to be very different for human health and wildlife. Are they really both the same, 1.4?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Don, the person whose specialty this is isn't here. My understanding, going out on a limb as a wildlife biologist is that I think some of the area where the two might close the gap is that in the human-based concentration we assume very, very conservative amounts of fish consumed by people. I do not know the numbers off the top of my head, but I know it seems like an outrageous amount of fish per day for an extremely long period. So that may be the area where those numbers merge. Beyond that I would have to refer you to the specialist that did the actual work.

**MR. DON MACDONALD (DIAND):** Yes, if you wouldn't mind having your specialist send me the reference for that information, I would just like to have a closer look at that if it is possible.

**MR. MIKE BELL:** Julie, did you have a question on cadmium?

**MS. JULIE DAHL (Fisheries and Oceans):** Yes, it was a long time ago. I had a question for Rick Schryer. In his presentation, the assessment for cadmium, I thought you had said that if cadmium concentration in the discharge did not exceed benchmarks you did not go any further in the assessment, whereas I thought yesterday we heard that in the process of working through things the first step was if a parameter didn't exceed concentrations of the guidelines in the discharge it didn't go ahead. So why the difference, and am I understanding that correctly?

**MR. MARK DIGEL (Golder Associates):** In terms of comparing discharge concentrations to the Canadian water quality guidelines, which is what we discussed yesterday as the first step and then comparing maximum concentrations of the guidelines and then developing site-specific benchmarks, that was for the water quality assessment. What Rick was referring to earlier was specific to the cadmium and bioaccumulation assessment that was done.

**MR. MIKE BELL:** Julie.

**MS. JULIE DAHL (Fisheries and Oceans):** How does that relate then to the assessment that was done for the cadmium concentration in the discharge? It was one of the parameters that exceeded the benchmark at the 60 metre mixing zone. Is there any comparison in the two? Because one looked at discharge relative to benchmarks, and the other one looked at -- I am confused.

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**MR. MARK DIGEL (Golder Associates):** Julie, can you just clarify the questions? We are having some discussion as to exactly what question to answer. So we just want to make sure we've got it straight.

**MS. JULIE DAHL (Fisheries and Oceans):** I guess the only thing is my confusion is yesterday you had looked at the concentrations of various parameters in the discharge and you did a step-wise approach to determining whether or not they went on to the assessment against benchmarks. The first one was, if the concentration in the discharge was below guidelines it didn't go any further. If it was above guidelines it went to the next level of assessment to see if the concentration was at the 60 metres diffuser zone was below guidelines. If it wasn't then it went on ahead, and cadmium was one of the ones that went on ahead.

Now what I have heard today is that cadmium was essentially screened out of the assessment for the bioaccumulation based on the fact that its discharge concentrations were below benchmark. So why was it compared to benchmark for being dropped out of the assessment for bioaccumulation, but it was compared to guidelines for whether or not it went ahead for assessment for impacts at Snap?

**MR. MIKE BELL:** Excuse me a minute. It is 12 noon, would you rather answer this question when we come back, would that be all right with you? Or will it be a quick answer? We're having huddles here and this type of thing, so...

**MR. ROBIN JOHNSTONE (De Beers Canada):** You have a hot date, Mike? I think it will just take a minute.

**MR. MIKE BELL:** Okay. I have to walk my dogs.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think we are probably going to have to continue this outside. The short answer is for the cadmium approach here we used the concentration at the end of the pipe and that was carried, so that is what you see the results of cadmium based on that being. Mark is going to add another little short bit.

**MR. MARK DIGEL (Golder Associates):** So just to clarify the process, and this may go part way or all the way to answering your question. As part of the water quality assessment, we went through that process I described, compared concentrations to guidelines at the discharge, compared it at the maximum concentration in the lake. For those ones that didn't meet guidelines at the maximum concentration in the lake, we developed the site specific benchmarks and assessed the effect on water quality. Those were benchmarks for the protection of aquatic life.

For those substances -- and cadmium was one of them -- that didn't get screened out by comparing maximum concentrations to the Canadian water quality guidelines, in addition to assessing the water quality impacts they were

also carried forward into the aquatic resources section where it looked at the specific effects on aquatic organisms which is why cadmium was carried forward. One of the factors of cadmium is it has the potential to bioaccumulate. So an assessment of the potential effects of bioaccumulation was carried forward. That is why it was done. If you have a specific question about the way that the bioaccumulation potential was considered we can try to answer that.

**MS. JULIE DAHL (Fisheries and Oceans):** I am not concerned about that, I am just concerned about a statement that I saw in the presentation and I am confused. Was it one of the conclusion slides or something that talked about -- wasn't there a conclusion one that said... There was something there that said cadmium didn't go forward because it wasn't above benchmark. I just wondered why not above benchmark when the previous criteria -- it was screened out during the assessment because the concentrations in discharge water were less than water quality benchmarks. Whereas before, we were told parameters were screened out if the concentration in the discharge were less than water quality guidelines. So that is the question, not the actual assessment that was done.

**MR. MARK DIGEL (Golder Associates):** The bullet is simply incorrect. Cadmium wasn't screened out, cadmium was assessed in the water quality assessment and then it was one of the ones that was carried forward. So the bullet is just incorrect.

**MR. MIKE BELL:** Don had a quick question.

**MR. DON MACDONALD (DIAND):** Probably a question for Rick or for Mark. I have been operating under the assumption here that we have been using two different sets of benchmarks. One was the benchmarks that we talked about yesterday that are toxicity based, and Rick, I understood today from your presentation that the benchmarks used for screening relative to bioaccumulation are the bioaccumulation based water quality criteria from USCPA. Is that correct?

**MR. MARK DIGEL (Golder Associates):** Can you just clarify specifically, when you are saying -- can you just clarify what benchmark you are talking about?

**MR. DON MACDONALD (DIAND):** So yesterday, the benchmarks we were talking about are the toxicity based water quality guidelines and comparable benchmarks from USCPA and other sources. What I understood today was that we were talking about a different set of benchmarks, those which are rather than being toxicity based are bioaccumulation based.

**MR. MARK DIGEL (Golder Associates):** That is correct.

**MR. MIKE BELL:** I am going to invoke privilege, as much as I have left, can we come back and do it after?

**MR. STEVE WILBUR (Dogrib Treaty 11):** This is really quick. If that is wrong, what is it supposed to say?

**MR. MARK DIGEL (Golder Associates):** Just let me re-read it and then I will give you a proper bullet. Cadmium, (break in tape) as part of the water quality assessment, and therefore it was carried forward into the aquatic resources assessment. It is something -- basically it was not screened out, it was one of the parameters that was carried forward into the bioaccumulation assessment.

The bullet is simply wrong. There were all of the parameters were not screened out as part of the water quality assessment were carried forward, and that is what that first bullet should say, and cadmium was one of those.

The second bullet refers to the fact that bioaccumulation was specifically looked at for cadmium in part because there were specific concerns raised about the bioaccumulation of cadmium.

**MR. MIKE BELL:** Okay, I will see everybody at 1:30. Thank you.

-- Break

**MR. MIKE BELL:** I usually start the sessions with a joke, and if you come late you miss the jokes and I don't want that to happen to anybody. We have one clarification from this morning. We have several people who wanted to talk about bioaccumulation. Then I would like to do a brief wrap-up in terms of where we stand with the issues. If we have moved concerns to issues that people want to articulate, then we will have a presentation. I would like to try and do that within the next half hour maximum if we can, please. Don.

**MR. DON MACDONALD (DIAND):** Just by way of clarification this morning, you may recall that I was making some comments about baseline data and relevance and appropriateness to the EA process. When I indicated that I felt that the baseline data was generally acceptable for purposes of supporting the EA I was really speaking specifically about water quality and sediment quality data, rather than broadly speaking about all the other biological data. I just didn't want to give the impression that we were in some way antagonistic about the position DFO was taking, or the concerns that they have expressed, and our friends with the Dogrib and so on.

**MR. MIKE BELL:** We certainly like to see congeniality among our federal departments.

**MR. MARK DIGEL (Golder Associates):** If I could, I just would like to correct one statement I made just before lunch with respect to the bioaccumulation assessment. In the water quality assessment the cadmium was assessed and the effects were classified as negligible. On that basis cadmium was not carried forward into the aquatics assessment. In fact, one of the information requests raised the issue of the potential for bioaccumulation of cadmium. The bioaccumulation assessment for cadmium was provided to respond to that specific information request which was information request 1.52.

**MR. MIKE BELL:** We had several other people. Don, you had questions about bioaccumulation. We will do the same thing as we did this morning. There were a number of people to talk about the same issue, so just jump in -- I'll tell you when to jump in.

**MR. DON MACDONALD (DIAND):** With the supplemental information that DeBeers has indicated they would provide to me, I am quite happy.

**MR. MIKE BELL:** Other questions about bioaccumulation.

**MR. BOB SCHELAST (NSMA):** On the selenium, Rick you presented information that your initial results were not reliable, were invalid. A question of clarification: where were the samples where you ran that analysis, where were they taken? What was their origin?

**MR. RICK SCHRYER (Golder Associates):** The selenium analysis that we were referring to were when we were trying to characterize all of the inputs into the mine water such as conag water, or water from the underground. Those were all analyzed and that was all put into the overall model to be able to model overall selenium levels. So that is where the analysis came from.

**MR. BOB SCHELAST (NSMA):** So those were analytical values, not modeled values?

**MR. RICK SCHRYER (Golder Associates):** Yes, those were analytical values.

**MR. BOB SCHELAST (NSMA):** And then you stated that you reanalyzed, was it the same samples or was this a different set of samples? And do you now have comfort in the quality of the data?

**MR. MARK DIGEL (Golder Associates):** The original analysis was done doing an ultra low technique with mass spectrometer. As part of the analysis, the mass spec process, there can be interference with other compounds in the water. So we were essentially getting false positives with the selenium results. So what we did is we went back with those same samples and most of the samples were still available to be analyzed, and we analyzed them with a technique called atomic absorption, which had very similar detection limits and has absolutely no issues with interference with other compounds. So the new values, we have very good confidence in the new values and there was much work that went in to ensure on reanalysis that we had correct data. So the corrected values took away the problems with the interference so we have an accurate representation values of what selenium values are in the underground waters.

**MR. BOB SCHELAST (NSMA):** So the samples are considered representative of what we are going to see once the mine is operation? The fact that there will be some processing of the rock, is there potential for greater release of selenium or other metals in processed rock than what you have been dealing with now?

**MR. MARK DIGEL (Golder Associates):** Ken DeVos who isn't here would be the best person to answer on the specifics of that, but selenium, as with the other metals, were evaluated to take into account whether or not there could be releases as part of the process. So the numbers that were generated and evaluated and put forward in the selenium concentration in the final discharge did consider the things that you refer to.

**MR. BOB SCHELAST (NSMA):** Thanks. One final request on the bioaccumulation, similar to what Don asked. If I could get some information on your RBCs, I guess specifically and Robin alluded to it, on what consumption rates the guideline is based on, particularly for human health. Again, knowing that typically they are of fairly large quantities on a fairly frequent basis. Again, if I could get either that information or guidance as to where I could find it I would appreciate it. Thanks.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Bob, have you looked in the appendices to the EA for that?

**MR. BOB SCHELAST (NSMA):** Not specifically for that, but again, it's my understanding from your presentation or comment that this was a USEPA based assessment, and if it's in the EA, I will dig it out from there.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think that the USEPA approach related to the concentrations for cadmium and not the fish consumption, but we can get that information back to you. It's either in the EA or it's in the... one of the rounds of information requests that we can dig that out.

**MR. MIKE BELL:** Rachel, did you have a question on bioaccumulation?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I just wanted to make sure that Tim's question got dealt with.

**MR. MIKE BELL:** Okay. Thank you.

**MR. TIM BYERS (Yellowknives Dene):** And my question is I noticed from the response to DFO's request 1.1.1, and I will read the request verbatim: Please provide data or information which describes atrophic, that is feeding relationships, of the zoo plankton, benthic invertebrates, and fish species in the affected water bodies. The information should be discussed in reference to a biomagnification/bioaccumulation perspective.

I noticed from De Beers' response that, and this is covered in section 9.5.2.4.3, that the contaminants effects on the abundance of organisms is discussed, but I don't see anything in there on biomagnification through the trophic levels. And I am wondering if DFO has received a response to that or if you are going to be issuing a response to that, with the data and the information that DFO requested.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I cannot comment on that at this stage, Tim, without taking a look at 9.3.-whatever, and the specific issue there. ...(inaudible)... that stage of the week that I can refreshen mine and provide you with the appropriate information for clarification.

**MR. TIM BYERS (Yellowknives Dene):** So do I hear a commitment then that you will be providing that information to DFO and to ourselves, and to everyone?

**MR. ROBIN JOHNSTONE (De Beers Canada):** We'll be clarifying what the information is first, and whether we have it or not. I'm not going to commit further until I know whether it is information that we can possibly provide. I don't want to promise you something that I cannot deliver.

**MR. TIM BYERS (Yellowknives Dene):** Thank you.

**MR. MIKE BELL:** Okay, are there anymore questions on bioaccumulation? Go ahead.

**MR. DAVE BALINT (Fisheries and Oceans):** In reference to some of the comments that Bob previously made, some of my concerns had been alleviated to questions back to him, and I was concerned with selenium and the integrity of the sample.

I was also wondering if, because those samples were determined at the advanced exploration stage, what the influence of selenium would be in regards to paste backfill? What kind of other metals come out of that paste backfill? Is there an additional selenium level? Because the advanced exploration stage did not take that into account, that sample?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I'm afraid I cannot answer that for you, Dave. We would have to have Ken DeVos here to provide the right information.

**MR. DAVE BALINT (Fisheries and Oceans):** I understand that.

**MR. MIKE BELL:** Okay. Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** I'm just curious if De Beers will provide that information.

-- Interjection

I wasn't sure if... maybe I missed it, but is Dave going to get that information?

**MR. ROBIN JOHNSTONE (De Beers Canada):** No, you are right, Louie, I didn't state whether I would provide it or not. And I will take that comment and I will provide that information back to the public registry.

**MR. MIKE BELL:** Before the summary, one question came up among the participants today, indicating that their person that dealt with groundwater was not able to be here yesterday, they would be here in the future, and they asked if questions could come up afterwards, after we have already covered the issue. Since De Beers has consultants coming in and out for various purposes, I guess the response is a two-fold one. If we have the time to do it, and everybody is agreed, we'll do it, but it depends upon the consultants that you have available. So what I suggested to them is to talk to De Beers directly, to talk to you directly, find out when that consultant will be back so we would find it at an appropriate point, if we have time to raise it. Okay? Good.

What I would like to do now is simply go around the room quickly and have a consolidation of concerns and concerns whether or not they've moved to issues, just to get a clear picture from people who have raised their concerns this morning as to where we stand in relationship to baseline data in particular and where we stand in relationship to bioaccumulation. I do not want to open the discussion again. I'm trying to close down the discussion by synthesizing what people's viewpoints are who have raised the questions, okay?

**MR. DON MACDONALD (DIAND):** There were some other issues. Are we going to pick those up after this synthesis?

**MR. MIKE BELL:** No, I guess we should pick them up before. I only had... I see there is one more on here. Dave, you raised one of TDS... what did you raise?

**MR. DAVE LEVY (Fisheries and Oceans):** It was no net loss accounting.

**MR. MIKE BELL:** Have we covered that?

**MR. DAVE LEVY (Fisheries and Oceans):** No, we have not.

**MR. MIKE BELL:** Go ahead.

**MR. DAVE LEVY (Fisheries and Oceans):** I have reviewed the habitat accounting that is presented in one of your appendices, 9.12. In section 8, there is a habitat accounting and table 9.12-14, there's various types of habitat that have been quantified for various fish species, spawning habitat, rearing, foraging, et cetera.

In the main body of the report, section 9.5, if you look at the results for the IL lakes, in and adjacent to the project footprint, there's a table, 9.15-15, and these lakes have been classified in various ways -- IL 2, IL 3, 5, 6 and 7 have the comment -- marginally suitable small-bodied fish habitat exhibits some capability to over-winter small fish.

Some of these lakes are very sensitive to the actual construction, for example, IL 7 is actually going to be sitting under the part of the rock pile, so what I'm having



a hard time doing is trying to understand why these lakes have not been included in the habitat accounting?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Dave, if this applies directly to the habitat accounting no net loss, I suggest that the information is provided to DFO as we've discussed previously under that information.

**MR. DAVE LEVY (Fisheries and Oceans):** I think it extends beyond that, Robin, because in effect, there's some inaccuracies in the EA report.

**MS. AMY LANGHORNE (Golder Associates):** The table you are referring to in the impact assessment where we identify the habitat accounting strictly related to construction of the water intake and in the mine water discharge or outflow points.

The inland lake habitat in the environmental assessment at the time we wrote it, prior to the discussions we had regarding the inland lakes, was based on then ecological endpoints, so the contributions of those small lakes, the fact that they were non-fish bearing to our determination, and so they are not included in that accounting. That accounting strictly related to the instream structures in Snap Lake.

**MR. DAVE LEVY (Fisheries and Oceans):** I think to be fair that those areas are fish habitats and they do need to be included in some kind of accounting. Maybe it's not there now, but perhaps it could be done in the future.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think that was a comment.

**MR. DAVE LEVY (Fisheries and Oceans):** That was the other Dave.

**MR. DON MACDONALD (DIAND):** Yes, I have a concern about TDS and what we understand is that the activities that are going to be undertaken as part of this project will result in the releases of major ions. And as a result of that, the ionic strength of Snap Lake is likely to increase, and we've had some clear estimates that are in the EA describing what those changes are likely to be.

We've heard this morning about the assessment of the potential effects of chloride on various receptors in the aquatic ecosystem. The part that's still missing for me is an assessment of how changes in the ionic strength of the lake water could potentially effect the community through non-toxicity based types of effect.

So what I'm specifically getting at here, for example, if you change nitrogen to phosphorous ratios in lakes such that there is an abundance of phosphorous, you tend to get an accumulation of blue green algae. If there is an addition of silica to certain lakes that are silica deficient previously, you are going to see a transition towards diatoms in many cases.

And what I was expecting to see is some assessment that indicates what the potential for a change in the community, either of the zoo plankton community or the benthic community or the alveo community might be as a result of these changes in the really rather large changes in the concentration of the total dissolved solids and associated changes in the abundance of various ions.

**MS. AMY LANGHORNE (Golder Associates):** I will check into that in the EA right now, but I am pretty sure that we discussed potential for a shift in community structure in relation to TDS in the EA.

**MR. DON MACDONALD (DIAND):** Great, I would be pleased if you could get back to me on that.

**MR. MIKE BELL:** Okay. I would like... oh, one more. Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I'm just going to follow up on Don's, and I have a question about that same thing. I concur with Don's comment wholeheartedly, and I guess just to put it in a layman's terms, it seems to me that that's a pretty profound change that's going to happen to Snap Lake, predicting five times the level of dissolved solids, and community structure is going to change. To me, that's not just a... that's a profound change in that lake structure, and I guess I would want somebody to comment on how they assess that as a consequence.

**MR. ROBIN JOHNSTONE (De Beers Canada):** By the looks of things, this is going to take us a minute or two, so we can go on to another question while...

**MR. STEVE WILBUR (Dogrib Treaty 11):** I have another specific question about chloride. I noticed that you predicted the maximum of 100... I think it said 137 milligrams per litre, and that the BC benchmark was 150, and as a result of that, you are able to conclude... I think it's no impact or whatever the statement was. I guess I'm unclear that, recognizing that the benchmarks that BC developed and the one that Quebec and the USEPA developed. How good is your prediction of chloride, number one, and number two, do we feel comfortable making this statement that we aren't going to have an impact when we are that close to these benchmarks?

**MR. MARK DIGEL (Golder Associates):** In terms of major iron concentrations and chloride concentrations in particular, the work done to predict the concentrations in the impact assessment was based in part on results during advanced exploration, when the level of grouting and activities that would affect elevate chloride levels was significantly or substantially higher than expected during full mine development. And so I know Ken's opinion was that the results for TDS were conservative with respect to TDS and chloride, and he was quite comfortable with the levels that were predicted, and that they would, if anything, be higher than you would see during actual operations.

**MR. STEVE WILBUR (Dogrib Treaty 11):** So if I could put a level of confidence around that number, what would it be? Plus or minus what percent over the 137? I guess that's what I'm getting at. How good is that number?

**MR. MARK DIGEL (Golder Associates):** I could not provide a numerical percentage one way or the other, plus or minus, and I'm not sure that Ken would, but Ken would certainly be the person who would have to answer that question.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I can appreciate that Ken's not here, it's just that it's a basic concept, and maybe we could get a response to that when Ken... if you could ask Ken to respond to that.

**MR. MARK DIGEL (Golder Associates):** One thing that Kevin Himbeault pointed out to me is there was an additional level of conservative used in terms of chloride, for a number... for a majority of the compounds, we used the expected value. For chloride, one standard deviation above the expected chloride level was used, so without being able to provide a plus or minus, I would say that's an indication that we are being one standard deviation based on the variability conservative above what was the expected value.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I don't want to belabour the statistical nature of it, but it does come down to statistics at some point...

**UNKNOWN SPEAKER:** If I could just interrupt, I feel like I could shed some light on this. Since Don and I prepared the BC guideline, the guideline has a safety factor of 5 built in, so if you are pushing the guideline, it's not going to have environmental effects.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Okay, you have established the guideline with a safety factor of five principally because you don't know. That's why you have a safety factor. In engineering we have safety factors. We all go with safety factors, and so you feel comfortable with a safety factor of 5 and you didn't assign it a safety factor of 10, maybe 2, but the principal is that you've established a guideline and that's the one we're using. It's not, you know, the safety factor is there because we just don't know everything.

**UNKNOWN SPEAKER:** Right, and if the value is below the guidelines, we don't worry that much about it.

**MR. STEVE WILBUR (Dogrib Treaty 11):** The point is though that the number that they presented it, we don't know the accuracy of the number, and it's very close to the guideline, and I just want to be sure that it wasn't 137 plus or minus 50 milligrams per litre and it would take it over the guideline. That's all I'm saying.

**UNKNOWN SPEAKER:** I hear you.

**UNKNOWN SPEAKER 2:** Steve, you made a really good point, and one thing that I want to point out is that Ken Raven was not able to join us here. One of the

points that he has tried to make strongly is that he feels that the levels of chloride that were used in the assessment may be ...(inaudible)... based on his review of the data from the north lake studies.

And so what I'm anticipating is that there is going to be some further discussion about input concentrations of chloride into the lake and based on some resolution that Ken comes through with the De Beers folks, and then at that time, it would be very appropriate to then run through this analysis again and see where we are relative to the guidelines or what have you.

**MR. MIKE BELL:** Can I ask if we can proceed and summarize? Are we done... there's another one. Okay, go ahead.

**MR. DAVE BALINT (Fisheries and Oceans):** On page 9357 of the environmental assessment report, there is discussion of TDS levels rising to a whole lake maximum of 330 milligrams per litre. And then it is also stated that this will occur in 10 to 20 percent of the lake. Could you please clarify if this is a whole lake or where those areas are affected at that level?

**MR. MARK DIGEL (Golder Associates):** Without... prior to commenting on something that specific, I would like to actually have an opportunity to read the section, so I can't comment off the cuff on that particular statement.

These are results pulled forward from the water quality section. I would want to take these and look at them in the context of what was specifically... what our results were for TDS and at that point, I would be able to respond, but that's not something I'm able to do today.

**MR. DAVE BALINT (Fisheries and Oceans):** I acknowledge that you may have some time to read that, and I don't have a problem with that. I have a number of other questions relating to this type of impact, so I would discuss some of these issues, perhaps bring them forward right now to get a few things so you can see where I'm going with this.

So it is crucial to our understanding and to the ...(inaudible)... effects on lake trout, how much of this habitat will be affected throughout the lake. The reason I bring that forward is because it's a whole lake concentration of TDS rises to 330 milligrams per litre, I would state that that will have significant impacts on the lake trout population.

The preferred range for lake trout is 50 milligrams per litre, as documented by several studies done by the Imperial Ministry of Natural Resources, so I would be suggesting here that there could be significant impacts, so it is vital to our assessment to delineate the amount of lake habitat that would be affected.

Also, in regard to getting an assessment of the area of impact, from the effluent studies that have been proposed or projected, and the way the effluent ...(inaudible)..., it is anticipated that the TDS will settle at an area greater than 8

metres at least for a portion of the year. We do not see this plume going to the north lake, or the north arm of the lake, so I would ask that you would make a distinction of whether your model predictions on the whole lake basis includes the north arm of the lake or whether these effects will be concentrated in the main body of Snap Lake.

I am going to keep going. On the next page there is mention of TDS levels, 9-3-58, there is much discussion here about TDS levels and rising and discussion on the effects on fish. Members of mostly cool water species and perhaps warm water species were listed. I have a question as to whether consideration was made specifically to the effects of TDS on lake trout.

**MR. RICK SCHRYER (Golder Associates):** I am going to address the question that Dave had concerning the potential toxic effects of TDS on lake trout. What was published in Ontario was a preferred range for that species. As far as I know there is no published data on the upper limits on the actual effects of TDS on lake trout at upper levels, at least I have never seen any. What I do know from experience is that the salmonides as a group are very tolerant of saline conditions because a number of them are capable of going in and out of salt water, which is termed anadromous.

In Saskatchewan where I am from, various species including lake trout are introduced into Saskatchewan lakes all the time and the TDS levels are much higher than what we would see here. They are in the upper range of -- say some of the normal ones would be more in the 800 to 1,000 range TDS. I have seen them put rainbow trout in Redbury Lake at 15,000 TDS and they survived and were able to grow. So as a group, the salmonides are quite tolerant of saline conditions.

**MR. DAVE LENT (Fisheries and Oceans):** I recognize also that salmonides as a group are tolerant of saline conditions. I think we need to remember we are looking at lake trout, which is a fresh water species and lake trout are the most sensitive to changes in saline or TDS and therefore they need to be looked at on a separate basis.

**MR. RICK SCHRYER (Golder Associates):** Do you have a specific reference for that that I could review for the salinity ranges or tolerance of lake trout?

**MR. DAVE LENT (Fisheries and Oceans):** A specific reference was lake trout stocking and inland lands, an annotated bibliography and literature review by the Ontario Ministry of Natural Resources. This publication was put out by S.J. Kerr and Lasenby. Another reference would be, as I alluded to previously, would be David Evans working in conjunction with Trent University and the Ontario Ministry of Natural Resources.

**MR. RICK SCHRYER (Golder Associates):** Thank you. If I could get the complete references from you a little bit later on, I'd appreciate that.

**MR. MIKE BELL:** Is that it?

**MR. DAVE LENT (Fisheries and Oceans):** Those are my questions for the present time. Thank you.

**MR. MIKE BELL:** Tim.

**MR. TIM BYERS (Yellowknife Dene):** Feeding off of the questions from David, I would like to know, when you mention salmonides being able to withstand huge increases in TDS, is that strictly adults or is that also fry, juvenile classes?

**MR. RICK SCHRYER (Golder Associates):** That applies to all life stages. As a group, the physiology of the fish is what can tolerate changes in salinity, so that goes from egg all the way to adult.

**MR. MIKE BELL:** Okay. We have a number of things to cover this afternoon and I am trying to solve a crunch, because we have another presentation. We have questions flowing from the presentation and then we have cumulative impacts if I am not mistaken, later on this afternoon. So I would like to try and move through this a little bit. My question at this point is, do you need a summary on baseline data? Opinions have been expressed over the course of the matter, are you clear where people stand in relationship to the issues that have been raised by baseline data? Would it be helpful to quickly go around the room with this issue and the other ones and find out what people think in terms of who initially raised the concerns as a summary? Is that going to be useful, or should we go on?

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** In regard to your question it would be valuable for me to get that summary.

**MR. TIM BYERS (Yellowknives Dene):** I am not sure how this relates exactly to what you are asking, but one thing that I am comfortable with is that one of the fellows with Golder who cannot be here today, Ken Devos, a certain number of the questions could only apparently be answered by him. Now, some of these questions the answers are pretty important to us. I am wondering if it is possible - I know myself I am going to be at these sessions to the very end, to the last day of next week. I am wondering, with the wonderful 21<sup>st</sup> Century technology we have, I don't know if Ken is back at your office or not, but if it is possible to relay some of these questions that you folks can't answer right now without his assistance, send those questions to him, and if he could then be able to send back an answer to you folks and then you could later on, sometime down the road in these sessions present either a verbal or a written response from him would be I think really beneficial for me, anyways.

**MR. ROBIN JOHNSTONE (De Beers Canada):** We would be happy to provide a verbal answer, recognizing that if we get really detailed questions back again, Tim, we don't have to go through the process again. Technology is great but there are limitations. As long as we all recognize that we are happy to go with it.

**MR. MIKE BELL:** Let's go around the room in terms of comments people want to make as a summary. I just want a summary if I can in terms of issues that you feel are outstanding.

**MR. DON MACDONALD (DIAND):** We raised a number of issues this morning. Relative to baseline, we feel that generally the water quality and sediment chemistry baseline are adequate to support the EA. We will have an issue related to the collection of additional data in the aquatic effects monitoring program if we go that far in this process. We still have an outstanding issue related to TDS and chloride that I have heard a commitment to try and get that resolved. In terms of changes in nutrient supply, I think we worked as a group last night and we put forward a series of recommendations. If those recommendations are acted upon, then we will be able to address that issue.

Finally, on the issue of bioaccumulation, additional information will be coming and then we will be able to evaluate whether or not that is still an outstanding issue or not.

**MR. MIKE BELL:** Next.

**MR. DAVE LENT (Fisheries and Oceans):** I expressed some concerns this morning on adequacy of baseline for invertebrates samples. I heard a commitment from DeBeers to review that information and provide it. If that information is not available then we have a concern regarding how predictions with the environmental assessment can be put forward. Then there are still issues there with the TDS and effects on lake trout.

**MR. DAVE LEVY (Fisheries and Oceans):** Just to summarize, we feel that there are some problems with the actual baseline data assessment for the IL lakes, under the footprint and adjacent to the footprint in terms of describing fish utilization and fish habitat. We feel that the value of this habitat has not been properly accounted in the habitat accounting, and also the streams in the project footprint also need to be adequately surveyed and accounted for.

**MR. MIKE BELL:** Okay, on this side. Does DeBeers have any issues?

**MR. DAVE OSMOND (Gartner Lee):** I raised a question regarding the S-27 system and I believe that I indicated that my concern had been addressed. I also raised an issue regarding the Northeast Lake impacts. From the point of view of lake trout spawning and rearing habitat, and that concern has been addressed to my satisfaction.

I still, although I didn't raise it we did raise it as an IR regarding TDS levels and effects on communities. I would still like to hear some feedback on that.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I can't add any more to what everyone else is saying.

**MR. TIM BYERS (Yellowknives Dene):** Some of the things that I am interested in getting answers for are the concern over DeBeers response to a DFO question on bioaccumulation. Also, concerns still outstanding on adequacy of baseline data as it applies to cadmium in the sediments in Snap Lake. Also, some outstanding questions yet on some previous fish work that was done that we are not quite sure where that data is. Thank you.

**MR. MIKE BELL:** Bob, did you have a question?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Tim, my concentration may be faulted, but can you clarify your concern about baseline of cadmium and sediment? I hadn't heard that one before.

**MR. TIM BYERS (Yellowknives Dene):** Yes, certainly. Unfortunately that is my mistake. For some reason I wasn't here earlier in the morning and somehow I thought the lake sediments issues were going to be discussed later than they were. My apologies. I had one question that I had wanted to bring up. If I may bring it up now, or should I wait until later. Go ahead? Okay.

Cadmium levels in Snap Lake sediments were double the levels in Reference Lake. These cadmium levels were above CCME interim sediment quality guidelines. This may not be a problem because several of the 25 sites, other lake locations in 1993 and 1994 also had high cadmium levels at or above these guidelines.

What I am wanting to figure out in my own mind is that the sample sites that were used for sediment quality in Snap Lake it seems to me were located beside areas of bulk sampling activities and beside access roads. I am wondering if these baseline sediment samples could have in any way been affected by dust generation and deposition onto those sites, if it is at all possible. And if it is possible, then that kind of puts into doubt in my mind the adequacy of what we are calling baseline.

Sorry, I should mention that the sites were SH-1 and SH-2.

**MR. MARK DIGEL (Golder Associates):** We are confident that the level of activity that had gone on prior to collection of those samples would not have affected the chemistry of the sediment and that the samples that we collected as part of the baseline program do reflect baseline sediment quality and the variability in baseline sediment quality in Snap Lake. Variability in sediment quality both within and between lakes is a common phenomenon. Concentrations above sediment quality guidelines in lakes is also common.

**MR. TIM BYERS (Yellowknives Dene):** I believe that answers my question. I wasn't putting in dispute whether being at or above those guidelines was not possible, I was just questioning whether in fact the mine activity could have affected those samples in any way and it sounds like from what you are saying I could probably put my mind at rest.

November 28, 2002



**MR. MIKE BELL:** Rachel, summary of concerns.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I was just thinking that yesterday when I went to my office to check on the email to see if I was given copies of day-to-day presentation materials there was nothing, and I was thinking, did we decide that we were going to get this information everyday or not? I see you lifting your CD so are we going to get some information on plastic then? Okay.

Mr. Schryer, you mentioned that in Saskatchewan they put fish in water that has some saline in it. You mentioned this information, if there was a study done could I get a copy of that study? I was thinking when you mentioned that, I wondered what the fish in that kind of environment, I wonder what the fish taste like. And other information regarding the health of the fish, I would like to have that information. Thank you.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Rick will provide you with that information, Rachel. I am not sure if he can provide you on the taste of it -- no.

**MR. MIKE BELL:** Rachel, did you get your answer?

**MR. STEVE WILBUR (Dogrib Treaty 11):** I don't believe she got an answer to, will she be provided with any of the presentation materials?

**MR. MIKE BELL:** The first question, yes. Sorry about that.

**UNIDENTIFIED SPEAKER:** I have a copy of the information on the presentation material. DeBeers provided me with a copy of the first three days of the presentations. Depending on the size of it I will email it out to everybody. If it is too large to do that what I will do is post it on the web site. Is that satisfactory?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I was told by my computer expert that my computer was dead or dying -- I need paper copies. Thank you.

**UNIDENTIFIED SPEAKER:** I will see to faxing you a copy, Rachel.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I might suggest that not everybody is going to have access to their electronic versions until after they leave. If there is anything in these presentations that could add substance, further value while we are here, it might be nice if they were actually handed out. I don't know if that is too much paper or what, but maybe consider that.

**MR. MIKE BELL:** He will consider it. Moving along to the summaries. Bob.

**MR. BOB SCHELASTIN (NSMA):** I have raised some concerns on baseline data. I still have an issue on further baseline data collection as part of a monitoring program. A second concern was on selenium. Certainly there has

been some clarification on some of the re-analysis. Still some outstanding questions on the backfill, that still remains an issue.

**MR. MIKE BELL:** Janet.

**MS. JANET HUTCHINSON (NSMA):** Still some outstanding concerns about how the lack of use of TK and community consultation affects the reliability of the baseline data, and also if DeBeers does plan to do some further sampling and study as suggested by DFO, there would be an outstanding concern about community consultation prior to that sampling occurring.

**MR. MIKE BELL:** Okay. Let me tell you what the drill is going to be. Thank you very, very much for the summaries. We are going to have a 15-minute break. Then we are going to have a presentation by DeBeers. Then we are going to have questions flowing out of those presentations. We are also going to try and deal with communities impacts this afternoon.

I have now learned not to try and rush people along, but I think you realize that if I don't rush you along somewhat, some subjects may well fall off the table and they may well require some re-examination of the total agenda. We are willing to do that, or my man here is willing to do that. Basically, that is the issue. So I will try and keep it moving along. We will come back at ten to the hour. A 15-minute break. Thank you.

-- Break

**MR. JOHN MCCONNELL (De Beers Canada):** We really don't have a lot of sympathy for seagulls, so we are going to ask Brent to drag this presentation out for two hours. Anyways, our next speaker is Brent Top. Brent is a surface water hydrologist. There were some questions about lake levels so we have put together this brief presentation that Brent is going to present. Over to you, Brent.

**MR. BRENT TOPP (Golder Associates):** Thank you very much, John. I want to talk today about the clarification of Snap Lake water level predictions. The concern has been raised that lake level fluctuations may impact fish and fish habitat. The particular emphasis was on low lake levels. One of the comments was that if a lake level drops, ice could freeze into spawning areas and compromise the viability of lake trout eggs.

So, the purpose of this presentation is to describe the adequacy of our baseline data and to determine the fluctuation in lake levels. The second purpose is to compare the frequency, timing, and duration of the change in predicted lake levels. This topic has been addressed in the EIA sections 9314.44. Also, 93.2.2.3 and appendix 9-4. We have also addressed this in one of the information requests, 3.10.17.

The baseline data collections for lake outflow and water levels were initiated in 1999. We collected data on a continuous basis over the open water season in

both years. Our means of data collection were with special transducers and data loggers, so the data was already recorded. I believe that the sensors were probably scanned on an hourly basis and averages would have been daily from that data.

Once we had the daily record for the outflow over a two-year period, we used statistical methods, regression analysis, to tie in our short-term record with a nearby water surveying Canada monitoring station with a 22-year record. Based on the strong statistical relationship that was observed in that data, we were able to expend Snap Lake outflow data over a period of 22 years.

A few things about the flow from that data was that as we knew, peak flow and water level were from snow melt in June. There is a small amount of outflow from Snap Lake during the winter and the range in lake level is approximately 50 centimeters from lowest to highest within a year.

The way that we generated a long-term record for lake elevation or lake levels was that the outflow rates and lake levels are very closely related. As the lake increases, the outflow increases and vice versa. It is a very tight relationship, as you would expect.

Based on the long-term flow record that we had from Snap Lake, we were able to apply that close relationship between the two and generate a long-term record of water elevations for Snap Lake as well. So at the end of the day we had a 22-year record of water elevations in Snap Lake as well.

Once we had this long-term record, we wanted to evaluate the effects of the project on the hydrograph and water elevations. So we evaluated the net change in inflow to the lake and found that there is, on an annual basis and even within months, there is slightly more flow going in than was lost. So the result was we have a slight increase in water levels in Snap Lake.

The two factors that contribute to an increase in flow to the lake are mine water and site runoff collection. Mine water is by far the greater of the two, probably ranges between 90 and 95 percent. Things that take away flow from the lake are groundwater recharge from the underground workings and water that is intercepted on site. So at the mine site itself, we intercept some water that would normally flow into the lake and that is included with the treated mine water releases.

So our assessment used actual measured short-term data that was collected on site. As I mentioned we had two years data that we used to extend the flow record. The project related inflows and losses were evaluated over three separate periods. These are representative of the overall mining period. So during the first year, the first year of operations the lake level increase is 4.2 centimeters. In year 6 it is 5.3 centimeters and over the operating period 17 to 22, it is 3.3 centimeters. So these are very small increases in water level.

On a monthly basis, the highest level is between 18 and 14 centimeters, and this occurs in late winter, April. The smallest change then occurs during the high flow period, during the prochet in June. Flows are already very high and the influence of the project is negligible. This figure shows the change in water levels by month, and again it reiterates that April is the month when the highest level of increase is seen. This is the change from natural baseline levels.

What this says is it just doesn't get as low as it used to in winter because of the project-related increases, but in January the project related flows are indistinguishable from natural levels. That is fairly consistent over the open water period.

So the results of our evaluation indicate that the increase in water levels will be very small at Snap Lake. The increase is well within the natural range of flow, which I mentioned initially was 50 centimeters. I don't believe that the increase is likely to have a negative effect on fish spawning habitat or recruitment. The intention is, and we have been doing this, are doing this now, are monitoring Snap Lake water elevations. We are doing it all season now, not just summer so we have pressure transducers under the ice right now and they are measuring the flow. That is it.

**MR. RICK SCHRYER (Golder Associates):** I will be giving two talks this afternoon. The first one deals with the potential for the predicted flow and the increase in **inaudible** levels to produce a shift in the community structure of zoo plankton and phyto plankton in Snap Lake.

This was covered in the EA in section 9.4 and there were no information requests directly related to this topic. Mark Guy yesterday gave a talk on how **inaudible** concentrations would increase in Snap Lake due to phosphorus inputs. Before I start I just wanted to explain a little bit here what we mean by the different levels of what we have for classifications of lakes. Lakes basically come in three categories of productivity. Lakes with low productivity are called oligotrophic. Lakes of moderate or medium productivity are called mezotrophic and those with high productivity are called utrophic.

Based on the chlorophyll A levels presently in Snap Lake it would be designated as a lake that is at the upper oligotrophic level. We are predicting that the inputs of chlorophyll A, the trophic status will change to the lower mezotrophic range.

Just some background here before we get into it a little bit more. **Inaudible** established four phyto plankton assemblages, or community assemblages, for unpolluted arctic and subarctic lakes. The main message to get from this is that in all four categories, the golden algae are what dominate the phyto plankton community. You can have some secondary dominant groups such as the **diatom** small **flagellates** or dynophytes, but it is the golden algae that dominate in oligotrophic lakes.

So what do we have as a phyto plankton community right now in Snap Lake? Well, we have a high density and a minor enviromass of -- I am not going to bore you with the scientific names, I will just say blue green algae. High density and high biomass of **diatoms**. A moderate density and low biomass of green algae. A low density and low biomass of the small flagellates and a low density and low biomass of the golden algae.

Based on this, the Snap Lake phyto plankton community displays characteristics of both aligatropic and mesatropic lakes.

For the zoo plankton community in Snap Lake, what we have is the highest density in biomass is produced by the **calonite copepods**, the second most abundant species are the **psychoboyd copepods** and the density of **plugostarons** is at a much lower level than either of these first two groups. This is characteristic of a mesatropic lake and I will get into that in a minute.

What happens when a lake goes from being aligatropic to mesatropic? Well first of all, I mentioned that phyto plankton and zoo plankton communities differ a lot between lakes, so all you can do is sort of look at large scale trends in the data. The following changes are known to occur and this is based on a wide variety of literature, primarily on literature that was developed in arctic waters. You have a decline in the golden algae and the diatoms. These are steadily replaced with green algae and an increasing presence of blue green algae. **Psychochoboyd and calonite copepods** increase in dominance as conditions approach mesatropic. So in conclusion, Snap Lake may shift from an upper aligatropic to lower mesatropic status based on the algo concentrations.

However, the increased productivity caused by the nutrient inputs will not cause a shift in zoo plankton and community structure, since the community is already typical of the mesatropic lakes. So we are going to have a community that is basically already mesatropic. So the input of nutrients aren't going to change them from aligatropic to mesatropic, they are already there. The community is already at that level.

The second topic I wanted to discuss was dissolved oxygen levels in Snap Lake. Again, as Mark illustrated yesterday there is a potential under a worst case scenario to have a reduction in dissolved oxygen levels of one to two milligrams per litre in the deeper holes of Snap Lake and I just wanted to talk a bit about what those potential impacts might be to fish and fish habitat.

This was covered in the environmental assessment report in section 9.4 and also in two of the responses to information requests.

As Mark mentioned, dissolved oxygen levels in Snap Lake would remain high near surface and decline with depths, as he showed you that profile that was a bit of a curve. This would be a gradual decline in oxygen levels in the lake over the winter period. I should say that this is something that is common to lakes over

the winter period that you have this decline of oxygen levels due to consumption of the oxygen by metabolic processes.

The worst case scenario for the reduction of dissolved oxygen would be that we would see a decrease down to the level of 3 milligrams per litre. The CCMA guideline for freshwater fish is 5.5. This decrease would occur in the deepest holes of Snap Lake and would be limited to late winter. Consequently, based on the criteria that we established in the environmental assessment report, this impact would be classified as low since the exposure to reduced dissolved oxygen would occur over a limited area and over a limited amount of time.

That concludes the presentations.

**MR. MIKE BELL:** We would like to talk about areas of concern. Start with Bob, areas of concern, and then Don.

**MR. BOB SCHELAST (NSMA):** An area of concern regarding again the increase in algae and changes in the phyto plankton and zoo plankton community through chain effect.

**MR. MIKE BELL:** Don.

**MR. DON MACDONALD (DIAND):** My outstanding concerns actually relate to cumulative effects assessment right now.

**MR. MIKE BELL:** Other concerns? Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I have a few questions regarding the water level presentation, just for clarification, and then I have one question relating to the mesatropic aligatropic classification.

**MR. DAVE OSMOND (MVEIRB):** I have a question regarding drinking water quality with increased blue-greens.

**MR. NEIL HUTCHINSON (MVEIRB):** I had a question regarding the dissolved oxygen predictions.

**MR. MIKE BELL:** Any more? Tim.

**MR. TIM BYERS (Yellowknives Dene):** I have also got a question with a shift in phyto plankton community structure as it applies to blue-green algae.

**MR. DAVE LEVY (Fisheries and Oceans):** I have a question related to zoo plankton and phyto plankton community structure.

**MS. JULIE DAHL (Fisheries and Oceans):** I just had a couple of questions regarding the trophic status and some of the zoo plankton biomass values.

**MR. MARK LANGE (Fisheries and Oceans):** I just had a question on the oxygen concentration in the lake.

**MR. MIKE BELL:** Because of my vast knowledge in this particular area, if you see an issue that somebody else is talking about that is also your issue, would you jump in so we can solve them at the same time, if it is very close? Almost the same question or clarification. We will do it that way so we can move through this very quickly. Bob.

**MR. BOB SCHELAST (NSMA):** I guess my concern, and I don't think it was entirely addressed in Rick's presentation and links back to our discussions yesterday is on phosphorus inputs, and with that increase in phosphorus loading to Snap Lake we are going to see a change in the nitrogen phosphorus ratio of the lake, and with that there is the potential for a shift in the phyto plankton community to more of a blue-green algae dominance.

Within the blue-greens there again is the potential for toxicity. There are some toxic blue-greens that could develop. Your presentation and again, focusing on the trophic level, at least from my perspective, wasn't the issue here. Again, it is more so a nitrogen phosphorus ratios. Again, with the increase in phyto plankton, effects we may see on zoo plankton community, it may put a species at advantage. We may see a shift in the zoo plankton community because of a change in food supply which again may link back to fish, young of the year trout or other species found in the lake may preferentially feed on one species of zoo plankton at a certain life stage. Again, there potentially may be shifts there.

So my question to start it and which may help answer some of the others is on the current nitrogen phosphorus ratio within the lake. I don't know if you have presented some of the data, if you have any information on those ratios handy, just what the ratios are and what ratios you predict under the phosphorus modeling that you did do, recognizing that there still are some outstanding questions on the phosphorus modeling.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Mark has just indicated to me the need to do some quick calculations, so perhaps we can move onto a non-phosphorus related question while he does that.

**MR. MIKE BELL:** Okay. How long are you going to be able to stay? Can we take a cumulative effects question right now out of order, or is that going to complicate life? Okay. Go ahead.

**UNIDENTIFIED MALE SPEAKER:** I really wanted to talk about cumulative effects assessment, but when I heard some of Bob's points it really makes me want to talk a little bit about the communities as well and how they may change relative to nutrient addition. So I would like to ask a question about that if that is okay. The question is, based on the presentation it seems like the impact hypothesis that you are putting forward are really pretty blunt. What I am hearing

you say is that currently we have an alga community that is dominated by blue-greens and diatoms. We don't think that is going to change. Currently we have a zoo plankton community that is dominated by copepods. We don't think that is going to change. There are metrics that are much more quantifiable that could be used to look at these various communities, and so what I was really expecting to see was some impact hypothesis that were a little sharper than what I heard. I am wondering, Rick, if maybe you can respond to that.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I guess I will be really -- you know, by no means are we wanting to use blunt instruments, and certainly wherever we can get down to neurosurgery that is certainly ideal, Don. For my interest, I would be curious in hearing you describe where your thoughts are going on this first? This is for my background, I guess, around going from blunt to sharp.

**MR. DON MACDONALD (DIAND):** Essentially what I am looking for is something that looks more like impact predictions that can be tested with monitoring data that is collected subsequently. Does that provide the clarification you are looking for?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Yes, that is great.

**MR. DON MACDONALD (DIAND):** Well I can't answer it, I just asked the question.

**MR. RICK SCHRYER (Golder Associates):** As I mentioned in my talk, Don, the perspective that I took at looking at these communities was very much at sort of a top level. The problem of course with phyto plankton and zoo plankton communities, as you probably already know, is that they change drastically with season, with temperature, with the characteristics of the lakes. So it is difficult to make any precise measurements or estimations on what will change exactly within a community because there are just so many factors that play into this.

What I think you can do, as I have done, is look at it very much on a community-based level as to who dominates and who doesn't dominate in the overall community structure of the phytoplankton assemblages and base our predictions on that. I think that is a viable method to go to be more precise in that type of assessment I think is difficult to do.

**MR. DON MACDONALD (DIAND):** Thank you, I appreciate that. I won't belabour this point any further. I know that I am seeing Steve write stuff down and I think he will probably pursue this a little bit further as well from the perspective of baseline data and adequacy thereof. So I am not going to say any more about that. While I still do have the microphone, I do want to talk about cumulative effects assessment. You probably were going to have a presentation on that later? No you were not. Okay, so this is the right time to do that. I just wanted to go on record as saying from an INAC perspective, we think that the



cumulative effects assessment that is currently in the EA is not as well-developed as we would like to see. Some of the challenges that we have identified in reviewing that are, one that the interactive effects. Well first of all, some of the effects of various mining activities or discharges, we are still talking about them now and I think we still haven't come to resolution on whether certain types of impacts are significant or not, or certain types of changes are significant or not. I am thinking particularly about the nutrients issue and the TDS issue. Specifically. So that is number one, we still have some outstanding issues to resolve there.

Two, is that the interactive effects of various mining activities, I don't believe have been evaluated in the EA, and so specifically what I mean by that is that we have a number of changes that we are anticipating in response to mining activities. TDS levels are going to be very much higher, and chloride levels are going to be very much higher than what they are in the lake currently. Nutrient levels are going to be higher in the lake than what they are currently. There are going to be releases of metals into the lake. Each of these things have individual effects that are being analyzed. What I'm not seeing is an evaluation of the interactive effects of these things together. And the other thing that I think is missing from the cumulative effects... oops. Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Can you just clarify what you mean, the interaction of the effects on the other, as it pertains to cumulative effects analysis?

**MR. DON MACDONALD (DIAND):** So what I mean by that is that if there are nutrient effects within a certain portion of the lake, nutrient-driven effects in the portion of the lake, those may be in some ways mitigated or we may see by various other types of effects... I should have done this in reverse order. If, for example, there is a change in the community as a result, in the zoo plankton community as a result of releases of total dissolved solids. What we may see is an interactive effect then with a stimulation in production due to the nutrient effects. Also, there is a third effect. We've talked about the effect of releases of metals in at least one percent of the lake right now. I would have liked to have seen it tied together and say okay, what on a whole lake basis, what are the interactive effects of these various types of stressors on the ecosystem? Is that clear what I am talking about now?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Yeah, I think we know where you are going, Don. I think I know where you are going. Thank you.

**MR. DON MACDONALD (DIAND):** Very good. And just to complete that thought, I was also looking for... Dave, quit laughing. I was also looking for some broader assessment of the cumulative effects of regional and broader activities, you know, from a regional perspective, exploration activities within the lockhart basin but that are not on De Beers property, for example. On a broader basis, looking at, for example, the interactive effects of deposition of organic chlorines or metal from southern areas in Canada that as a result, or in Canada and US

and Mexico, that as a result of various state processes, are likely to end up in Snap Lake and other portions of the lockhart basin. I'm looking for some kind of narrative that emphasizes an understanding of those potential interactive effects, and either indicates that we can't evaluate them right now, but we can maybe in our monitoring program, but we... I was looking for something that was a bit clearer on those overall cumulative effects.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think our clarity is in proportion to the issue expressed, Don, so...you've expressed a lot there. I think that there are a couple of things I will touch on. I think with cumulative effects, you know, following the good old practitioners guide, the focus is inevitably on the effects of where there is an overlap in geographic scope. The focus is inevitably on other projects which may have a measurable effect, okay? Now, the quandary is what is measurable? How do we collect that information and what already exists, recognizing that it's beyond our purvey to go and do an impact assessment on an exploration program or a tourism camp or whatever, on a regional basis. So the focus and the cumulative effects section has been on projects for which there is some measurable effect. Now, you know what the reality of that is. It means that we have to focus on projects for which there has been some environmental assessment or screening.

So that's the bigger picture in terms of regional. You touched on organic chlorines and obviously the long range deposition, transport and deposition of assistant organic pollutants as of certainly a great concern for Northerners, and I fully understand that. In terms of cumulative effects, the question becomes what contribution, what additive effect, what contribution would we be then making to effects that may result from deposition of organic chlorine.

And on a straightforward level, you know, we're not contributing to the deposition of organic chlorines, so we see that as certainly was discussed in an IR, although I can't remember the number of it, but it's rattling around in there somewhere, that it was essentially, it's been discussed, and you know, I think it is well beyond the validity of a proponent to really expand the state of the art of cumulative effects assessment to that level. I haven't addressed all of your comments, but those are a couple. If there are other issues you would like clarification on, remind me what they are again.

**MR. DON MACDONALD (DIAND):** You didn't really address the issue of the interactive effects of multiple stressors from the mine development itself.

**MR. ROBIN JOHNSTONE (De Beers Canada):** That's a difficult question, and I don't know the answer to that, Don. I think that our approach the whole way through the environmental assessment has been that wherever there is a pathway or linkage, especially where it's measurable, then we'll look at those. I think that whole effluent toxicity is one. I think that following the phosphorous to communities is one. I think the TDS basically follows through on that level as well. So I think that in terms of the impact assessment as it goes to cumulative

effects, I think we've done the best job that we can, giving available information and the state of the science. But I think that... I think I will leave it at that.

**MR. DON MACDONALD (DIAND):** Thanks, Robin, I really do appreciate those comments. It still is an issue for us.

**MR. MIKE BELL:** Good.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Can I just follow up on 'Don's comment there just briefly? And Robin's comment on the use of the practitioner's guide, I have a practitioner's guide right here, and I would like to read a bullet, that it says, I think it's pertinent to what Don is saying. It says the incremental additive effects of the proposed action on the BECs are assessed. If the nature of the effects' interaction is more complex, i.e., synergistic, then the effect is assessed on that basis. But why that is not reasonable or possible is explained.

I think what Don is essentially getting at is that component of the additive or the synergistic effects hasn't been addressed or explained, and that's what we're looking for.

**MR. MIKE BELL:** Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** I've looked at the terms of reference, and the terms of reference are very clear in that De Beers is to look, and I'll read it: The purposes of this development, the environmental assessment should include an evaluation of the cumulative effects that are likely to result from the proposed development in combination with other development and developments within the regulatory process on the day these terms of reference are issued.

So within the scope of developments that could be included in terms of the interaction of effects, the scope is bound by the review board by those developments within the regulatory process, and where there's likely going to be an interaction.

So the level of certainty is established by the board and it's also scoped out for other projects or other developments. It's bound to that scope as well. Now, within the project, interactions within the project, it has not bound that precisely, but it's certainly bound the cumulative effects assessment in terms of other projects or other developments to consider.

**MR. ROBIN JOHNSTONE (De Beers Canada):** And that's certainly the approach to the... you know, the issue of project overlap and hence the discussion of the lockhart watershed versus diamond projects being... other diamond projects being in different watersheds.

**MR. MIKE BELL:** Okay, Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I guess I'm unclear as to what Louie is saying. Could you clarify that? Are you saying that the... that interactive effects, if they are not likely, then you are not going to consider them, or have to assess them, or only if they are likely, or if you are saying that doesn't matter... I was confused by your answer.

**MR. LOUIE AZZOLINI (MVEIRB):** The key question is likely, and basically the board is saying if there are likely going to be some cumulative effects resulting from other developments, and those developments are defined by the board, then they should be considering it.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Okay, so we are only talking about additive effects from other developments, not interactive, which seems to be at the core of what the practitioner's guide is pointing at. We need to look at interactive components.

**MR. LOUIE AZZOLINI (MVEIRB):** There were a number of questions on the table with respect to cumulative effects -- long-range transport and so on. Now, I want to be able to address those questions, I guess, in a fairly linear way, and try to say okay, with respect to developments or projects, what is included in the scope, and the terms of reference outline that. So I just want to put a boundary on what's included in the cumulative effects assessment when looking at other projects. Now, when you are dealing with interactive effects within the project, that's not explicitly stated by the board, so we're dealing with two separate issues, as I'm attempting to say.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I'm just going to speak here in my own opinion. If you don't assess interactive effects within the project, then you haven't addressed cumulative impacts at all.

**MR. LOUIE AZZOLINI (MVEIRB):** I'm not stating that they should not be. I am simply stating that there are two questions that were brought or put on to the general table for discussion. One addressed the overall scoping of projects to be included within the cumulative effects assessment, and the other was the interactive within the project. I am simply saying that the other developments or projects to be included are bounded or made explicit by the board, that the interactive component of it, that's just the guidelines speak to that. I'm trying to separate the broader, I'm trying to separate the interactive components within the project and the broader interactions that are likely to occur from developments with other projects.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I appreciate your comment. I just... still, I guess what direction do we have as to what we can expect De Beers to be doing and are we talking about a loophole here? I guess that's what I'm feeling, and it doesn't seem comfortable.

**MR. LOUIE AZZOLINI (MVEIRB):** For the record, basically the board, in 1999, adopted the CEA guide for cumulative effects assessment as an interim measure that it would use for guidance to proponents on cumulative effects assessment. And that hasn't...is still the case. So if you are looking for direction, there are two primary documents. One being the terms of reference, and I've spoken to those, and the other being I sent you the CEA terms of reference as adopted in 1999, I believe, and those are on the website. So those are the two primary documents that provide direction on the methodological and scoping aspects of cumulative effects assessment.

**MR. MIKE BELL:** Okay, where are we?

**MR. DON MACDONALD (DIAND):** Louie just asked the question, does that help? From my perspective, I think I know what's in the guide. I think I know what's in my head. What it doesn't help me do is reconcile that with what Robin just told me about evaluating interactive effects of the project. So maybe some clarification, further clarification from Robin relative to Steve's reading of the bullet from the practitioner's guide.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The impact assessment is De Beers' professional job of addressing the impacts of the project and cumulative effects. And I'm not sure, Don, that I can go further than that. And in part because I'm not sure that the cumulative effects practitioner's guide isn't being quoted out of context, but that aside, I stand by the cumulative effects impact assessment that we've produced.

**MR. DON MACDONALD (DIAND):** Although you were kind of hedging a little bit around the answer because it's unclear what the answer is, I think I got the answer out of what you said. And that is really the interactive effects are not part of cumulative effects assessment. The interactive effects are part of the assessment of the project per se, in that... and then once we've completed the assessment of the project per se, then we have an ability to assess the interactive effects of the project with other activities that could reasonably be expected to cause impacts.

**MR. ROBIN JOHNSTONE (De Beers Canada):** You are patently correct that De Beers' interpretation of the terms of reference is that cumulative effects assessment primarily relates to interactive effects with other developments, and that elsewhere we, so it's basically project specific, and then there is the potential for those to interact elsewhere.

**MR. MIKE BELL:** Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I just have one simple question. Have interactive effects, for example, the ones that Don posed as a community, have they been addressed in terms of impacts?

**MR. ROBIN JOHNSTONE (De Beers Canada):** It's not a simple question because I can't remember the examples that Don used.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I can't remember the exact examples he used either, but in essence what he was saying was that if you have a community, an ecosystem that has various components and you effect one and then you effect another, it's going to have an interactive effect between the two, and then he brought in a third, and I can't remember those three different ones. Maybe Don can remember better than I can, but I'm just curious. He posed the question about these interactive components, and I wanted to know if those interactive components, as an example, there are other interactive components that we could come up with, have they been specifically addressed in the EA?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I'm not sure about the example that they... just a second, before you hit the button... that the linkage analysis that we do, the linkage diagrams provides one of the prime ways by which we identify the flow-on of effects, the interactions, so that's primarily where it's occurred, and that in my opinion, the EA has done that.

**MR. DAVE BALINT (Fisheries and Oceans):** Along the same lines, and I think this is where I have been coming from as far as effects to populations within the lakes, we have mentioned dissolved oxygen levels at depth. We have also mentioned TDS levels at depth. Most of those types of interactions have been discussed on an individual basis, and when these two things interact together, there could possibly be an additional effect, or synergistic effect. And I would say that the EA has not looked at all of those types of interactions.

**MR. ROBIN JOHNSTONE (De Beers Canada):** That was a statement, not a question.

**MR. MIKE BELL:** Okay. Go ahead.

**MR. NEIL HUTCHINSON (MVEIRB):** The issues rationale document prepared by Gartner Lee for input into this has also addressed concerns with the general cumulative effects methodology and linkage between project components and inclusion of other projects. I spoke with Heidi Klein, who is our cumulative effects specialist, and she has indicated to me that these are scheduled for discussion next Friday morning under the global cumulative effects section. And that includes integrating previous components, cumulative effects methodology and consideration of other developments, so I know that our analysis has raised specific concerns with the level of detail that De Beers has done, and that is going to be addressed by Heidi next Friday.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I'd like to add to that that I just wanted to let Don get his questions in, because I know that he is heading out at five, that on Monday, De Beers made the commitment that where there were questions that related to cumulative effects around a discipline, we would be

happy to answer them, but by no means does this divert next Friday's general cumulative effects discussion.

**MR. MIKE BELL:** We'd like to invite Don back next Friday if he would like to come back and see us and...

**MR. DON MACDONALD (DIAND):** Just to follow up on Robin's answer, are the experts on aquatics going to be available on Friday?

**MR. ROBIN JOHNSTONE (De Beers Canada):** No, that was the point that we made on Monday, that the individual experts would not be available, and that next Friday, a week on Friday's session would be specifically for overall cumulative effects and discipline specific topics should be dealt with on those days.

**MR. MIKE BELL:** Okay. Before we proceed to another area, I just want to make sure that Bob's question is now able to be answered.

**MR. MARK DIGEL (Golder Associates):** I've had a look at the TN to TP ratios for baseline conditions and for the project, and for the project conditions, I've chosen the conditions that were represented in the IA, which is basically the maximum concentrations which occurred during years 17 to 19, so under baseline conditions, the TN to TP ratio is approximately 25 to 1. Under project conditions, the TN to TP ratio is higher at approximately 1000 to 1. And the higher concentration is primarily due to higher concentrations of nitrate in the water column.

**MR. BOB SCHELAST (NSMA):** Thanks for that information. I guess we'll go away with this. We may have some nitrate issues now. Thanks.

**MR. MIKE BELL:** Just on this subject, Julie, go ahead.

**MS. JULIE DAHL (Fisheries and Oceans):** Just further to this discussion that was going on, I was going to make a comment earlier regarding an earlier comment that Bob made on a concern about a shift in community to blue greens and the potential for the toxic species of blue greens and that sort of thing. I guess my first thought was that hopefully, we are not looking at that level of nutrient addition. If we are talking complete shift of dominance to blue greens and toxic forms, we're talking utrophic to hyper-utrophic type systems where the blue greens really kick butt... oh, this is on the record, isn't it? Oh, well.

So I was going to say that hopefully we're not looking at that level of change, and hopefully what we're not looking at is a complete shift of dominance, but rather a more of a shift in the various contributions of the different phytoplankton species.

Now, I was going to ask a question as to whether or not, like the statements that were made sounded like they were a broad, whole lake basis. And I'm wondering what about localized effects of changes in nutrients? If on a whole lake basis,

there's not expected to be this shift in community, what about localized basis? There may be a potential for shifts. I find it hard to think that you are not going to have a shift in community, but now that I hear that the N to P ratio is going to go from 25 to 1 to 1000 to 1, now I am thinking more about a shift of blue greens. And I couldn't before think of how that could possibly happen, but now I'm a little concerned about that shift in the ratio.

**MR. RICK SCHRYER (Golder Associates):** Julie, what was the specific question then that you had?

**MS. JULIE DAHL (Fisheries and Oceans):** I don't know what my specific question was. I just wanted to raise that there is... I guess one question could be were your statements based on a whole lake assessment of changes in nutrients will not alter the... will not create a shift in phytoplankton community? Did you take into account localized effects and did you take into account the shift in N to P ratio when you made the statement regarding no shift in community?

**MR. RICK SCHRYER (Golder Associates):** With a TN to TP ratio of a thousand to one, what we would see is that the blue green algae are nitrogen fixers, so they don't care whether... the amount of nitrogen there doesn't really matter to them. They're nitrogen fixers on their own. What you will see is that phosphorous will become very limiting for other forms of algae, so because you have a thousand to one ratio. So we're not expecting to see a large shift to blue greens under that scenario.

And to answer the second part of the question, the assessment that we did was on a whole lake effect, not on any site-specific effect or localized effect. It was on whole lake.

**MR. DAVE LEVY (Fisheries and Oceans):** I'd like to follow up on the same topic. I'm one of the seagulls that John referred to at the beginning of the session, and I come from British Columbia. And we have a lot of oligotrophic lakes in B.C. with salmon in them, and we purposely add nutrients to those to get additional salmon production. And the experience that we've had in British Columbia in these lakes is that these nutrient additions change phytoplankton species community structure and also change low plankton community structure.

So when you talk about changing the TN to TP ratios from 25 to 1 to a thousand to one, I find that conclusion that there will be no change difficult to justify.

So my question is how confident are you in your conclusion that there will be no change?

**MR. RICK SCHRYER (Golder Associates):** I am confident because the scenario that you are describing is a change from an oligotrophic lake to a mezotrophic lake via nutrient addition. My argument is that Snap Lake is essentially already mezotrophic, so the change in community is... or the



community that would live under mezotrophic conditions is already there, so there isn't going to be a shift from oligotrophic to mezotrophic.

**MR. DAVE LEVY (Fisheries and Oceans):** First of all, this classification, we should recognize that it's a continuum from oligotrophic through mezotrophic to utrophic, and I believe the graph you showed of chlorophyll concentration before and after had Snap Lake in the oligotrophic category before and mezotrophic category after.

**MR. RICK SCHRYER (Golder Associates):** That was the establishment of the trophic status based solely on chlorophyll A levels, and that's how we predicted a change from the upper oligotrophic to the lower mezotrophic. What I did was take that one step further and say okay, what we're looking at is this criteria using chlorophyll A correct, and so what I did was look further beyond that and then look at the communities and then see what the communities looked like and see if they reflected the assessment based on chlorophyll A levels, and what my results showed is that I think they were actually much closer to the mezotrophy if not really at the mezotrophic line than chlorophyll A levels would indicate.

**MR. DAVE LEVY (Fisheries and Oceans):** Rick, I'm willing to bet you a one carat diamond that those communities will shift after this development.

**MR. MIKE BELL:** Excuse me, we're going around... just let me intervene in a minute. We're going around on an issue that's a difference of opinion between two groups, and I think basically what we've got to do is document that different opinion in the process outside of this, so if you want to put that in a technical paper and make requests, you make the requests and as a response at that particular point. But I think we've gone down this road just about as far as we can at this point. Can we... would you accept that as a solution at the present time?

You will probably see the issue again in a technical paper, okay? Good. I'm back to... you got the question to your answer? You got your answer to the question? Bob.

**MR. BOB SCHELAST (NSMA):** Yes, and it's still an issue.

**MR. MIKE BELL:** Okay. I have a thing here that says Steve, questions. Did you... you're happy at this point?

**MR. STEVE WILBUR (Dogrib Treaty 11):** With respect to the mezotrophic, oligotrophic...

**MR. MIKE BELL:** No, I think we've been down that one. With respect to whatever else you had that you said you might want to list. Did you have another question?

**MR. STEVE WILBUR (Dogrib Treaty 11):** Well, I had several questions that you asked at the beginning after the presentations. Is that what you are talking about?

**MR. MIKE BELL:** That's what I'm asking for.

**MR. STEVE WILBUR (Dogrib Treaty 11):** So I had questions on the oligotrophic and mezotrophic levels, and how they were viewed in terms of impact. I think the discussion that this occurred right there covers the basis of my concern. I did have a question also, several questions about lake levels. I don't know if we're ready to go into that.

**MR. MIKE BELL:** Live it up.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Okay. I guess I just want to clarify some of the numbers. You mentioned there was a 50 centimetre, this if for Brent, a 50 centimetre change, and I just want to make sure if that was based on observed measured levels, or was that based on the 20 tier trapolation water balance kind of assessment?

**MR. BRENT TOPP (Golder Associates):** That 50-centimetre difference between max and min is based on the generated data. You know, part of that is based on actual data from site, but that range is through the 22-year record data.

**MR. STEVE WILBUR (Dogrib Treaty 11):** So just to be sure, you've stated there will be a 50-centimetre change based on data. How much have you actually observed at this point?

**MR. BRENT TOPP (Golder Associates):** Well, under baseline conditions we have a range of 50 centimetres at present. Are you asking what did we see in the actual measured data outside the extrapolated data?

**MR. STEVE WILBUR (Dogrib Treaty 11):** Specifically, you've got a period of time where you measured, observed the change and you've got an amount. And then you've got this extrapolated change due to 22 years of data that you are normalizing and bringing in.

I just want to know what the actual measured amount is and how much of that 50 centimetres, in essence, is based on the extrapolations?

**MR. BRENT TOPP (Golder Associates):** I would have to check our data to see what the actual measured range is.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I have another question. You mentioned that you calculated the amount of change that you might expect based on run-offs characteristics. Is that true?

**MR. BRENT TOPP (Golder Associates):** In part, that's true. That was one of the factors that we looked at in terms of seeing how flows were increased.

**MR. STEVE WILBUR (Dogrib Treaty 11):** So did you account for the potential increase in runoff that might be due to the loss of the vegetated area due to the mine imprint?

**MR. BRENT TOPP (Golder Associates):** Yes.

**MR. STEVE WILBUR (Dogrib Treaty 11):** One final... what is the percentage area of the mine footprint of the total Snap Lake watershed? You don't have to give me exact numbers.

**MR. BRENT TOPP (Golder Associates):** I'm not sure of the percentage off-hand. I think it was around 1.5 percent.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I'm done.

**MR. MIKE BELL:** The next one I have was Dave, but Dave has just stepped out for a minute, so the next one we've got is Neil.

**MR. NEIL HUTCHINSON (MVEIRB):** This is a continuation from the questions I raised yesterday when the dissolved oxygen response of Snap Lake was discussed, and we saw that the oxygen was going to drop from down to three milligrams per litre in portions of the lake. CCME guideline is 5.5. I would like for De Beers to delineate what areas of the lake might be affected by this, how much habitat volume may be lost, and to which species, and if in fact the specific features where dissolved oxygen will drop below the guideline might represent specific habitat features to one species or another.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. De Beers does not have that information at the moment.

**MR. NEIL HUTCHINSON (MVEIRB):** Is that something that... I would like to recommend that De Beers provide that information to the assembled parties. I see Mark Lange nodding, and I think you raised oxygen questions as well. Because my fourth question was is loss of habitat of this nature a concern to DFO?

**MR. MARK LANGE (Fisheries and Oceans):** It is, and it's...sorry for the correction, it's Lange... minus the A at the end.

**MR. NEIL HUTCHINSON (MVEIRB):** So I think there's a recommendation that we'd like De Beers to provide this information.

**MR. ROBIN JOHNSTONE (De Beers Canada):** We will consider your recommendation.

**MR. MIKE BELL:** The next one I have, I took fast notes and it says Dave Osmond, drinking. I'm sure that's not what he meant to say, but it's something like that...

**MR. DAVE OSMOND (Gartner Lee):** Yeah, I have a number of concerns about the palatable drinking water supply for the mine, and one of them relates to increased and the presence of blue green algae, and if they are going to increase or not, I don't know. I can't speculate on that, but what blue green algae are often associated with taste and odour problems in water supply. And when you chlorinate that water, it just exacerbates the issue of taste and odour. And I guess I don't know what kinds of impacts you have done for that, plus we have an increase in TDS in that water supply, and I'm not sure whether or not there's been any kind of parasitic pathogenic parasite work done here as well. So I've just got a concern about the mine water supply going from a TDS level of 15 now to an ultimate concentration based on the figure 9-4-14, looks like it's going to be anywhere between 200 and... well, just a minute. 200 to 250, possibly 300 milligrams per litre TDS. I just have these concerns about the drinking water supply just about its suitability and palatability.

And I would suggest and hope that you've talked with the Stanton Regional Health Board about this and you are meeting their requirements. I don't know what their requirements are, but I just want to bring that to your attention as a concern.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada is going to be treating water by chlorination and filtration. So this was a point that was made at the pre-hearing conference, and so it was chlorination and filtration that we will be meeting the appropriate drinking water standards for the NWT, and obviously we want to maintain a healthy workforce.

**MR. DAVE OSMOND (Gartner Lee):** I was unaware that filtration was part of it. I only thought it was the chlorinated water intake. With filtration, that puts my mind, to some extent, at ease. I would predict you are going to face an odour problem. Thank you, my concern has been addressed.

**MR. MIKE BELL:** Okay. We talked about Neil's concern. Tim.

**MR. TIM BYERS (Yellowknives Dene):** Before I begin, let me thank Louie Azzolini for adding to the festive, warm atmosphere here.

-- Interjection

**MR. MIKE BELL:** Merry Christmas. Okay, the rest of us have to stay here. Tim.

**MR. TIM BYERS (Yellowknives Dene):** You are stating that you expect that the lake will change, the trophic status of the Snap Lake will change from upper oligotrophic to mezotrophic. And I'm assuming this is the whole lake trophic status and I'm kind of concerned with dramatic increases in TDS and possible

nutrient loading that you may in fact have very localized areas of eutrophication, in possibly the bay or maybe the northwest arm, I don't know. So I'm wondering if the possibilities have been looked at for localized eutrophication that may in fact create some kind of cyanobacteria balloons along shorelines, where production of toxins from I believe it's cyanobacteria, *Microcystis*, and one of the species of *Microcystis* are neuro-toxic producing, so that if you did have, God forbid, a huge balloon in a eutrophic state, that it would produce a situation of presenting toxins that could be drunk by wildlife on the shorelines or loons. And I'm just kind of thinking out loud, more or less, but I'm wondering if these types of possibilities for localized eutrophication have been looked at.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The modeling is capable of predicting localized local algal concentrations, but the effects analysis has not been, has not gone down to that level.

**MR. TIM BYERS (Yellowknives Dene):** Is that then kind of suggest that you may want to look at that in the future?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I take it that you are making a suggestion, Tim?

**MR. TIM BYERS (Yellowknives Dene):** It is a suggestion and whether you fellows have thought about that as a future monitoring decision?

**MR. ROBIN JOHNSTONE (De Beers Canada):** At this stage, we will take the recommendation and consider it, but we have not given it any further consideration at this time.

**MR. MIKE BELL:** Okay. Somebody had a question about plankton. Julie.

**MS. JULIE DAHL (Fisheries and Oceans):** I just had a quick question. Rick, you put up a slide and you talked about Snap Lake being dominated by calanoids, followed by cyclopoids, followed by kydocerins. Two questions, one, where do rotophurs fit into that and were those dominants down to whatever based on biomass or abundance?

**MR. RICK SCHRYER (Golder Associates):** So if I understand the question properly, you want to know where rotophurs fit into the picture and B, I believe you wanted to know what the... whether or not the numbers that I put up were based on density or biomass. Okay.

As far as rotophurs, no, I didn't include them in my analyses. I looked at the dominant groups, primarily because the literature that is available that discusses changes in trophic status in relation to phytoplankton and zooplankton doesn't include a lot of information on what rotophurs do in relation to nutrient addition. So there wasn't much point in including it because I really didn't know, so I just didn't go there.

The second part of your question was whether or not the data that I presented was based on density and biomass. It was based on both. I looked at both density and biomass and I found that both the density and the biomass of the calinoids and the cyclophoids was very high in comparison to the klydocerins. If you have a look at the data, you will see on both sides, that's the trend that I saw.

**MS. JULIE DAHL (Fisheries and Oceans):** Thanks. Rick, I was just wondering then, in your sampling for baseline, did you sample for rotophurs? So you do have data on rotophurs, you just didn't include them?

**MR. RICK SCHRYER (Golder Associates):** Yes, we did sample for rotophurs. But like I said, I didn't include them in my review because there wasn't any information to fall back on as far as what they do in relation to what I was trying to... the point I was trying to make.

**MS. JULIE DAHL (Fisheries and Oceans):** But you do have the data on biomass abundance for rotophurs? I'm seeing a nod back there. Okay. Thank you.

**MR. RICK SCHRYER (Golder Associates):** Yes, that's correct. We do have the data.

**MR. MIKE BELL:** Mark, oxygen.

**MR. MARK LANGE (Fisheries and Oceans):** Questions pertaining to the devolved oxygen concentrations in the lake. First, just repeating to the conclusion that I heard in the presentation, just for clarity, that oxygen concentrations are modeled to drop as low as 3 milligrams per litre, and I think we heard yesterday the range between 3 and 7 milligrams per litre, versus a baseline of 5 milligrams per litre and that the low concentration of oxygen would be limited to deep holes, or deeper areas of the lake. And that the overall impact to Snap Lake was insignificant because it was limited, it was low, sorry, it was low due to its I guess spatially limited to those deep areas. Is that correct so far?

**MR. RICK SCHRYER (Golder Associates):** Yes, I said that impact was... I rated the impact as low because of the limited spatial and temporal extent of the dissolved oxygen side.

**MR. MARK LANGE (Fisheries and Oceans):** Thank you for that clarification. I guess I was thinking about your conclusion, and thought a way of testing or convincing myself that that conclusion was robust to suggest an alternate conclusion, and I guess my question will be can you follow me through this alternate conclusion and find any data in Snap Lake that would refute or support that conclusion.

The deep holes, I'm looking at a map here, figure 95-5, it's a lake, the symmetry of the lake, the asymmetry of the lake. And I'm seeing a few deep spots, like the really deep spots. I gather this figure is in metres, metres depth? I'll just assume

then. So there's the deep spot right off the mine site to the southwest, and there's one spot that also goes down to I think around 40 metres in the north arm. So the... I guess I would argue that for lake trout, whitefish and burbitt, those two -- there may be more, but those two very deep spots would be a very important, perhaps even critical component of ... (inaudible) ... fish habitat. I would suggest if your model outputs are that about half of the time, oxygen concentrations are going to be below a level at which we would see, would below... let me see, how I could put this here... it would be at such a low level that we may expect some problems, I guess, with the fish, should they end up in that area, in terms of them dying or what not.

I guess I would suggest that since there's very little of that very deep over wintering habitat, if there are any effects to those few spots, that the level of impacts to the population of these three fish species at the lake level would be quite important, and maybe not as low as we think.

Can you suggest that that option is not likely in any way?

**MR. RICK SCHRYER (Golder Associates):** I will start by including my sort of definition of the importance of a over wintering habitat. Over wintering habitat is very important in a small lake where you have a relatively shallow depth and a single basin, because then the fish are restricted to one space and one space only. In a much large lake like Snap Lake, deep hole habitat in terms of over wintering really isn't that important because they have access to a much larger area in the rest of the lake, especially in terms, so they are not forced to spend the winter in that deep hole. They can go anywhere in the lake they wish. And especially in the wintertime, you most likely have better foraging opportunities in the shallower areas than you do in restricting yourself to a small portion of a small hole.

So I would say in relation to, specifically in relation to over wintering habitat, that that's not a very... that that's not a critical habitat for fish to survive over the winter periods.

**MR. MIKE BELL:** Mark, supplementary, or are you happy with that response?

**MR. MARK LANGE (Fisheries and Oceans):** Yeah, a few supplementary questions. I was just... I required a few seconds of thinking there. I need to upgrade that processor. Okay, I will... I think Julie may follow up on a related question here. I will accept that explanation for now.

So I guess the question I was asking was more in reference to the whole lake. Now, I'd suggest that if the oxygen concentration drops below five at all in any deep areas of the lake, I'd suggest that that's starting to smell and look like an alteration of fish habitat. Unless you can again suggest otherwise. And if that's the case, then I'd also suggest that we need to see that in some form of

accounting of losses and for the purpose of evaluation what all the impacts are on fish habitat on Snap Lake.

Should we just treat that as a comment, or... I guess I'm also looking for some input from De Beers.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada. It was a comment, so... in relation to this, the position that Rick has basically commented on is that due to the seasonal change in dissolved oxygen, that it would be a temporary phenomenon, with respect to habitat alteration, distraction, or the other d, whatever it is, I would say that again, this is basically best dealt with external to this EA process, but that we'll certainly report back the results of that information to the public record as we have stated previously.

**MR. MARK LANGE (Fisheries and Oceans):** That answer certainly satisfies me. Thank you. I think Julie had one question on DO still.

**MR. LOUIE AZZOLINI (MVEIRB):** A point of clarification. The impact assessment does deal with impacts. The no net loss policy is DFO's policy, but the board addresses impacts on the environment. If a loss of oxygen is deemed to be an impact by DFO on the environment, then the board evaluates that and ascribes to it significance or not.

We have to be very careful here about dumping or where DFO's job begins or ends. The board is concerned with understanding when changes in the environment occur and what those changes mean.

DFO's responsible for the no net loss and if those holes are or are not relevant to no net loss, that's DFO's decision to make. What the impact of those holes are on fish is a collective knowledge to bring to the table and for the board to, if it is an important issue to decide on, to decide on it.

**MR. MIKE BELL:** Julie has the floor, and then Steve.

**MS. JULIE DAHL (Fisheries and Oceans):** Hopefully a final comment here. I just wanted to follow up with Rick Schryer's earlier response when we were talking about the relative importance of deep holes in Snap Lake. I just want to see if what I heard was correct. You were suggesting that in a smaller, single basin lake that may only have one deep hole, that that deep hole is relatively more important, because all the fish are sort of crowded into that area. But I thought I heard you suggest that in the larger area where there are more areas for the fish to go, that they don't necessarily seek the deep areas because they have other places to go. And I'm just wondering, first of all, what would cause a change in basic behaviour of those fish that normally seek deep areas to change and not seek deep areas?

And the other concern is if the mean depth of Snap Lake, I believe it was reported as about six metres, tells me that maybe there aren't that many deep



holes in Snap Lake, and if it's the deep holes that tend to get preferentially impacted by low oxygen, are we not reducing the opportunity for the deep dwelling species to even access deep over-wintering holes, and wouldn't that go against their basic biology?

**MR. RICK SCHRYER (Golder Associates):** What I was stating was that for the small lakes, a deep hole is an important habitat, because the fish are restricted to that area during the winter period because of ice cover, so you have a limited area on which they can survive and feed and do all that other life processes. Whereas in a large lake, they're not restricted to that large hole. They can go anywhere. There's no need for them to be in a larger, deeper area. They have access to the remainder of the habitat in that entire lake, because you have much greater depth of water. So what I'm saying is that it's just the scenario isn't the same for a large lake versus a small lake versus the importance of over-wintering habitat.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada. Just hearing you guys, I think it's a matter of relative meaning of deep, so I think it's the hole in relation to the average depths, is it not?

**MS. AMY LANGHORNE (Golder Associates):** An important point to make in regard to this is that selection of over-wintering habitat isn't necessarily dependent on depth. It's dependent on foraging opportunities, temperature, and dissolved oxygen, so normally in a large lake, with a lake trout population and pretend you are an ice fisher right now, you're out there with your rod, where are you going to fish for lake trout in the winter? They are up near the surface. That's a common phenomenon. They are not seeking deep water as over-wintering habitat in large lakes.

In small lakes, habitat is limited to those areas that don't freeze and those areas that have sufficient oxygen, so that's what we're talking about here.

**MR. MIKE BELL:** Julie.

**MS. JULIE DAHL (Fisheries and Oceans):** I think we'll leave it at that for now.

**MR. MIKE BELL:** Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I'd just like to follow up on that. I guess in listening, it seems to me that we have these deep holes where there's going to be an oxygen deficit, and my question is, will fish avoid this low oxygen area, or will the fish swim through it where they can effectively be stressed by that low oxygen?

**MS. AMY LANGHORNE (Golder Associates):** Fish do have the ability to select oxygen criteria, and lake trout are a species that do preferentially select areas with oxygen that they would... with oxygen levels that meet their physiological needs.

**MR. STEVE WILBUR (Dogrib Treaty 11):** So in effect, by this avoidance, we're losing temporary habitat, or habitat temporarily?

**MS. AMY LANGHORNE (Golder Associates):** We did indicate in our evaluation that we felt there was a low impact because there's a temporal and spatial effect.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Are there any other organisms that require, have a DO criteria in this environment that are important to food supply and habitat in general?

**MS. AMY LANGHORNE (Golder Associates):** There are no CCME guidelines related to oxygen for any other organisms besides fish, and as Mark indicated, we are not expecting anoxic conditions at the bottom of the lake.

**MR. STEVE WILBUR (Dogrib Treaty 11):** That's comforting to know that there are no CCME guidelines, but it's also not so comforting that we can't make an evaluation because there are no CCME guidelines. In other words, based on your professional judgment, knowing what you know about aquatic organisms, would an oxygen deficient environment be something that we should be concerned about?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I think that's already covered in the analysis.

**MR. RICK SCHRYER (Golder Associates):** Just to clarify that point, benthic invertebrates for the most part, as far as I understand them and I can check on that if you want, but as I remember, have a much lower oxygen requirement than fish do. Their oxygen requirements are much lower. So that's why the CCME guideline is directed at fish, because they are probably the most sensitive endpoint in that environment.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Thank you, Rick. So the CCME guideline for fish is 5, but we're going lower than that, so when will we get to the... I mean, are we close to a level where... are they down to... are we talking about... I'm not an aquatic guy, so I'm just trying to find out, you know, are we close to this level where you've got a concern or not?

**MR. KEVIN HIMBEAULT (Golder Associates):** I guess based on my professional judgment and experience, you can collect bentho-invertebrates, much like the ones we're seeing in Snap Lake. You can find your copepods and your kydocerins in slough waters throughout the world in oxygen levels that are close to anoxic, so their tolerance level is very high, and as Amy said, fish are the most sensitive. The guideline is 5.5 and it probably has some conservatism built into that as well, so I think we're pretty comfortable saying we wouldn't have an effect on other organisms.

**MR. DAVE BALINT (Fisheries and Oceans):** I would interject that there would be a specific benthic invertebrate community at deeper depths in the lake, and

this would be a different community than you would find in the torah areas, so definitely as oxygen levels decrease, there will be a change in the benthic community in response to that.

My concern also goes back to lower DO levels and also interaction with TDS at depth, that that will also result in a change in community.

**MR. MIKE BELL:** Okay.

**MR. NEIL HUTCHINSON (MVEIRB):** I'd also like to point out by way of clarification that the guideline is intended to protect the most sensitive species that normally inhabits the lake, and the fact that it's developed for fish and its been applied for fish doesn't mean that it wouldn't apply to benthic invertebrates as well. It's the same as a copper or a cadmium guideline. It's not species specific. It's intended to protect the most sensitive of whatever it is in the lake maybe we haven't looked at yet.

**MR. MIKE BELL:** Okay. Go ahead, Rick.

**MR. RICK SCHRYER (Golder Associates):** If I could just comment on that, the CCME guideline is specifically for freshwater fish. The guideline is specifically for freshwater fish as it's designated in the CCME booklet.

**MR. MIKE BELL:** Okay. Did you have a comment? Go ahead, Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** What I'm hearing is that there's going to be changes in the lake and it's going to affect the fish. The oxygen level in the deeper depths are going to change, and it's going to be harder for the fish, especially in the winter. You'd think that they want to be in deeper depth of the lake. Early winter, as ice freezes over, they might travel all over the place, but as it gets colder, I think the fish would go deeper into the lower part of the lake.

My concern is that fish would have not much to eat, and if there's going to be less fish, and especially the trout, I think that we might end up with fish being changed. An elder once talked about fishing in one of those lakes one time and saw that the fish had turned really skinny in body, but the head of the fish was so huge. It was kind of looking like an eel. So if we're going to be looking at the habitat or the fish changing, I think Isadore wants to comment on that tomorrow. And the cumulative effects of the lake itself on the animals and things like water... the living organisms, or even things like frogs and stuff near the water area, if life is going to change for them, that's what we were thinking of cumulative effects. We were not looking at cumulative effects from this mine site to the next mine site and how it's going to affect the other mine site. The elders were thinking of localized cumulative effects on the things like the animals that eat fish, so for us, we want to know even if the water's going to change in taste, if it's going to be stinky tasting water, we'd like to know, so if our trappers go out around that way, we tell them to avoid that area and they'll know not to bother

going trapping over there because the animals that they usually would go trapping for is not there because their food source is gone. That's what we were looking at. Thank you.

**MR. MIKE BELL:** Okay. You said something about tomorrow, Rachel. Would you repeat that?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** The elders are going to be here tomorrow because the Dene Nation leadership meeting was in Rae and they had to travel to Rae. They did not want to come at two places at one time, and the direction they gave me was they were going to be here tomorrow to talk to people here, and they specifically wanted to talk to De Beers people. Thank you.

**MR. MIKE BELL:** Okay. I just want to know, we need a summary from the people who've raised issues at this particular point. Oh, excuse me, Tim, did I cut you off? No, I didn't cut you off? Do we need a summary or is the observation clear? Let's do a quick summary in terms of issues. DFO.

**MR. DAVE LEVY (Fisheries and Oceans):** I have a difference of opinion with regards to changes on planktonic community structure as a result of the mine development.

**MR. MIKE BELL:** Okay. Julie or Mark or Dave.

**MR. MARK LANGE (Fisheries and Oceans):** I still have I guess a difference in opinion, or I'm not seeing enough data presented to... that does not support the alternate conclusion I offered that the deep, over-wintering habitat is likely very important to those species who use deep water, like lake trout, round whitefish and burbitt, so that remains an issue for me. I'd also further encourage that the spatial modeling or distribution of where that low oxygen is in the lake be modeled. I'd like to know how far it extends out and how many holes are affected. Irrespective of that, though, I'd like to see an accounting of the likely impacts and for that to translate to a no net loss assessment later on.

**MR. MIKE BELL:** Okay. Julie.

**MS. JULIE DAHL (Fisheries and Oceans):** I think a lot of my questions were based on seeking some clarification. The issue of the change in phytoplankton community was already summed up as perhaps still a concern for us, and that's probably about it.

**MR. MIKE BELL:** Okay, any other questions on this side, conclusions, summaries? Okay. Neil.

**MR. NEIL HUTCHINSON (MVEIRB):** My outstanding request was in conjunction I guess with Mark's, and that is an accounting of how much area and volume of lake will dip below the CCME guideline.

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**MR. MIKE BELL:** Okay. Dave.

**MR. DAVE OSMOND (Gartner Lee):** I was unaware that filtration was going to be applied at the water intake, and I'm pleased with the answer.

**MR. MIKE BELL:** Okay. Steve.

**MR. STEVE WILBUR (Dogrib Treaty 11):** With respect to lake levels, Brent answered most of it. I just want to clarify, or will get back with him later and ask him just a couple of other questions, but in general, the answers were good. I still have some concerns related to this mezotrophic, oligotrophic, and the discussion of DO and the loss of fish habitat and those issues associated with that, but...

**MR. MIKE BELL:** Okay. Tim.

**MR. TIM BYERS (Yellowknives Dene):** My outstanding concern is still whether in fact there will be any localized eutrophication, and if so, what does that mean to aquatic lake forms and terrestrial and avian lake forms?

**MR. MIKE BELL:** Okay. Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I think I've said what I wanted to say already.

**MR. MIKE BELL:** Okay. Good. The other thing on the agenda we had was cumulative impacts, but I think we're going to be dealing with those later on, so unless people want to raise this, I would think that we pretty well have that covered later on.

**MR. NEIL HUTCHINSON (MVEIRB):** I was just going to point out I think Don MacDonald, if he hadn't left, would say that he had outstanding concerns.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I don't think... I thought we just kind of temporarily addressed cumulative effects, so I have still some more issues to raise with cumulative effects, if that's possible.

**MR. MIKE BELL:** Okay.

**MR. DAVE BALINT (Fisheries and Oceans):** We have a concern with additive effects, dissolved oxygen levels at depth with the TDS levels.

**MR. MIKE BELL:** That's just a summary.

**MR. DAVE BALINT (Fisheries and Oceans):** That is still a remaining issue. I wasn't sure it was summarized as an interactive effect.

**MR. MIKE BELL:** Okay, good. My question is a question for the agenda. Where is cumulative effects going to be dealt with? Do we deal with it now? Are we dealing with it later, or could we deal with it in both places? Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. There are a multiplicity of places to deal with cumulative effects. Cumulative effects regarding aquatics should be dealt with now. Cumulative effects regarding general approach, that sort of thing, should be dealt with a week on Friday.

**MR. MIKE BELL:** Let's deal with cumulative effects as they're effecting the situation now, aquatics. Steve, go.

**MR. STEVE WILBUR (Dogrib Treaty 11):** I guess I have a concern about the EA impacts process, and whether it's call cumulative impacts or impacts from the project that are interactive, to me is just semantics. I guess my concern is that we've piecemealed out the assessments, i.e. through the linkage process, and we lose sight of the whole, and the potential additive and synergistic effects between components, in particularly those components that we've defined as, or have been defined as negligible, or with low environmental inconsequence, and in some cases, this definition has been done with what I believe considerable uncertainty.

Perhaps we do this based on the assumption that we have learned all we need to know about the mechanisms that maintain ecological health. I mean, it seems to me that's the premise that we can make that basis, but things... based on what I'm hearing, there's going to be some big changes to the aquatic community, and these include an overall degradation of water quality, loss of lakes flowing to Snap Lake, a loss of food supply to Snap Lake, overall reduced dissolved oxygen during the winter, perhaps a loss of fish abundance, a loss of habitat in Snap Lake associated with a diffuser, a change in the or big increase in the TNTP ratio, a release of metals, a release of nutrients, increase in other iron constituents... to me, this is a change in the overall aquatic eco-system, and then we could take that further. There are changes to these ecological factors that ultimately effect perhaps the terrestrial environment, and those areas of the biological environment that depends on the water, aquatic community to exist the way it exists today.

So I guess it appears that De Beers is arguing that because it's happening on a large lake, the ecosystem is resilient or has enough internal buffers to change and it's strong enough to maintain itself, but it seems to fail to give importance that the overall ecosystem characteristics have substantially changed, and I think this is very significant. And I guess my concern is that we... the impacts assessment process has forgotten that. And that's my statement. I don't know if... that's my statement. I don't know if De Beers wants to comment on that. I don't have a question, but that's my observation.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Steve, I think I will comment on one thing, and that is we fundamentally disagree with your comment that it's related to semantics. So we're, you know, we're offside with you there. We think the terms of reference are clear, that the terms of reference require us to address the interaction of the project effects with other developments. And that's what cumulative effects is related to.

Now, so I fundamentally disagree with you. De Beers fundamentally disagrees with you. The follow-through with a lot of what else you're discussing is around, you know, I think I'd refer you again back to the terms of reference in terms of taking a look at what is discussed in it and how we should address it.

So I disagree around the issue of it just being semantics. Does a geographical scope issue to cumulative effects and De Beers considers that we're well within the terms of reference and followed it in terms of our cumulative effects analysis.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Robin, I appreciate that. I guess what I meant by semantics was not with respect to cumulative impacts, but was with respect to how we actually are going about our impacts assessment, and I think there's been some confusion in that what we're calling interactive should necessarily be addressed as a cumulative impact. And I think the interactive components should be a basic component of an impact assessment. Now, whether you want to lump that into cumulative impacts on a local scale, or you want to call it as part of the impact assessment, I think that's where what I'm talking about is that I haven't seen that level of assessment in the impact assessment. And I don't care if it's called cumulative impact assessment. That's what I'm talking about.

**MR. MIKE BELL:** Clarification, Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** What I'm seeing here is definitely disagreement or different viewpoints on addressing inter-project effects, even if they are not of a significant level. My understanding is that the CEA guide instructs that interactive effects are addressed at the significance level, and in this case, some of the board can make that determination. Steve, you have two more opportunities for your client to provide your viewpoint on this issue, because I believe that there's a fundamental difference in opinion. The first is at the technical reporting component of it, and then you have an opportunity to make your case for your client for the board at a hearing. I can't say... well, you have to ask for permission ...(inaudible)... So if it's not resolvable within the context of these technical sessions, take a look at the guide that the board has on line for cumulative effects, because I know that the CEA guide has changed, subsequent to the board's posting of its cumulative effects guide, and consider these other two opportunities in terms of advancing you or your client's position.

**MR. STEVE WILBUR (Dogrib Treaty 11):** Thank you, Louie. I guess I just want to make one comment. You mentioned the term significance, and I think all we've

been talking about is environmental consequence to date, so that's significance is for something that the board is going to determine, and that what we are trying to do is to raise a level of concern or interest, so the board can make that determination as best it can.

**MS. JANET HUTCHISON (NSMA):** Louie, just a question on that so that none of us are under or with apprehension about the number of opportunities we have. If I understand the process, we'll actually have to make a case at the pre-hearing conference before the public hearings about which issues we'd like to proceed forward with. Is that correct?

**MR. LOUIE AZZOLINI (MVEIRB):** We're going to have a pre-hearing conference before the hearing. Given that the board has never had one before, I really don't know what the rules will be and I don't know how the agenda will be set, but I am certain that there will be enough legal intelligence at the table to ensure that whatever is done is done legally. Does that answer your question?

**MS. JANET HUTCHISON (NSMA):** No, but thank you.

**MR. MIKE BELL:** Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** In my comments earlier, I said cumulative effects in the lake, in the lake. I want to change it to cumulative impacts.

**MR. MIKE BELL:** Anybody else? Okay, it's not just about ten to five. We've had a long day. I would suggest we've had a very productive day. I notice tomorrow we're talking about wildlife and wildlife habitat. I consider myself something of an expert in this area simply because we're be talking about something I can see. So I'm glad to be making that significant transition. We'll start at nine o'clock in the morning. I'd like to thank everybody who's participated. Will DFO all be leaving or will you be here or gone or...?

**MS. JULIE DAHL (Fisheries and Oceans):** We may have someone here later for the TK session. I just wondered if I could ask Rachel -- Rachel, when you talked about your elders coming tomorrow to speak, do you know when in the agenda they were going to do that? Was that going to be in the afternoon in the discussion of the traditional knowledge incorporation?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I was just trying to figure out on the agenda when I could get them to make their comments, because they are going to want an update from me for the last three days, so any suggestions?

**MR. MIKE BELL:** Rachel, if you could speak to Louie about that, he'll coordinate that, okay?



**MS. JULIE DAHL (Fisheries and Oceans):** It would be good if we know sort of before we adjourn so we know what time we should be back here. It's just that traditional knowledge is on the schedule tomorrow starting at three o'clock. Is that when it was anticipated that the elders would speak?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** They're coming here early in the morning, and I think we were thinking of early in the morning presentation.

**MR. MIKE BELL:** Okay. Mark.

**MR. MARK LANGE (Fisheries and Oceans):** DFO's presence here over the next week-and-a-half may... well, we'll definitely diminish in size, so just before we left I wanted to put it on the record I guess a thank you and an expression of how grateful we are for the board to have established this forum for us to discuss technical issues in an informal matter. And I would also really like to thank De Beers and all their support staff and people from Golder for the quality of answers they've provided and the professionalism they've shown throughout these sessions. Thank you very much.

-- Applause

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I just can't believe that you are not wanting to participate for the rest of it.

**MR. MARK DAHL (Environment Canada):** Oh, we want to.

**MR. MIKE BELL:** Nine o'clock tomorrow morning please. Thank you.

-- ADJOURNMENT

## **MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD**

### **De Beers Snap Lake Technical Sessions**

**November 29, 2002**

### **Yellowknife, Northwest Territories**

**MR. MIKE BELL:** I just wanted to remind you that we're going to have a group of elders come in this morning. Channel 1 is the channel you use on the interpretation, okay? Before we get started, today we're talking about wildlife. We're sorry, those of you who are new today, missed the conversations yesterday. We had very exciting conversations on algae. Today, we're finally going to be talking about something we can see, so I feel good about that. The present situation reminds me a bit of a story of these... and I think this is relevant to the De Beers lake -- Snap Lake experience. These two guys were going moose-hunting, and they hired a pilot to take him in and drop him into the lake, so the pilot had a small single engine plane, a beaver or something, and he dropped him into the lake. And when he saw the size of the lake, he said to these two moose hunters, "Now look, there's barely enough room to get in and out of this lake. I'm going to take one moose out of here, not two moose. One moose. I've got hardly enough room for a take-off." They didn't say anything, so he flew off and he came back five days later and he landed on the lake and taxied up to the shore and he took a look and there were two moose on the shore, so they started this huge argument, and he says "I told you guys one moose." And they said "But the guy last year let us take two moose. The guy last year let us take two moose." And unfortunately, against his better judgment, he let them put the two moose in. He got down the end of the lake, he revved the plane up as fast and as far as he could, he tried to slingshot himself and he headed down the lake and he started up through the trees and he didn't make it. And the plane crashed. And the pilot stumbled out of the wreckage and he saw one of the hunters leaning against the tree and his face was all black and he said to the hunter "Where are we?" and the hunter said "About 250 yards further south than we got last year."

Well, it wasn't a rouser. I can't guarantee they're all going to be rousers. Anyway, I'm stalling for some time here, as you can see. But somebody did say am I going to ask a joke... tell a joke today. We'll go around please, and do the introductions. My name is Mike Bell. I'm the animator of the group today, from Inukshuk Management Consultants.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Florence Catholique, Lutselk'e Dene First Nations.

**MR. FRASER FAIRMAN (DIAND):** Fraser Fairman, Indian and Northern Affairs.

**MR. BUDDY WILLIAMS (DIAND):** Buddy Williams, land administration, DIAND.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee..

**MS. VANESSA CHARWOOD (Environment Canada):** Vanessa Charwood, Environment Canada.

**MS. HEIDI KLEIN (Gartner Lee):** Heidi Klein, Gartner Lee, working for the review board.

**MS. BETTY BESWICK (Golder Associates):** Betty Beswick, Golder Associates.

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, De Beers Canada.

**MR. MIKE BELL:** And in the back, please?

**MR. RICK SCHRYER (Golder Associates):** Rick Schryer, Golder Associates.

**MR. MARK DIGEL (Golder Associates):** Mark Digel, Golder Associates.

**MR. KEVIN HIMBEAULT (Golder Associates):** Kevin Himbeault, Golder Associates.

**MR. ANDY MCMULLEN (Bearwise):** Andy McMullen, Bearwise.

**MR. MIKE BELL:** Okay.

**MR. STEVE WILBUR (Dogrib):** Steve Wilbur for the Dogrib.

**MR. MIKE BELL:** Tim.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, consultant for the Yellowknives Dene land and environment committee.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews, wildlife and fisheries, RWED, GNWT.

**MS. ANNEE GUNN (RWED):** Anne Gunn, wildlife and fisheries.

**MR. RAY CASE (RWED):** Ray Case, wildlife and fisheries, GNWT.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, legal counsel to the NSMA.

**MR. BOB TURNER (NSMA):** Bob Turner, North Slave Métis Alliance.

**MS. LISA BEST (GeoNorth):** Lisa Best, GeoNorth.

**MR. LIONEL MARCINKOSKI (RWED):** Lionel Marcinkoski, GNWT.

**MR. GAVIN MORE (RWED):** Gavin More, Government of the Northwest Territories.

**MR. ANGUS MARTIN (Yellowknives Dene):** Angus Martin, Yellowknife Dene First Nation.

**MR. JASON MCNEILL (RWED):** Jason McNeill, Government of the Northwest Territories.

**MR. DAMIAN PANI (Golder Associates):** Damian Pani, Golder Associates.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, De Beers Canada.

**MR. MIKE BELL:** Okay. Yesterday we have presentations and had conversations on Snap Lake water quality... wait a minute... aquatic habitat and organisms in the morning. These continued over to the afternoon and towards the end of the afternoon we had a few questions on cumulative impacts. Today, as you can see from the agenda, we'll have a presentation from De Beers. And after that, we'll have a series of questions. Somebody has asked me, and I think I've indicated that they might want to put something up on the overheads. That's perfectly all right, to preface your remarks. If anybody else would like to use the overhead to do that, that would be fine.

Then we'll have the situation this afternoon. Is there a presentation this afternoon? There's no presentation this afternoon, so the conversation basically will continue through the afternoon.

Just a question for my own benefit, how many people are rushing out of this place sometime this afternoon to catch an airplane or anything like that? That's not a big issue for us? Steve? You'll be sadly missed there, Louie. Anyway, Louie' going to be going, somebody else is going to be going, but it shouldn't affect our schedule.

We're waiting for a group of elders to come in, and I assume, Rachel, our people here... where's Rachel? Excuse me? John.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. Maybe while we're waiting for the elders to find seats, just on a housekeeping item, there were a couple of side sessions that took place this week. There were verbal reports back to the group. I think there were also written reports prepared and submitted to Louie. And I'm just wondering how those are going to be distributed, or are they just going to form minutes of this meeting?

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini here with the review board. I'd be quite happy to receive the information and distribute it via fax and email, if it's one or the other. And if it's too long, it could be a problem in terms of faxing.

**MR. JOHN MCCONNELL (De Beers Canada):** I think Steve can probably confirm, but I think most of it's two or three page notes on what happened in the meeting.

**MR. LOUIE AZZOLINI (MVEIRB):** And you're asking how that will be provided to all the people in attendance?

**MR. JOHN MCCONNELL (De Beers Canada):** That's correct.

**MR. LOUIE AZZOLINI (MVEIRB):** I caught the tail end of the conversation. We'll make photocopies.

**MR. JOHN MCCONNELL (De Beers Canada):** Great.

**MR. LOUIE AZZOLINI (MVEIRB):** Just for the record, I did distribute via email De Beers' presentations over the last three preceding days. I'm not sure if there's size buffers on your servers. There's a lot of pages to print out, so I don't want to start faxing stuff to everybody, because we'll go through reams of paper here in a blink of an eye.

**MR. MIKE BELL:** Tim.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives. Louie, I'm just wondering, I have... they... I did receive those files. Thank you very much. I'm wondering if figures maps are on them. I haven't had a chance to open them yet.

**MR. LOUIE AZZOLINI (MVEIRB):** Tim, neither have I.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. What I think what Louie sent out is the exact files from our presentation, so it includes the pictures and maps, the whole works.

**MR. MIKE BELL:** Any other comment on housekeeping? The elders are here? Okay, good. Just one last comment about procedure. We ask people to speak their name into the microphone before they talk, because we're making transcripts of these proceedings, and we've got to know who has spoken at which particular points. Everybody seems to be getting this down pretty well. De Beers seems to be having problems with it more than everybody else, but we'll try and make sure that we remind people to say their name before they speak, except for me. I just speak. Be that as it may, we'll proceed that way.

We have several elders here. I will ask Rachel to introduce the elders. You have your headsets and perhaps Rachel can coordinate this part of the proceedings.

**MS. RACHEL CRAPEAU:** We have one elder who's arrived. I'm expecting another person. I don't think they made the drive into town yet. Isadore Tsetta is the elder for the Yellowknives Dene First Nation. He's been working with the land and environment committee since its inception in 1994. He's a former chief of Dettah for the Yellowknives Dene First Nation. He taught the present young land and environment committee members on how to do work in assessments. And he has been helping myself and people like me do our work. Even last night, another elder phoned me to say that it was really nice weather. It's warm, it looked like spring, and he said to be careful because the cold is going to hit you now. So this is Isadore.

**MR. ISADORE TSETTA:** (translation not available)

**MS. RACHEL CRAPEAU:** Louie, could you explain who's here for his purposes, because he wants to know exactly who's here? Not by name, but work-wise.

**MR. MIKE BELL:** I think we'll just go around briefly and each one of the various departments...just... just give me a sec. Okay. I would ask people to go around again and just indicate the organizations, your name and the organization that you're from, and make the organization very clear, so Isadore can understand. John.

**MR. JOHN MCCONNELL (De Beers Canada):** I'm just interpreting what he said, but I think he'd like to know what people's disciplines are as well as what organization they're with.

**MR. MIKE BELL:** Okay. Fine. Good.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** (translation not available) My name is Florence Catholique. I'm from the Lutselk'e Dene First Nation, and I am here on behalf of the Lutselk'e wildlife lands and environmental committee.

**MR. FRASER FAIRMAN (DIAND):** My name is Fraser Fairman. I'm with the Department of Indian and Northern Affairs, Canada, with the environment and conservation division.

**MR. BUDDY WILLIAMS (DIAND):** Buddy Williams, with the Department of Indian and Northern Affairs, in land administration.

**MR. MARK DAWE:** Mark Dawe with Environment Canada. We are looking at water quality, typology and geology.

**MS. VANESSA CHARWOOD (Environment Canada):** Vanessa Charwood with Environment Canada, migratory birds and other wildlife.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee, on behalf of the review board, wildlife section.

**MS. HEIDI KLEIN (Gartner Lee):** Heidi Klein, Gartner Lee, on behalf of the review board, environmental assessment practitioner and wildlife biologist.

**MS. BETTY BESWICK (Golder Associates):** I'm Betty Beswick. I'm an environmental...

**MR. MIKE BELL:** The microphone.

**MS. BETTY BESWICK (Golder Associates):** I'm Betty Beswick. I'm with Golder and I'm representing De Beers. And I pull together environmental impact assessments, all the components.

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates, representing De Beers. I'm a wildlife biologist.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers, and also a wildlife biologist.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, De Beers. I'm a mining engineer by discipline and the senior De Beers representative and responsible for the Snap Lake development.

**MR. MARK DIGEL (Golder Associates):** Mark Digel with Golder Associates, representing De Beers. I'm a water quality specialist.

**MR. KEVIN HIMBEAULT (Golder Associates):** Kevin Himbeault, Golder Associates, representing De Beers. I'm water quality and aquatic resources.

**MR. RICK SCHRYER (Golder Associates):** Rick Schryer, Golder Associates, representing De Beers, and I'm a fisheries biologist.

**MR. ANDY MCMULLEN (Bearwise):** Andy McMullen, Bearwise, working with De Beers. My job is wildlife safety and mitigation.

**MR. STEVE WILBUR (Dogrib):** Steve Wilbur, consultant to the Dogrib Treaty 11.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews, wildlife and fisheries. I'm a wildlife biologist. I do environmental assessment work and a variety of monitoring work with wildlife, including birds of prey, raptors and right down to small mammals.

**MS. ANNE GUNN (RWED):** Anne Gunn, wildlife and fisheries. I work with caribou.

**MR. RAY CASE (RWED):** Ray Case, wildlife and fisheries. I supervise the research function for the Department of Resources, Wildlife and Economic Development, and also work with the large carnivores.

**MR. PETR COLMERS:** I am Petr Colmers. I am a wildlife biologist doing environmental assessments and here on behalf of the North Slave Métis Alliance.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, and I'm the lawyer for the North Slave Métis Alliance.

**MR. BOB TURNER (NSMA):** Bob Turner, North Slave Métis Alliance, here doing one of my jobs as lands and resource manager.

**MS. VELMA STERNBERG (DIAND):** Velma Sternberg, a geologist with Indian and Northern Affairs mineral development division.

**MR. LIONEL MARCINKOSKI (RWED):** Lionel Marcinkoski, RWED, environment protection. I'm a mining engineer.

**MR. GAVIN MORE (RWED):** Gavin More. I'm a biologist. I coordinate environmental assessments for the Government of the Northwest Territories and I work for Resources, Wildlife and Economic Development.

**MR. JASON MCNEILL (RWED):** Jason McNeill, I'm a biologist, and I work with Gavin helping him coordinate environmental assessments with the GWNT.



**MR. DAMIAN PANI (Golder Associates):** Damian Pani, I'm a wildlife biologist with Golder Associates.

**MR. MIKE BELL:** I'm Mike Bell... sorry, go ahead.

**MS. LISA BEST (GeoNorth):** Lisa Best with GeoNorth, taking notes from the meeting.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, De Beers Canada, environmental work.

**MR. MIKE BELL:** I'm Mike Bell. I'm the group animator.\*

**MR. LOUIE AZZOLINI (MVEIRB):** I'm Louie Azzolini and I'm helping the board coordinate this environmental assessment.

**MR. ISADORE TSETTA:** Mahsi. (translation not available)

**MS. RACHEL CRAPEAU:** Some few words that I talked about with the elders. Another person is going to be coming in a little bit, who wants to say a few words when we have a chance. Last night, Isadore Sangris phone me -- everybody calls him Jayco -- he told me to say that the water around Snap Lake area is close to MacKay Lake, where we have a hunting camp. Any changes or drastic impact to the environment will affect our hunting ability at MacKay Lake. He also said that people say that trapping is finished with. That's not necessarily so. Some young people are still interested in working out on the land. And he mentioned my nephew who likes to go out and he gets rabbits and he gets muskrats and he was looking for beaver recently.

He said that young little boys like that are going to grow up to be men. They're going to want to do some work out on the land in the future. And he said that if they're going to do work out on the land, they'll have the hunting, fishing and trapping ability, plus with education, they might be biologists, people who work with fish or wildlife. And he also told me to say that the caribou, the migration has been changing a little bit, and that there's always changes happening with development. We have to monitor and look at and watch it, to see how we can deal with the changes. He also said that the migration of the caribou has been moving further away from our area. Maybe it's because of the development in the region where the mines are being built.

But if these kinds of changes are happening, we'll have to just monitor it to see what we can do and how it's going to affect our hunting ability. If the fall hunt is going to be later, we'll have to try to figure out where we have to go hunting in the fall time, or maybe we have to book our hunting for spring hunts instead of doing

fall hunts, because we'll end up going further away from our camp to do our hunting. That's an impact.

The other consideration he told me to mention was that the animals that are associated with mines, we have to watch to make sure that their mortality rates do not get out of hand. We have to see what happens to territorial animals, because he said that when the animals are being monitored, either by helicopters or too much attention made to them, they do move and it affects the movement of all the other animals.

He wanted to mention that there were people from our communities who trap in Camsell Lake and around that area, and they used to go towards Lac de Gras. And he mentioned my dad, who trapped around those areas, and he said that these are still hunting, fishing and trapping areas of our people. That if mines are going to be built and they're going to be closed, cleaned up and reclamation is done, it has to be done to the best of our abilities, so we make sure that the animals and fish and everything that we need for living will return, and can have a life in that area again. So these were... this was the advice of Jayco last night when he phoned me. He can't be here because he's got an oxygen tank and he has to have a breathing apparatus with him because of his health is not that good. And we rely on his knowledge because for most of his life, he's followed the caribou and he travelled wherever the caribou was and he travelled with elders, who I consider our great-grandfathers, because when he was young, he used to travel with all different elders and work with different older people who gave him advice. Thank you.

**MR. MIKE BELL:** Good. Isadore had a couple of specific questions about... one about caribou changing patterns and migration patterns, and he asked for somebody to respond to that. He also had a question about goals. I'm not sure how one responds to this, but would somebody like to talk about migration patterns?

**MS. ANNE GUNN (RWED):** Anne Gunn, wildlife and fisheries. I'm not the only person here who's got some experience with caribou, so anyone else feels free to talk, I would be grateful.

Isadore asked about sickness in caribou, and in summer 2000 and 2001, it was unusually wet, and we heard a lot more about a disease called foot rot in caribou. It's when a caribou gets a small cut in its foot, such as caused by a sharp rock. It becomes an infection and, first of all, the hoof is infected, swells up, full of puss, and it can spread throughout the body. We've had a lot more reports of that than we have in the past. I think perhaps that's what Isadore was talking about.

Also, Isadore asked about changes in migration. Well, we know from people who've been on the land for a long time that caribou numbers over decades go up and down. And as their numbers increase and decrease, their range expands and contracts. So over decades, we would expect to see changes. But on a shorter timeframe, we also see changes. Some of those are probably associated with fall weather, which has been... when there's not much snow, the caribou... not many storms, the caribou travel further and they get to the further edge of their range, and that makes a difference to people. But there's a whole lot of things that affect caribou behaviour, and it's hard to discriminate, to choose between what's having any particular effect.

We certainly know from the monitoring that's been done that caribou are aware of the mine site, in particular the cows and the calves will change their behaviour around them, and they also know about roads and they change their behaviour in the immediate vicinity. What we don't know is what that means for their use of the whole range. So I guess the short answer is yes, we're aware of the changes. People have told us about them, but to say what's causing those changes at the moment is very difficult.

**MR. MIKE BELL:** Would anybody else like to comment before we ask Isadore? Tim.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives Dene. Anne, I wonder if you could also, in relation to the foot rot question, elaborate further on something that I found most interesting. One of the, I guess, mitigations that aboriginal people have been suggesting as far as the cobble on the sides of roads is to use crush to cover them over, and to what I understand from what you told the monitoring agency before was that maybe that crush isn't the best idea because of how the individual gravel has sharp edges that can poke inside the hoof and create problems. I wonder if you could kind of tell us a little bit about that.

**MS. ANNE GUNN (RWED):** Anne Gunn, wildlife and fisheries. There's two sets of problems with the roads. One is the large borders that make up the...(inaudible)... of the road. A caribou that panics is quite likely to either cut itself as it scrambles through that rock or break a leg. If it cuts itself, that's an entry point for infection. On the other hand, as Tim pointed out, if you put crush on top of that, you're putting small rocks but very sharp ones on the road surface or to build ramps, and they also can find their way between a hoof, the two hoofs or toes, and cause a cut. And we really don't know much about the injuries that cause... the specific injury that causes foot rot. It's a reasonable assumption that sharp rocks will do it, but because of... by the time we get the hoof, there's so many pathological changes, so many changes as a result of the infection, it's usually very hard to identify the originating injury.

In terms of mitigation, this is something that needs to be looked at. We need to understand more about how common foot rot is, how it's related to whether it's a wet or dry summer, and where the caribou, where they're getting the original injuries. We need to look at how much foot rot there is before they reach the mines, and then after the mines. And we are working with the communities and with the mines to develop a proposal to look more into this.

So I guess my short answer is I don't have an answer to Tim's question. We just have to spend some more time and effort looking into this.

**MS. RACHEL CRAPEAU:** Just one last comment. We were talking about mitigation, how to fix things if we run across a problem. We want our participation to be part of the decision-making process. If there's going to be a traditional knowledge gathering session involved, we want to be there. We can give our input in trying to figure out how to solve a situation. We would like to discuss this caribou a lot more, but we're here for a certain purpose. This is the technical session for Snap Lake. So when Isadore has a chance, I think he would like to talk to you some more, Anne. Thank you.

**MR. MIKE BELL:** What we will do then is, it's all right, we'll continue on with the program. When Isadore would like to speak, Isadore will be free to speak, so alls he's got to do is notify us. Two of the questions he did ask through the course of what I picked up in the conversation was he asked about monitoring and how this is done on a regular basis. I don't know if that's going to be dealt with today or what, but he also asked about the end of the mine and he had concerns in those particular areas. So if those come up or somebody would like to address those, that would be fine.

Meanwhile, why don't we continue with the program, if that's all right, and then we'd like to welcome Isadore and everyone else to participate as we ask the questions, okay? John.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I think the question of monitoring is dealt with on Monday, but before we move on, Isadore did invite questions, and I think there was some discussion around lake trout and where they winter, in shallows or in deeps, and you know, Robin has a little more details on it, but we'd just like to ask Isadore and take advantage of his knowledge and see if there's an answer.

**MR. MIKE BELL:** Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Isadore, there was a lot of discussion... Robin Johnstone from De Beers... there was a lot of discussion yesterday about where fish in deep lakes spend their winter. And given your

years of experience in fishing, I'd be interested in knowing your thoughts on, in a deep lake, like a hundred feet or so, would you tend to find lake trout in deep or shallow water in the middle of winter?

**MR. ISADORE TSETTA:** (translation not available)

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. And Isadore, how deep are you fishing? How deep are your nets going down? Mahsi.

**MR. ISADORE TSETTA:** (translation not available)

**MR. ROBIN JOHNSTONE (De Beers Canada):** Mahsi.

**MR. MIKE BELL:** Are there any other questions at this point? Good. Okay. Why don't we proceed with the presentation, and we'll have the questions afterwards. Oh, excuse me, Steve.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews, RWED. Mike, for those people who haven't been here since Monday, apparently there's been some changes in procedures. Could you talk about how we're going to proceed through the day today with the agenda we have?

**MR. MIKE BELL:** Okay. Basically, the procedure we have been following is this: De Beers makes a presentation, and after that, we have a period where we have discussion. The first thing that happens is I go around the table to find out people who may have concerns or places where they want additional information. But we're essentially dealing with concerns, and I ask people to just list these, so this provides us with a list of who would like to speak to the topic and to the presentation.

Then, after we've got that list made, and it takes just a couple of minutes to do this, the person basically who spoke has a chance to speak, so if Anne wants to ask questions or make a presentation or whatever, she would, at the review, she would make her comments and say "I may have a concern about this" or "I may have a concern about that."

We go down through everybody's name doing this, and at the end, we're trying to find out how many of these concerns have moved to issues. In other words, there may be some areas and people feel the information is given is quite adequate and they no longer have an issue or a concern. In other cases, people will say we still have concerns about this or we still have concerns about that. That provides us a list of issues. It's helpful to diffuse to know where the concerns of the issues of the group are, and it gives them a signal of the types of things that may be coming through with the technical sessions.

So the procedure again is the presentation, listing of concerns, discussion of concerns, and a summary at the end of each segment, so that we've got... we've assessed where things are at. Steve.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews, again. So are we going to sort of flip-flop through the whole agenda, or are you going to sort of route these things into topic areas, or... which would make more sense to me.

**MR. MIKE BELL:** They're listed on the agenda in front of you in terms of some general topic areas, and basically what we're doing is following the lead of De Beers and relating the questions to the areas that basically they cover in their presentation.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I think that, Mike, what you described has certainly been the layout of previous days. Today, from De Beers' point of view, it's a little bit different. We have got one presentation, but many of the topics that people wanted us to address were really so general that we really need to hear what peoples' issues are to be able to understand them further and to be able to provide a response. So the presentations aren't as specific, you know, focused on a topic as they have been previously. So De Beers really wants to take this opportunity to make sure there is an open discussion of people with wide-ranging, outstanding questions, and who basically seek direction from the participants as to what is addressed.

**MR. MIKE BELL:** Okay, good. Then Steve, basically, we'll start with a presentation, and after that, it's open to questions wherever they come. One of the things we have tried to do when we go through our initial take in terms of what areas people have concerns about, a number of people will have concerns about the same area. So for example, if we're talking about the sickness of caribou, just for an example off the top of my head, then if a number of people have that, we try and deal with that subject all together, bouncing the conversation around, so people should feel quite free to make their comments and all of this.

Just before we start, Rachel, do we have any change at the present time? Is the other elder that was going to speak come, or...?

**MS. RACHEL CRAPEAU:** We're just getting ready here. We'll listen to the first presentation, okay?

**MR. MIKE BELL:** Okay, you'll listen to the presentation. Good.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, with De Beers. Yeah, we have quite a brief presentation. I guess we've changed your tour guide for this morning. As most of you know that have been here the last few days, we generally start with just a bit of an orientation on the project, and then talk you through what we're going to say, and then we say it. So our first speaker today, or tour guide, is Betty Beswick. Betty's an environmental specialist with Golder and Associates. She has a biology background and a masters degree in environmental design. And her specialty is really environmental assessment approaches. She's worked on a broad range of assessments in many industries, including mining, oil sands, manufacturing, and petro chemicals. Most recently, she was involved with the Diavik project in their environmental assessment, so she brings a good background in assessment to this forum. So I'll turn it over to you, Betty.

**MS. BETTY BESWICK (Golder Associates):** Does that work? Okay. All right then. Much of today is to essentially introduce our presentation and get you warmed up, so that when John presents the information, you're ready for it and the coffee has already kicked in.

Our presentation this morning is really on wildlife and wildlife habitat. John's going to give a short -- I think it's about ten or fifteen minutes, and then we'll respond to questions, and John and I will kind of play tag-team match and arm-wrestle about who's going to answer your questions, so you'll see us discussing here who's going to get it.

Let me start, because some of you haven't been involved in the project from the very beginning, I'll give you just a lay of the land about where we are in the process.

De Beers started the collection of baseline information and the community consultation in 1999, and that's been ongoing, even through up to now. One of the first actual deliverables to this whole project was land use permits and water license applications...

**MR. MIKE BELL:** I just want you to speak slowly, because we are interpreting/translating.

**MS. BETTY BESWICK (Golder Associates):** Okay. Good. Thanks for that reminder. In February, 2001, De Beers made applications for a land use permit and water license applications that were submitted to the Mackenzie Valley Land and Water Board. Those applications consolidated quite a bit of the information that had been collected up to that point, with the community consultation and baseline wildlife information.

The Mackenzie Valley Land and Water Board reviewed those applications and then referred it to the Mackenzie Valley Environmental Impact Review Board in May, 2001, for an environmental assessment. And at that point, De Beers started doing the environmental assessment, and received the final terms of reference for that assessment in September, 2001.

Throughout this whole process of developing the environmental assessment, our real approach has been to try and start big by dealing with lots of the issues, provide answers, and resolve issues throughout the entire period. This technical session is one of those, to provide the information that people need to understand the project and understand what the effects of that project will be. The purpose of these sessions is really to try and address as many issues as we can, as early as we can, so that by the time we get to later stages in decision making, we will have already addressed most of the issues and we don't need to deal with them anymore.

The environmental assessment report was submitted in February of this year. Since that time, we've conducted a series of comprehensive technical information sessions. That happened last spring. That happened last spring down in the movie theatre, where the popcorn was better than it is here, but the view wasn't as good, so it's a tradeoff.

Many of you, I think, added questions at those technical sessions. Since then, there have been a series of further information requests that have come to De Beers through the board. Those started just after those technical sessions, and we received them right up to this point.

During this period, there has been a review of the environmental assessment, which culminated in September, 2002, with the decision that the environmental assessment met the terms of reference that were provided last year.

Today, we're here with another series of technical sessions. They've occurred all this week, and they'll be running again all next week as well. And the intent of those sessions, from our point of view, is to try and answer questions that you have, and provide you with the information that you need to understand the project and its effects.

Following these sessions, people will be preparing their technical submissions that will go to the board, and those are expected in February, 2003. Following that, we expect public hearings to be held at the end of March.

I'll just give a brief orientation to the project, although most of you probably know this, I'll do it so that everybody's on the same page. We're here in Yellowknife. The Snap Lake diamond project is located about 210 kilometres northeast of



Yellowknife. And it's located about 100 kilometres south of the other two major diamond projects, which is Ekati and Diavik.

Camsell Lake is right here. I'm showing you that so you understand the... where it fits with the next slide. Here it is again. This is Camsell Lake. This black blob right here is what's expected to be the footprint of this project. This blue line around it is a 500-metre buffer on that mine site footprint, and that's what John will be talking about as the local study area. The regional study area that John will be talking about is this dotted line around here, and that is built on a 31-kilometre radius from the mine site to the outside of the regional study area.

The regional study area includes a number of features that John will talk about. The Tibbitt Contwoyto road, which is here. He is pretty likely to mention MacKay Lake, Camsell Lake, and what else are you going to talk about? Those are the lakes.

These other lines that you see through here, this dotted line here is a winter road that will be used to access the mine site from the Tibbitt Contwoyto road. These dots here indicate a road that will be used, a winter road that will be used periodically once every few years to access a quarry that will be down here on an esker.

These lines that go through here like this indicate esker complexes. This square box here shows the area where the intensive wolverine surveys were conducted. And the final thing I'm going to show you are these lines that run back and forth across the regional study area, and there, the aerial survey transits for the caribou studies.

Now, the next slide is going to show you more about this area here. Okay. Here, we've zoomed in on the mine site, on the project site. This is the footprint of the project. This distance, from about here to here, is in the neighbourhood of three kilometres. This is where most of the surface features of the project will be, with the exception of a couple of small sites here, which is where ventilation raises from the underground workings will come to the surface to provide ventilation to the underground mine. And the outline of the underground mine is this black line that's under the lake, so the mine will actually be under the lake at that site.

Now John is going to talk about wildlife and wildlife studies we've done. He's going to give a very short... he's going to give a short presentation with the real purpose of that is to give you a broad understanding of what we've done, and get you thinking about the kinds of questions that you want to be asking about this program.

**MR. TIM BYERS (Yellowknives Dene):** Before we go on to the next fellow, I'm wondering, if we can go back to that previous slide.

-- Interjection

Sorry, Tim Byers, Yellowknives Dene. Yeah. Now, I understood you to say that the black line over the lake is the extent of underground workings. Is that correct?

**MS. BETTY BESWICK (Golder Associates):** Yep, that's...yep.

**MR. TIM BYERS (Yellowknives Dene):** Okay, I didn't realize it had gone that far south of the peninsula. Okay, thank you for that.

**MS. BETTY BESWICK (Golder Associates):** All right. Now, I'll turn you over to John Bergell.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. While they're exchanging microphones here, I'll just say a few words about John. I think he's reasonably well-known, certainly up here, because of his work with Diavik and Ekati. John is a wildlife biologist and presently, as I said, is very involved with both Ekati and Diavik in terms of setting up their monitoring systems for wildlife, and providing advice to both the boards on wildlife monitoring. So I'll turn it over to John.

**MR. JOHN BERGELL (Golder Associates):** Well, I've asked Betty to put that other slide back up, but I'm sure that's not an easy job.

-- Interjection

Okay, if you could put the one up that Tim Byers was talking about.

-- Interjection

I could see that. Next slide. Yeah, Tim, just to the north of the northeast of the peninsula, there's actually two outlines there. There's that one in the lake, and there's one that goes under the northshore. Both of those are outlines of the inferred resource. It's not necessarily exactly what will be mined, but certainly we've picked up kimberlite dyke in that whole area, so... but the thicker areas tend to be more to the middle of that and to the north. While that's in the resource, I'm not sure mining will ever extend down to there, but it could.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Florence Catholique, Lutselk'e. I wasn't paying attention there. Was the question in reference to what that particular area was going to do, or was it in regard to whether or not there was to be a development? And just on that question, if it

was in the latter, then I want to ask the question, how many... I can't say pits because there's no pits, right? Is there only one underground area, or is there going to be more than one?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I think -- Tim, you can correct me if I'm wrong, but your interest was in the extent of the resource deposit.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives. My question was where the shafts themselves were going, so where was the underground workings, and whether it extended that far south to that island, if you were actually blasting and removing kimberlite from that far south, that...(inaudible)...area.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I'll just get the map back up there, Florence, but it is just one mine. It's not two. And access to the mine is from a portal on this peninsula, and then there are two. You can see the red areas here, the little boxes. There will be two ventilation shafts there for ventilation for the mine. But the main access for men and materials and the ore to come out of the mine is all from a point on the peninsula about here.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** So the EA process that we're going through is only for that one underground development, so it's just for the permitting of that one underground development.

**MR. JOHN MCCONNELL (De Beers Canada):** That's correct. The lease that we've applied for with our application is outlined in the red, so that's the area where we're assessing.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Mahsi.

**MR. JOHN MCCONNELL (De Beers Canada):** Okay, now we'll turn it over to John and Betty will run the technology.

**MR. JOHN BERGELL (Golder Associates):** Good morning and welcome. The purpose here today is to present and openly discuss wildlife issues that have been raised. The slide here shows a number of issues. For this presentation, the visual aid of this presentation, we will be presenting baseline data and impact projections, and hopefully from there, that'll promote more discussion on other issues, such as linkage analysis, impact ratings, et cetera.

From the outset, it must be realized or stressed that the purpose of an environmental assessment is not to design a research program to understand the population dynamics, the survival rates, reproductive rates, habitat selection of wildlife species. It's really to describe or come up with a study design that allows

us to make impact predictions regarding the specific nature of a project. And in this case, particular to this presentation, there's examples for grizzly bear, caribou, wolverine, and raptors.

In section 10.4 of the environmental assessment report, the study areas, methodology and results of the baseline data are described. In addition, there were a number of responses to information requests that really provided clarification on the methods and results and in some cases, reanalyzed the data to support the impact predictions.

It should also be mentioned that the methods used to... to gather baseline information on caribou, grizzly bear, wolverines and raptors, was really adopted from the monitoring program that is currently proceeding at the Ekati diamond mine. These methods are reviewed by RWED Annually and the purpose of attempting to standardize or use similar protocols and methods is really so that we can use this data from the Snap Lake project in combination with other projects in the region to better understand the potential impacts on wildlife from a regional perspective, or cumulative effects perspective.

Now there are several important attributes of the Snap Lake diamond project that were considered during the design of studies, the collection of baseline data and during the assessment of impacts. These included the type of operation. It's an underground mine. There are no open pits. There are no major all-weather haul roads, so things like dust is limited. The barriers to movement, or physical barriers or psychological barriers that can be induced by long haul roads is not there, and the size of the footprint.

This slide here shows or exemplifies the size of the Snap Lake footprint, relative to the size of something that you're all familiar with, and that is the city of Yellowknife. The large green square represents the area of landscape that's taken up by the city of Yellowknife. The smaller blue square in the middle represents the direct loss -- physical loss of habitat due to the Snap Lake project. This is just to put things in perspective.

As I mentioned, the Snap Lake project is an underground mine type operation. The footprint is small, which means there will be minimal loss of habitat to wildlife, and the effect of the project, because it is small to movement, or barrier to movement of animals, is also minimized. Because it is an underground blasting operation, the potential for fly rock to kill or injure animals is minimized. Surface blasting will only be conducted during the construction phases. And also, that limits the dust, amount of dust that will land on the landscape around the mine. And because there are no major haul roads here, the longest road is from the main camp complex to the airstrip, the potential for vehicle/animal collisions, and therefore injury or death from vehicles to animals is also limited.

These are very important things to keep in mind when we are assessing the impacts and looking at the amount and type of information that was collected to understand the impacts from this project.

Also, the distance from the... the longest distance here from the water management pond to the portal is 400 metres, just to give you an idea of the scale here.

So now I'd like to run through the type of baseline data and the study design for caribou, grizzly bears, wolverines and raptors.

For caribou, the study design was really, we were trying to understand the pattern of caribou numbers and their distribution within the regional study area. We used two types of data here. The first type included short-term data, things like aerial surveys during the northern and southern, or post-calving migration. These surveys really provide a snapshot of in time of the number of caribou in the regional study area and their location relative to the mine.

Snow track data was also collected during those aerial surveys for northern migration, as we wanted to know where the highest density of snow tracks were within the area, relative to the mine, again trying to figure out where most of the caribou are moving within the area. We also used information from RWED's satellite collared caribou. By overlaying the seasonal home range of these animals on the landscape, we're able to determine what, within... whether or not the home range of the Bathurst caribou herd actually overlapped the Snap Lake diamond project.

This information also enabled us to focus when we conducted our aerial surveys, so that we could capture the majority of the movement of caribou through the regional study area.

In addition, we used long-term data. This included things like mapping the historic trails that caribou leave behind during their southern migration. It also used traditional knowledge from the community of Lutselk'e, which state that caribou moving south from the calving grounds, once they hit MacKay Lake, really split off into two groups. One group would move east towards Almer Lake and the other one would move along the north shore of MacKay Lake, cross at the narrows, move through the regional study area, on their way towards Gordon Lake.

Traditional knowledge also tells us that the number of caribou moving through the regional study area is not large, although it varies from year to year. The actual numbers moving within this region is not that large, and most of the

caribou moving through there are in small groups and move north and west of the mine footprint.

So using all this information together provided us with enough information to understand how the project could affect caribou numbers and distribution.

For grizzly bears, we really wanted to understand how habitat loss or use of grizzly bears could be impacted from the project. Recent analysis on satellite-collared grizzly bears in the Slave Geological Province tells us that grizzly bears prefer to den in or near eskers, based on their availability. There is significant selection for these type of landscape features for grizzly bear dens.

So we focused our aerial surveys and ground surveys along those eskers in the regional study area searching for grizzly bear dens. In a couple of information requests, we also produced further analysis on the potential effects of the esker and winter access roads on denning habitat.

Using RWED's satellite-collared information for grizzly bears, we also provided in an additional information response the estimated density of bears, or number of bears, excuse me, that may use the regional study area around the Snap Lake diamond project. These estimates are based on current information from the Lac de Gras area, and estimated that between six and eight individuals, adults, may use a portion of the regional study area. Information on the home range size of these bears was also used to determine the loss of habitat due to the Snap Lake project. And basically, the Snap Lake project would result directly in a loss of less than one percent of one individual's home range.

So habitat loss is minimal.

Since 2001, we've also conducted surveys for grizzly bears presence in habitats that are different other than eskers. For example, we've conducted surveys in habitats such as riperry and shrub and sedge wetlands, looking for the presence of grizzly bear signs.

So the predicted changes in habitat at Snap Lake and the number of bears using the Snap Lake regional study area are supported by the esker surveys for dens in the regional study area, the additional data on preferred bear habitat in the area, and information from collared bears in the Lac de Gras area.

For wolverines, the methods were designed to determine the presence of wolverines in the regional study area. The study design considered the light history of these animals, relatively large home range, and their elusive and solitary nature. The methods were again based on protocols used at the Ekati diamond mine, and again, it was meant to try and provide more regional

information on wolverine presence, the possibility of disturbance around these mine sites.

The baseline data from snow track surveys and the number of incidental observations we have of wolverines indicates that the regional study area is an important place for wolverines. However, the real issue here is that we need to develop mitigation and management to avoid attracting wolverines to the mine site. By avoiding... by not having wolverines come to the mine site, lessens the chance that individuals could be killed or injured or having to be relocated. So it lessens the chance of loss of individual wolverine from the population.

For raptors, the surveys were designed to determine the distribution of raptors nesting around the mine site and their occupancy rate. That is, the number of returns of birds each year. The surveys were conducted in preferred raptor nesting habitat. Prior to the initial survey in 1999, major cliffs and eskers were identified on maps, and these areas were then targeted for searches during the same time as the surveys for grizzly bear dens, and wolf dens and fox dens. In addition, all nests observed during other wildlife surveys, such as upland breeding birds and water fowl surveys, they were visited in subsequent raptor surveys.

In 2000, all nests located in 1999 were revisited. In addition, an area with an 11-kilometre radius of the mine footprint was intensively searched for suitable raptor nest sites and raptor nests. Also, beginning in 2000, we have been conducting surveys in July to estimate nest productivity.

In conclusion, the data collected supports the predicted impacts to changes in the occupancy rate of raptors and their distribution in the regional study area.

So in summary, I'd just like to reiterate a few points. The scope of an environmental assessment is not to provide estimates of population trends, demographic rates, home ranges, or habitat selection behaviour of wildlife. The design is meant to provide baseline data on which provides sufficient information for impact predictions for the specific nature of a project. We wanted to provide data for understanding the patterns of wildlife habitat presence, abundance, and distribution. In addition, the baseline data and design of the studies is meant to provide effective or identify where effective mitigation is needed, and to initiate the development of monitoring programs. Thank you.

**MR. MIKE BELL:** Thank you very much, John. What we will do now is have a break and we'll have the break for 15 minutes until five to eleven.

-- Break

**MR. MIKE BELL:** Okay, just to clarify the process again. We have from now until noon and from 1:30 to 3:00, or 1:30 to 2:45, to deal with issues around wildlife specifically. At three o'clock, we're supposed to start with the session on traditional knowledge, according to the agenda. We're still talking about wildlife in a lot of situations, but we're trying to fit it in.

Now, I'd like to first go around and find out who would like to speak. And I should say something in advance. Sometimes, in terms of our past experience, we run into too many questions and too much time required on the basis of what we're dealing with. We do have the possibility of sidebars. By that I mean meetings between De Beers folks and the scientists and specialists from the various interest groups may meet on the side. They may meet in the evenings, whatever. And they usually provide us with a report about what those conversations have been.

So I'm going to try and keep things moving along, but I don't want to impede people's ability to say what they want to say, just as long as you understand and appreciate the incredible pressure that group animators are under when try and to this... no, no no... do this job. So basically, everybody understands what happens. So the first thing we'll do is make a list as to who wants to make a presentation.

Now, what I'm going to try and also do is group questions together as we go through. Just indicate to me, I have a concern about one, two, three. I'm then going to try and collect and go in the order where we listed them, collect the caribou concerns together so we're not bouncing from caribou to raptors and this sort of thing. So I'll try and ...(inaudible)... that way, okay? Okay, good. Concerns? Would you give us your name, please?

**MR. ALFRED BOYERON (Dettah Band Council):** (translation not available)

**MR. MIKE BELL:** ...the elders as they're coming in have some kind of briefing. Maybe, Rachel, we can talk about that afterwards, so that they do have a sense, or you're providing past information for them or this type of thing. If we could talk about that afterwards?

**MS. RACHEL CRAPEAU:** Sorry, I was busy thinking. Can you repeat that?

**MR. MIKE BELL:** I think it's important to try and give some kind of summary to the elders in terms of things we've already talked about, like fish or these things, so maybe we could just talk about that briefly afterwards, because it might need some resource people from De Beers or something. I'm just concerned that when the elders come in, they're in the midst of something and they may have a little



difficulty understanding we talked about fish and this type of thing. So I'm concerned that there be a proper orientation of what's gone on.

**MS. RACHEL CRAPEAU:** I understand that. I think we're recording today's session. We also recorded their concerns. I'm wanting to know how their concerns are being recorded. Is it on tape? Because we can transcribe these tapes and give it to the appropriate people who were here yesterday and the day before, because when we were talking about aquatic habitat and organisms in fish habitat, these concerns that they brought out today, we can present it to them. I thought Julie Dallow was going to be here today to hear their concerns about fish, but we can do a quick update for them, if you'd like. But the concerns that they bring out, I think people are listening. They can put in their two cents worth if they feel they need to explain things. Also, I think maybe some of the questions were directed to De Beers.

**MR. LOUIE AZZOLINI (MVEIRB):** With respect to transcribing, what is spoken into the mikes is what is transcribed.

**MR. MIKE BELL:** Okay. Concerns or issues that people may have? Let's just go around. Environment Canada, any issues or concerns of anything to do with wildlife, around the subjects we're dealing with; caribou, grizzly, raptor, wildlife corridors, impacts wildlife movements, wildlife study design, any of those subjects?

**MS. VANESSA CHARWOOD (Environment Canada):** Vanessa from Environment Canada. No, we have nothing at this time.

**MR. MIKE BELL:** Okay.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg from Gartner Lee. I have, I guess, a question about... with respect to the bear study, but I have a few concerns, I guess, that came up just in your presentation. So I might just follow-through and narrow it down to one question. I have in my notes here that you mentioned...

**MR. MIKE BELL:** Just...just... would you just list what the concerns are, then we'll go back and let you speak about them.

**MS. PATTY HOGG (Gartner Lee):** Okay, specifically then it's the bear surveys.

**MR. MIKE BELL:** Okay, good. And if other things come up, we'll put them on the list as we deal with them. Heidi.

**MS. HEIDI KLEIN (Gartner Lee):** No questions at this time.

**MR. MIKE BELL:** Steve.

**MR. STEVE WILBUR (Dogrib):** Steve Wilbur for the Dogrib. I have a few questions about each critter we talked about regarding the baseline.

**MR. MIKE BELL:** So basically, if I just list the species, caribou, wolverine, raptors, and... what's the fourth area... caribou, wolverine, raptors, and...

-- Interjection

...grizzly, right. Okay. Tim.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives. Questions on reporting protocols for injured or dead wildlife on the mine site, as well as questions on... this one is more of a cumulative effects question, so I don't know if it should be deferred to later or not, but anyways, on wolverine. Cumulative effects questions, surveying of wolverine.

**MR. MIKE BELL:** Okay. I just want to mention that Monday we're dealing with wildlife monitoring programs and we're dealing with mitigation and adaptive management, so questions relating to monitoring and all of those things are more appropriate on Monday.

But I leave it to De Beers as always at this point to say we think we'd rather deal with that question on Monday or whatever it is.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Yeah, I think if we can follow the schedule, I guess the one question was just the clarification on, you said cumulative effects and then you said surveying for wolverines. Were those linked or were they... if I could just have some clarification there.

**MR. TIM BYERS (Yellowknives Dene):** There is a link there because apparently the wolverine track surveys, to what I understand, were done at a different time of year from those done for the Diavik/BHP studies.

**MR. MIKE BELL:** Okay, let's get it on the agenda. If De Beers still feels they'd rather deal with it on Monday, we can deal with it on Monday. Rachel.

**MS. RACHEL CRAPEAU:** My concerns is that we need some more maps on the wall. The elders want to see some maps on the Snap Lake diamond project, overall site plan, figure 3.1-3. Maybe we can give them one each. The other one, the post-closure pathway of ground water in contact with mine working, 9.2-13, and the other one that you showed on the presentation with the winter road, that

one. Could we get a fair-sized one so that we can do an overall look at it when we do our own little caucus session?

My other question was you did a circle, and with the circle of what you've been doing for baseline data collecting work. Were you... is that just in that area that you did your collection of information?

My other question is how does the winter road and access winter road, how is that going to be done for building, or how are you guys going to do the monitoring? Because we're interested in that work, how it's going to be done. And for the record, it's Rachel for the Yellowknives Dene.

**MR. MIKE BELL:** Right. John or Robin, can we deal with this map problem just now?

**MR. JOHN MCCONNELL (De Beers Canada):** Sure. It's John McConnell with De Beers. We have posted some of the maps. I'm not sure if they're of a size suitable for Rachel.

We did look at this morning's presentation, and probably at the moment, most of the drawings that you saw in this morning's presentation are being printed in the size that's on the wall behind me. But certainly for extra meetings after these sessions, if Rachel just keeps a list of drawings that she would like large, we can get those done and get them to her.

**MR. MIKE BELL:** Okay.

**MS. RACHEL CRAPEAU:** Rachel for Yellowknives Dene. If I want them extra large, I need them right away. I don't want to wait until tomorrow or next week, because we're going to look at them today, and eyesight being the way they are with elders, I don't want to order for a big magnifying glass either. Thank you.

**MR. MIKE BELL:** Okay.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. We'll try and keep that in mind for next week in terms of the presentations, but you have to appreciate that sometimes we're finalizing these presentations at eleven o'clock the night before.

Although the technology is good, it's tough for us to generate a sort of three foot by four foot map in a matter of moments, so we'll do our best, but sometimes the technology just isn't there to generate these things in that large a size immediately.

**MR. MIKE BELL:** Okay. Rachel.

**MS. RACHEL CRAPEAU:** Could I just let you know which ones I need and you can produce them for me in this size, and I'll go to creative, or that place next to the post office. And I hear they're only like three dollars or something a sheet. Thank you.

**MR. MIKE BELL:** Good. Okay, who's next? Steve.

**MR. STEVE MATTHEWS (RWED):** I have some questions regarding...

**MR. MIKE BELL:** Name, please.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews: I have some questions regarding the raptor baseline data and the assessment of rare plant potential.

**MR. MIKE BELL:** Rare plant potential...okay. Anne.

**MS. ANNE GUNN (RWED):** Anne Gunn, wildlife and fisheries. I have some questions, some issues and concerns, over the adequacy of the baseline data for caribou, dust and light.

**MR. MIKE BELL:** Caribou, dust and light. Okay.

**MR. RAY CASE (RWED):** Ray Case with wildlife and fisheries. I've got some questions regarding wolverine and the assessment of potential attractants for wolverine. I also have questions regarding grizzly bear and the use and interpretation of data and results provided by the West Kitikmeot Slave Study study on grizzly bear ecology, and some of the implications of the interpretations and assumptions that have been made.

**MR. MIKE BELL:** Okay.

**MR. PETR COLMAS (NSMA):** Petr Colmas, NSMA. I have some questions and concerns in regard of the study design and how that relates to your ability to define and assess impacts. So basically, the impact assessment itself needs to be clarified, and that also relates to the ability to design monitoring programs, but I guess we're going to be talking about that tomorrow.

**MR. MIKE BELL:** Okay. Janet, questions. They've already been handled?

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. Nothing at the moment, Mike.

**MR. MIKE BELL:** Okay. One more.

**MS. VELMA STERNBERG (DIAND):** Velma Sternberg, Indian and Northern Affairs, mineral development division. I have a question on the raptor survey, but I wish to direct the question both to De Beers and to other experts in the room. Thank you.

**MR. MIKE BELL:** Your name again, please?

**MS. VELMA STERNBERG (DIAND):** Velma Sternberg.

**MR. MIKE BELL:** Okay. John.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. Mike, I think, you know, most of Alfred's comments was a comment, but he did have one question at the beginning which was in regard to why we've only talked about grizzly bears, caribou, wolverine and raptors, and not some of the other wildlife, so I think that should be added to the list as an issue and we can address that.

**MR. MIKE BELL:** Okay... okay. Why don't we deal with Alfred's comment to start with, and maybe we can get a response?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Alfred, we studied many different types of wildlife, and we chose to discuss a few of those species today, because from the comments we received, those were the animals that people were most interested in. We didn't really have any questions on wolves, but we're happy to answer any questions on wolves or breeding birds or any of the species that we study.

**MR. MIKE BELL:** Alfred.

**MR. ALFRED BOYERON (Dettah Band Council):** (translation not available)

**MR. MIKE BELL:** Thank you, Alfred, for that clarification, and now, who was the next... I'll just look at my list here. Patty.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner...

**MR. MIKE BELL:** Just a sec, Patty, please.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini here with the review board seeking a point of clarification. Alfred mentioned moose and wolves. Maybe we could answer that question with respect to the work that was undertaken.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. Alfred, your question was whether we looked at moose and at... what was the

other one? Wolves, ducks and fish. We did look at those species. For moose, we don't see moose very often up at Snap Lake, above the tree line. We have recorded the times that we have seen moose. I think there have been a few sightings of moose. I can remember one day in a caribou survey seeing a moose out on the tundra, which was certainly interesting to see.

We have also looked at wolves, and what we did for wolves was that we flew along the eskers in the area, and to look for wolf dens and Dean Cluff, regional biologist for RWED, he joined us I think on two of those surveys. And we have found, off the top of my head, I think four wolf dens. And we have visited those since first seeing them.

We have done surveys to look for small birds; ptarmigan and small tweety birds, and we have also done surveys looking at water fowl, so basically counting the number of ducks on the lakes.

We have done many studies on fish, what sort of fish exist in the area. And what I found in Snap Lake and some of the other lakes around it, and we have looked at what contaminants in the fish and we have looked at what we think the effects of the project might be on fish.

And we looked to check to make sure that there wouldn't be any effects on people from eating those fish, and/or from eating the caribou. Mahsi.

**MR. MIKE BELL:** We would like to add that Rachel will provide data or information that's been shared on those areas that you're talking about, particularly fish or things like this that we're dealing with, okay? Patty.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee. So John, just to go back to some of the things you mentioned in your presentation with respect to the bear survey, first of all, I have some quotes here that I'm not quite sure if they contradict what you said, but if you could provide clarity on one statement that you said, that bears... there's significant selection for eskers by bears based on their availability. And the quote I have, or it's not necessarily a quote but the statement I have is taken from several documents and it's based on Phil McLaughlin's thesis with respect to spatial organization and habitat selection patterns of barren ground grizzly bears in the central arctic. And it indicates that bears may prefer to den in heath tundra with limited use of esker habitat, and in fact, esker habitat accounted for only 13 percent of the dens located. So certainly that's a premise for some of my further questions in terms of the way the study was designed, but I'm not quite sure how to sort of match that with a statement you had stated earlier today in your presentation, about that there was significant selection of eskers by den, or by bears.

**MR. JOHN BERGELL (Golder Associates):** Patty, you're right in saying... oh, John Bergell, Golder Associates. You're right saying that the number of dens located in esker habitat was only 13 percent of the, I think it was 56 dens that Phil found. However, when he did an analysis of the number of dens found in each of those habitats relative to the availability of the habitat, there was still significant selection for bears to den on eskers.

And this is why we focused our surveys on eskers.

**MR. MIKE BELL:** Excuse me, just keep the conversation going each time, if you would just Announce and all the stuff you want to say is something more.

**MS. PATTY HOGG (Gartner Lee):** Okay then, I'm just...and then within a statement that you had in the EAR, that baseline studies completed during 1999 and 2000 found no active bear dens located within the RFA because searches for dens are restricted to habitat eskers, or esker habitat. The likelihood of finding dens and other habitats was low. So again, it seems to me that there's sort of a confusion here or a problem with...

**MR. JOHN BERGELL (Golder Associates):** That is one of the reasons why we've turned our monitoring or our continuation of baseline data to those other habitats where grizzly bears also prefer to select, so that's the reason for doing surveys for bear signs in the riparian shrub habitats and the sedge wetland habitats.

**MS. PATTY HOGG (Gartner Lee):** And you did this for 2001 and 2002, or just 2001?

**MR. JOHN BERGELL (Golder Associates):** 2001 and 2002.

**MR. MIKE BELL:** I know it's a little painful, folks, but please Announce your name each time you... because we've got transcripts.

**MR. JOHN BERGELL (Golder Associates):** Sorry, John Bergell, Golder Associates, yes. And it also is being... it will be done this year.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee. Okay, thank you. So then, have you had an opportunity then, based on this new data, the two years worth of data, to reanalyze your results, and then from there, perhaps reevaluate your impact predictions.

**MR. JOHN BERGELL (Golder Associates):** We haven't had a chance to look at the data from this year yet, completely. The data from 2001 confirms the impact predictions, that there is... grizzly bears do use the regional study area, and those habitat surveys show that there... that the percentage of those plots for

grizzly bears, where signs of grizzly bears were found was... I don't have the number off the top of my head, but I think it's somewhere between about 50 and 60 percent. So it does support our baseline data that grizzly bears do use the regional study area. However, as you know, it does not give us an estimate of the number of bears.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee. Okay, again, thank you for that. That clarifies certainly the majority, I guess, of my concerns. As you say, it confirms or reaffirms your baseline results and again, are you confident then with your impact predictions that you made, for the first two years, given us extra information?

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates. Yes.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee. Is that information available in a report or is it... can it be made available, the extra data for the two years?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Once the impact assessment was finalized, De Beers chose to continue on work for wildlife monitoring, and has produced a wildlife monitoring report for 2001, which has been provided to RWED. It has not yet been circulated. I will place that on the public registry so that everybody can read it, and that when the 2002 report is available, we will also do that.

**MS. PATTY HOGG (Gartner Lee):** Thank you.

**MR. MIKE BELL:** Good. Mike Bell again. Steve, to the subject of bears.

**MR. STEVE WILBUR (Dogrib):** My questions are going to relate to baseline information and how well we essentially know about these wildlife and wildlife migration habits. Actually, I had caribou down first. Do you want me to stick with bear?

**MR. MIKE BELL:** Yeah, because we started with bear.

**MR. STEVE WILBUR (Dogrib):** Okay. Let's see... John, I think you mentioned that there were six to eight grizzly in the regional study area, and my question relates to, how much is that going to vary over time? And what is the typical density of bear populations across the region? So that... is this six to eight representative of just the study you conducted recently, or is this something that's going to, for 25 years, how will that vary?



**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates. Steve, the number of bears... it's not the number of bears within the regional study area, okay? It's an estimate for the number of bears that could potentially use the regional study area. That is, it would be part of their home range, okay? So it's not that there's six to eight bears actually within the regional study area.

**MR. STEVE WILBUR (Dogrib):** Steve Wilbur, Dogrib. Thanks, John. I guess I'll clarify then. Six to eight bears could potentially use the regional study area, over what time frame?

**MR. JOHN BERGELL (Golder Associates):** That would be from the period of emergence in the spring to... to the hibernating period. Again, we have not found or located a grizzly bear den during all our field surveys there, so we have no indication that bears actually hibernate, okay, in the regional study area right now.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. I think you were getting at over the 25-year mine life, how many were you likely to see? It's still likely to be the regional study area will overlap with the home ranges of six to eight individuals, but that those individuals may change over time, so as... due to the natural process of recruitment and to the population, that the ones that are going to be disappear will be replaced by another.

**MR. STEVE WILBUR (Dogrib):** Steve Wilbur, Dogrib. Thanks. So I guess in essence from impact, over the 25-year period that density of use by bears, not the same individual bears, would we expect that same six to eight number, and that's kind of a number I'm getting, is that going to be a per-year number we expect in a year? Are we going to go down to one to two? Are we going to expect a lot more? I guess my questions are related to, will the mine be an attractive nuisance or something later that they will avoid the area?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. Kind of ironic, De Beers and regarding De Beers. I think the key point here is that the way in which we... there are essentially several ways in which we could impact grizzly bears. And I think that, you know, habitat is one of them, because we have a mine, a small mine footprint, that we're essentially restricting our potential to influence grizzly bears, because we have a small footprint.

The second element is that regardless of the natural variability in grizzly bear populations, the key issue is how many of those do we have the potential to impact? And ultimately, it comes down to we need to have effective mitigation to ensure that we don't impact the grizzly bears, whether it's ten or whether it's a thousand in the regional study area. We have to focus on minimizing, to the maximum extent possible, impacts on any of them.

**MR. MIKE BELL:** Steve.

**MR. STEVE WILBUR (Dogrib):** Steve Wilbur. I'm done with bears, if we can move on.

**MR. MIKE BELL:** Good. Just give me a second. I'm going to change things a little bit and suggest, Steve... Steve, I'm going to change things a little bit because I'm concerned about... oh, sorry.

**MR. ISADORE TSETTA:** (translation not available)

**MR. MIKE BELL:** Yes, please do.

**MR. ISADORE TSETTA:** (translation not available)

**MR. MIKE BELL:** De Beers.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Isadore, thank you very much for your question. I would suggest that perhaps Ray Case from RWED might be able to provide RWED's perspective on the use of grizzlies wandering into the tree line.

**MR. MIKE BELL:** Ray.

**MR. RAY CASE (RWED):** Ray Case, with wildlife and fisheries. We didn't have any grizzly bears collared in this specific area. However, we have tracked grizzly bears in the area around Kugluktuk and Great Bear Lake, Winter Lake area, Snare Lake area, and we have found that the grizzly bears can be expected to use the area right at the edge of tree line, and certainly in areas similar to the Snap Lake area, where there are just outpockets of trees. So we would expect the grizzly bear to make quite a bit of use of the Snap Lake area.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. And if I could add to that, we have observed very few grizzlies at the Snap Lake project, but the surveys that we've been doing since 2001, we've looked at, rather than looking for actual grizzlies, we've been looking at different places around the regional study area, to look for their sign, so to see if there is evidence of them using the area. And in conjunction with people from the communities, we fly out and we look in an area of where we would expect to see a grizzly bear, and look for scat and hair and tracks, to provide us with some more information on what grizzlies use the area. And certainly that information confirms what Ray is saying, that we do see grizzly bear use in the area, and in fact, the grizzlies that we... the areas where we're seeing some of that, some of the use, is closer to those pockets of trees near Camsell Lake. Very close to the areas where we're seeing the majority of caribou coming through.

**MR. MIKE BELL:** Isadore, did you have another question?

**MR. ISADORE TSETTA:** (translation not available)

**MR. MIKE BELL:** Okay. Good. Thank you. Just on our list, I would suggest, since we've got numbers of questions around the different types of species, that we start next with caribou, unless we... are there more questions about bears? Did anybody else have a... Ray, you had a question about bears. We'll take... anybody else? No. We'll take your questions. There are several questions here, and then we'll go to caribou, okay? Good. Ray.

**MR. RAY CASE (RWED):** Okay, first I just wanted to make a comment. In the characterization of the baseline information, John essentially looked at the baseline studies that were done by De Beers themselves, but I just wanted to highlight that the baseline data for this project includes a \$1.1 million study of grizzly bears, which was designed after BHP environmental assessment was conducted because there was very little baseline data upon which to assess the BHP project.

My review of the use of this information raised some concerns and, to be frank, I don't think De Beers has made full and appropriate use of this study, but the door's not closed yet on that.

One thing that the study looked at in quite a bit of detail was how grizzly bears use the landscape. We found De Beers has taken a look at the footprint of their site and come to conclusions about how this project will affect some of the landscape features that grizzly bears use.

What I didn't find and would like De Beers to address, the question of what do they feel is more likely to be the full zone of influence on how grizzly bears use the various habitats around their site? The footprint itself is turned into non-grizzly bear habitat, but for some extent around the area, the effectiveness of that habitat for the use by grizzly bears is affected by things such as dust, noise, aircraft coming in and out, and various other activities associated with the development. As I say, we believe the information was available for them to take this type of view.

Another area where the information on that study... well, maybe... yeah, no... maybe I'll go through a couple of these and then allow De Beers to comment. With respect to the potential effect on the grizzly bear population, the idea that six to eight bears may use the regional study area I believe is a reasonable estimate. But of considerable more importance is that there may be, amongst that group of six to eight bears, one or two breeding females that have that area

as part of their home range. And they are a significantly more important part of the population dynamics of grizzly bears.

The other thing was the conclusion of the WKSS study was that grizzly bears in the Slave Geological Province need to be managed as a whole. There's interchange between those various areas, and that conclusion is clearly based on the extent of movement of sub-adult bears.

The results also, however, showed that there appear to be several nodes or concentrations of adult female bears. Now, there can be some question as to whether that's something of study design or an actual fact. Certainly habitat suggests that it could be, in fact, some different nodes of adult females.

To use a precautionary principle, the analysis and the potential effect then should probably be assessed on these nodes of adult females, given that we don't know for sure that that isn't the case.

This could be important in whether or not we look at it at this scale, in that some of these adult females may also be -- in this node -- may also be impacted particularly by other human activities in the area, including outfitting, which is quite concentrated within that node, as well as the other mining developments.

Patty raised the issue of denning, and I guess, like the stock market, past performance isn't any indication of future performance. The fact that no dens have been observed in that area to date isn't that informative to grizzly bear ecology. It's more important is the information as to whether some of the areas in there serve as potential grizzly bear habitat. For the most part, grizzly bear within the barren lands do not re-use dens and do not necessarily come back right to the same area.

The importance of eskers to denning bears and some of the data that they've used also found that adult male bears had a tendency to use the more significant esker systems for denning than did the female bears. And this in some ways makes sense in that they are used as travel corridors, and the females really don't want to be found by adult male bears and they will den off-site.

My concern is then that in looking at this information and challenging these assumptions in a different way, there is the potential, I feel, in that there may be a need to revisit some of the impact conclusions regarding grizzly bears. Certainly as pointed out by De Beers, the mitigation aspects of it are critical, and we can talk about them later, but some of the assumptions regarding what might come off of a bear, if... what impact might be if bears are displaced, unable to use some of their habitats, or some of the impacts on an adult female component of the population. So those are the types of issues and concerns that RWED has

been putting forward, and would like to see some discussion regarding them, see what sort of resolution we can come to.

**MR. MIKE BELL:** Mike Bell. Before we start a response to the concerns that are raised, I want to point out to you that we will break at noon precisely for the break, and therefore, if I interrupt you, we'll come back to allow you to continue a response. I don't know how long the response will take, but we will stop at noon, okay? As Robin says, I have a hot date, so...

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. There were a lot of comments there, Ray, and very difficult to... I'm going to provide a response, but because there was so much that you covered, I'm sure I'm only going to keep it a few points of it, so I think if we need to go back, we can.

I think a couple of things is that I'll touch very briefly on your issue around the zone of influence. Now, we do not know the zone of influence for Snap Lake. We're not going to know what the zone of influence is until we've built a mine and until we've monitored to determine what that zone of influence is, that we can essentially what we've done is that we've established what we think is a zone of influence based on the zone of influence that's been determined from Ekati. But it's likely to be much smaller, because we don't have the huge footprint that Ekati does, but we're not going to know that until we basically proceed into monitoring after construction of the project.

I agree that, on a second issue, I agree that past performance relating to habitat uses is not... it doesn't mean that grizzlies won't den there in perpetuity, you know what I mean? By no means do we conclude that. We state that to date, there's been no evidence. And I think that certainly the research of Phil McLaughlin certainly has provided a new way for research on grizzly bear habitat use to be used, and we've adapted that in our study methods.

I think the key point is certainly breeding females are critical to the integrity of the population. We recognize that. But that by providing impact management measures that are protective of all grizzlies, whether they're male or female, we're basically going to cover that.

Now, the questions regarding the, you know, the fine level disturbance of those is going to be something that certainly by all means we can take the opportunity to identify other methods that we've used for monitoring. We're quite happy to revisit that. I think that the work done at Ekati certainly is extremely valuable.

**MR. RAY CASE (RWED):** We're on the clock watch here.

**MR. MIKE BELL:** I'll watch it, you just talk.

**MR. RAY CASE (RWED):** You indicated that your assumption was that the zone of influence would be like Ekati. Could you be more specific in what like Ekati means as far as a zone of influence?

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates. I guess you... we haven't got an analysis of that data. You guys have not completed that analysis of really the influence of roads, the core mine area on bears using the Lac de Gras area.

What we see, have seen over the last couple of years there though is that there is some... there is some space between the core area of the Ekati Mine and those individuals that are using the area, around the core area, okay, not the misery camp and the road and that. The bears are running across the road there, at least one of them is. Last year there was a couple that did that.

So that, you know, barring the... that there has been no analysis done, basically as a qualitative assessment, it does... there does seem to be a zone of influence around... around the core area of the Ekati Mine. Whether or not that's related to the mine itself or a combination of mine and habitat, will... will come out of an analysis, hopefully.

So I guess that is where it... really, just looking at it qualitatively, Ray, we... we're assuming that there is some zone of influence around there, but right now, at Snap, because we have no information, we really don't know what that zone of influence is. Maybe some years of monitoring those habitats around there will give us some indication, or hopefully there will be some bears that will be collared that... that use the regional study area around Snap Lake, and will provide us with some more information on that.

**MR. RAY CASE (RWED):** I guess the assumption then is that since we don't really know what the zone of influence is that we can't do anything to, you know, to address that hypothesis about, you know, yet certainly within both the BHP and Diavik processes, they took advantage of information from studies in other areas to come up with a hypothetical zone of influence of a shape which indicated, you know, their noise profile and such. I think that the research ongoing right now with BHP may actually show that during that period, their assumption of a zone of influence was probably greater for some habitats than will be demonstrated through the study. It was just noticeable within the conclusions, or the information leading to your conclusions, that because the information wasn't available specifically for this area, that we didn't really try and address the issue of zone of influence.

Now, that said, there was some effort to do that in a response to an IR about the winter road, using a 200-metre impact on denning, but that's only one aspect of it.

**UNKNOWN MALE SPEAKER:** Just before we break for lunch, and I appreciate what Ray, where you're going with your questions, Ray. I just want to leave us with a couple of... what I understood to be the... try to synthesize it down to four or five key questions that we can sort of ruminate over lunch with. Basically, the general question about the use of data from the BHP study, I appreciate what you're saying, but I think we need to have more specific questions.

-- Interjection

You were mentioning the applicability and the use of work that was undertaken through previous studies. You wanted to know, if I understood correctly, how many of the six to eight bears in the regional study areas could be females, so I think that you're sort of looking, because you believe that they had a higher importance. Then you wanted to know if using a precautionary principal is assuming that where the mine was built was a female noting area, what would the impact be? In other words, what would be the impact if the mine was in a female noting area? And the third was with respect to denning habitat and what percentage of the area that could be affected was reasonably suitable for a female habitat denning and male habitat denning. Again, for purposes of impact prediction.

And that's sort of what I distilled as the key questions, and I think I'm trying to bring some focus to the questions, because there's a lot of comments, and your comments is this is what I got out of your comments in terms of questions.

**MR. MIKE BELL:** Can we break, or would... is that all right for De Beers right now if we break, and you've got a sense of what these issues are, we come back? Okay. One-thirty, there's bonus points for those who get here early. I usually tell jokes, so that's an added incentive to come back at one-thirty. Thank you. Right on time.

-- Break

**MR. MIKE BELL:** Our schedule says that we have until now until 2:45 for a break, and then three o'clock we start with traditional knowledge. It seems to me we've got a significant number of questions here, so I will consult you as we're going along, around two-thirty, or something, when I get a better sense of how far we're getting, what kinds of adjustments you may want to make, if indeed we need to make adjustments by that time, okay? Everybody understands what I'm dealing with? The bottom line is we seem to have more questions than we have

time to deal with them, so we've worked out solutions for this before. We may be able to deal with this in some other way.

Okay, we were in the midst of a conversation... excuse me, go ahead, Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Sorry, Mike, I'm probably pre-empting you there, so I should've kept my hand down a bit.

We heard Ray express a lot of concerns about the impact predictions around grizzly bears and things like nodes and females and all this sort of thing. I think that from my perspective, that there's a lot of issues wrapped up in that, and that we really don't have a clear idea of the specifics. And until we have that, it's going to be very difficult for us to provide the resolution. What De Beers would propose is that we identify an opportunity to essentially sit down with RWED and go through the impact assessment for grizzlies and identify the specific information and the references that we've used or haven't used at this stage of the environmental assessment, to basically determine whether, to really come to understand RWED's concerns around this.

And so, you know, it's essentially an opportunity for, like one of the focus groups that we've had previously. I'm not suggesting that it's tonight between six and eight, but you know, I think that this might be a good opportunity, and by... just like the other venues, we can certainly get back to people with what the conclusions are and what recommendations or suggestions there are.

**MR. MIKE BELL:** Okay. Ray.

**MR. RAY CASE (RWED):** Yeah, RWED is certainly interested in having further discussions with De Beers. I guess the one point though is that certainly not just RWED that has concerns, or had questions or raised questions regarding grizzly bears, and we might want to identify perhaps, a little bit broader of a group to discuss that.

I do have an issue in that my carnivore biologist is not available this weekend and not in town right now, so we really don't have an opportunity to look at some of the specifics, you know, in the short term, but we could consider options for dealing with some of the specifics.

I think it's, you know, in some of the questions and concerns that I've raised, I guess I conclude that De Beers is not in a position right now to answer those, and clearly those would have required some return to the data at some point, so we'd be looking for some of that opportunity as well, and some interest, I guess,



on... a willingness, I guess, expressed on behalf of De Beers that that is a valid thing to do, and to revisiting some of the data and analyzing some of the data.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. You know, certainly on the first point, we weren't suggesting that we do this this weekend. If certainly we have an opportunity Monday night, and if Monday night is appropriate, then we can do that. If that's... and certainly, you know, previously, if we keep it to this forum when other people are in town in terms of a commitment in terms of consultants for other groups, it's certainly a good opportunity. So if Monday night works, then that's fine. If it doesn't we can certainly seek an alternate time.

I think though I do have to say that I disagree with your conclusion, Ray, that we're not in a position to answer your concerns, because we don't have any specific questions and we're not clear on what your specific questions are. You've got a lot... you've expressed a lot of concerns, but until we know the details of those issues, then we're not going to be able to address those further. So we're certainly happy to spend some time with RWED to basically identify what those are and discuss those, but we need to do that and have those thoroughly worked out before there's any question of revisiting the data.

**MR. MIKE BELL:** Two qualifiers. If the two of you... if you could get together and we could set up a particular time for that, I want to make sure there were a couple of other people who had questions about grizzlies and I want to deal with these first, because these may fit in or not fit in. You had one, Chris had one also that he talked to me about a little... a moment ago. So why don't we go with his...

**MR. LOUIE AZZOLINI (MVEIRB):** Just a procedural matter first... sorry, Louie Azzolini. I would like to ensure that whatever the outcome of your discussions are that they are read into the record.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada would propose that similar to the previous meetings this week, that detailed notes would be taken and they would be submitted to the public record.

**MR. MIKE BELL:** Thank you. I should've noted that myself. How do I pronounce your first name?

**MR. PETR COLMAS (NSMA):** Petr.

**MR. MIKE BELL:** Spell it for me, please.

**MR. PETR COLMAS (NSMA):** Petr.

**MR. MIKE BELL:** Petr. Okay. Over to you.

**MR. PETR COLMAS (NSMA):** Petr Colmas from the NSMA. I do have a bit more of a specific questions, and you guys were asking for more specific questions, and that's in terms of the preference of grizzly bears for eskers. You, John, quite clearly indicated that there is a clear preference by grizzly bears for eskers because there's so few of them in the areas of the mitigation measures, of course, is that you stay away from eskers. But looking at it from a... not from a disturbance point of view but from a grizzly point of view, if I'm a grizzly bear, I still have about a 87 percent chance to not be on an esker, especially if I'm a female grizzly bear. And as far as I understand, most of the footprint of the proposed project is in areas outside of the eskers. How does that affect your impact assessment, given that most of the disturbance happens where most of the bears are?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Petr, can you just repeat the question again?

**MR. PETR COLMAS (NSMA):** The question is that most of the impact assessment that you have presented focuses from the use of eskers. And we have learned that this is a very important habitat for them, and that's good, but we have also just learned that, and earlier this morning heard, that most of the bears are actually outside of the eskers, denning outside. So the question now is that if we consider that for your impact assessment, will that affect the impact magnitude that you are predicting?

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates. Yes, Petr, we did assess the impact to grizzly bear den sites on that small amount of esker south of the mine that would be quarried, but we also looked at the impact, the direct loss of habitat of those other habitats that are important for grizzly bear habitat, such as heath tundra boulder habitat, spruce forest habitat -- those things that could be directly impacted by the actual, physical footprint of the mine. Does that provide clarification for you?

**MR. PETR COLMAS (NSMA):** Yeah, I just need to see the numbers. I don't recall the assessment of the impacts on bears from the other habitats in terms of the quantification.

**MR. JOHN BERGELL (Golder Associates):** It was provided... sorry, John Bergell, Golder Associates. It was provided and also in an information request from RWED, it... and it... yeah, that's...

-- Interjection

I can give you the number later, okay?

**MR. PETR COLMAS (NSMA):** Yeah, thanks.

**MR. MIKE BELL:** Okay. Chris O'Brien.

**MR. CHRIS O'BRIEN:** Chris O'Brien. Yeah, I'm a bit confused now. I thought I had a clear question in my mind, but anyway, De Beers I thought had said that they felt that most of the dens were going to be found on eskers, so that they concentrate on looking at eskers for dens, and then, of course, they have since found out that most bear dens are in fact not on the eskers, and although they did... so I guess they didn't do an intensive look for bear dens off eskers. Although, of course, if they found some in looking for other information, they would've noted them down. Someone pointed out to me that doing a really intensive look for bear dens in other parts, non-esker parts of the study area, I guess would be like looking for a needle in a hay stack, so it's extremely hard to get an idea of how many dens there would be off-esker. Ray Case pointed out that's where you find, in a way, the most important dens, the dens of breeding females.

So what I... now I find myself in a position of total confusion. What Ray and De Beers are talking about back and forth there, I didn't quite grasp whether Ray was saying they don't have the information, they don't have the good baseline information, or whether their interpretation of the information is lacking.

But my concern, of course, is the ability of anybody to predict the impacts of a mine like De Beers on grizzly bears. I think that's what this meeting is going to be all about, that...

**MR. MIKE BELL:** Chris, I hear what you're saying, but I don't understand what your question is.

**MR. CHRIS O'BRIEN:** I'm not sure if I do either, anymore. I thought it was pretty clear. It was particularly to do with, it seemed to me that De Beers had not looked for eskers... sorry, for dens off-esker, where apparently, most of the dens are to be found. So how can they possibly know how many dens there are? But apparently that's impossible information to find. So then, my question sort of dissipated into a puff of smoke.

**MR. MIKE BELL:** Okay, maybe this can... it seems to be... we've got some discrepancy, or at least, misunderstanding between the groups involved and we've set up a meeting next Monday night to try and solve those problems.

**MR. CHRIS O'BRIEN:** Yes, I think that... that will... I presume that's where it will call come out in the wash, whether De Beers has gathered enough information or

not, have come to the right conclusions, or reasonable conclusions. So I guess I look forward to the outcome of that meeting.

**MR. MIKE BELL:** Okay. Good.

**MR. CHRIS O'BRIEN:** Thanks.

**MR. MIKE BELL:** Robin. Oh, sorry...

**MS. BETTY BESWICK (Golder Associates):** Betty Beswick representing De Beers. Let me try and summarize what I think De Beers is saying and what you're asking. I think a needle in a haystack analogy is probably a really good one, and for that reason, De Beers focused on looking on eskers which, given any other habitat, is the most likely one for bear dens to be in, accepting the fact that they could be in all other kinds of habitats, lots of other kinds of habitat too, including the heath boulder. Given that, the mine site is primarily on heath boulder, and if there were bear dens in there, there's lots of other heath boulder habitats that's less limiting than what the esker habitat would be. So I think... and then the impact assessment wasn't focused on only on eskers. Our baseline work was focused on looking at eskers because we thought that was the most likely place to find them, but the impact assessment looked at all those kinds of habitats and what the impact would be on the bear use of those habitats.

**MR. MIKE BELL:** Okay, if we've still got confusion, I don't want to increase the confusion here. I'd rather deal with it on Monday night. Is it... Ray, what's your sense?

**MR. RAY CASE (RWED):** I guess just... what I thought I'd try and do is sort of rephrase some concerns into a question and then basically leave it at that and, I mean, it's not all of the issues that I've raised, but a couple of things we could allow people to think about before we get together.

So my... one of my questions would be what does De Beers consider to be the zone of influence that their project will have with respect to how grizzly bears use the landscape? What are they looking at as far as the number of kilometres, how does this relate to specific activities, such as activities and effects, such as dust or aircraft travel? And how does this relate on the scale that the grizzly bears see, and particularly the adult female grizzly bears, see their landscape at? So is there a proportion of an adult female's home range, or a group of adult females home ranges that would be displaced? Those types of questions.

The second aspect relating to impact at a population level, how many bears does De Beers feel will be killed at the site over the next 25 years? Assumptions

regarding age, sex, and the impact of different age/sex classifications on the population.

And then we just touched on what was the potential for denning habitats and changes available, or opportunities available to use denning habitat as a result of different activities at the mine, and the importance of that at the scale of an adult female grizzly bear? So those are just a couple of questions that I jotted down and hopefully help focus some for future discussion.

**MR. MIKE BELL:** Okay. Okay. Steve. Sorry, just a minute please. Sorry, Steve. Robin. Steve.

**MR. STEVE WILBUR (Dogrib):** Steve Wilbur, Dogrib. I won't be able to be here for this follow-up dialog, and from what I'm hearing, both from Chris's questions and it seems like I've got four questions here that I've been able to frame based on what I think the concern is. So I'm just going to ask those questions.

Has De Beers looked off-esker for bear dens? Number one.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Steve, Robin Johnstone from De Beers. Why don't we take them one at a time so we don't get into this following on thing. We have looked for bears off the eskers, okay?

**MR. STEVE WILBUR (Dogrib):** Would you... how... can you describe this off-esker survey? The level of effort, I guess, is what I'm looking for.

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates. I'm just looking at the... at what we did in 2000. Or, sorry, 2001 and 2002, and what the methodology is is first of all, we figure out on the landscape there in the regional study area, where the riparian shrub and sedge wetland habitat is, okay? And we select polygons, or a plot, that is 250 by 250 metres with... and it has to have at least 30 percent of that particular habitat type in it. That is the focus of the survey. But the other thing is it's not restricted to the plot, okay? So if there is an esker nearby, or there is an outcrop or something like that that could, you know, be suitable for a bear den, we will also check that out.

Now, the numbers of those plots in the spring for sedge wetland is 26 across the regional study area, and the number in riparian shrub is 16. And we spent approximately an hour in each one of those areas. And we do that each year.

**MR. STEVE WILBUR (Dogrib):** So do we have an estimate of the... that number you just gave, 26 and 16, is that an estimate of bear dens or is that an estimate of...

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. No bear dens were affected.

**MR. STEVE WILBUR (Dogrib):** Okay. Then have we estimated impacts to bear dens based on this information? Is that our baseline of information that... the negative finds, I guess.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers, Robin... you want do finish that, Steve?

**MR. STEVE WILBUR (Dogrib):** I'll finish it. Maybe I'll ask it in a different sense. I guess having found no bear dens, have you approached this with more like a limiting factors assessment in the sense that the mine influence is so small compared to the available habitat of bear dens?

**MR. JOHN BERGELL (Golder Associates):** The purpose of the... John Bergell, Golder Associates. The purpose of the program is to survey for bear signs in the regional study area to ensure that bears are still present in the regional study area. And also, it provides us an opportunity, an extra search opportunity off-escapers to potentially find grizzly bear dens. So it's not a process of elimination. It's an opportunity to find the needle in a haystack, so to speak.

**MR. STEVE WILBUR (Dogrib):** Thanks, John. I guess I was just concerned about do we have enough baseline information to be able to predict an impact, and then continue this monitoring to be able to assess if an impact is occurring?

**MS. BETTY BESWICK (Golder Associates):** I guess given that we found no bear dens in all these surveys... Betty Beswick, Golder Associates for De Beers. I guess given that we found no bear dens, if we truly use that information on our impact assessment, we would say there's no bear dens, there's no potential, our project will have no impact. But we haven't taken that approach. We've continued to say even though we've found nothing, and we've looked, and we've looked in the most likely places to find them, we're still going to say there is a potential and we will still treat this as an issue that needs to be treated carefully.

**MR. MIKE BELL:** Okay.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini. A question, De Beers has been very consistent in this approach to conservatism. And in the case of ground water, you assumed all the water was going to be moving onto another lake, and could or could not be. Is that same approach being applied to grizzly bears, assuming that all six of those grizzly bears den within the RSA and that you'll take the appropriate mitigation to ensure that those bears would not be affected?

I'm trying to find out how you applied the principle of conservatism to your bear impact assessments.

**MS. BETTY BESWICK (Golder Associates):** Well... Betty Beswick, Golder for De Beers. We did apply the concept of conservatism. We said, we took a maximum estimate of the amount of bears we thought might be in that area and then we said we'll assume there are dens there. And those are both conservative, because it's likely there are fewer bears there. And like I said, we didn't find any dens but we still assume that there are dens there. So both of those add elements of conservatism to the impact assessment. Did I answer your question, Louie?

**MR. LOUIE AZZOLINI (MVEIRB):** Maybe you'll just playing an intellectual game here, but what I heard Ray say is if it was an important place for denning, that would add conservatism to your figure, to your analyses. In other words, if you assumed a worst case scenario in terms of the outcome. In other words, if the context of the development was in a space that was more important to a specific type of, in this case female animal, then you can... your principle of conservatism would be more, is further applied. Would that be a fair interpretation of what you're saying, Ray?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I think that there's, you know, the issue of the "let's pretend", you know, because basically, it would come down to... okay, let's assume that the project is being built on an esker surrounded by boulder heath. And so, so... it was probably the expression of the question, Louie, that is problematic.

What we've done in the impact assessment and in the baseline was that, with, like Betty says, we've looked at areas where bears are more likely to be... you know, have the greatest likelihood of bears to be detected. There was some large number, and we've... we've applied mitigation in terms of the project. First of all, there's the issue of habitat, and that, you know, it gets back to a... regardless of the number of bears in the area, that the area of habitat being used, being directly altered by the project is very small. It's not much of a walk for a bear to walk across the study area, the local study area. And we've applied conservatism in our impact predictions, and that that shows up in the uncertainty around the analysis too, and that's part of the reason why, you know, we're applying mitigation factors.

**MR. STEVE WILBUR (Dogrib):** Thank you.

**MR. MIKE BELL:** Okay. I just want to see if we can move on at this particular point, away from bears. Rachel.

**MS. RACHEL CRAPEAU:** Before we move away from bears, one of my co-workers gave me some questions about the grizzly bears. It made me think about a time when I was really young. Me and my brother, we found a nest with little baby birds. We were so excited we took the birds home to my mom. And instead of getting a pat on the head, she got really mad at us, and told us to bring those birds back to its nest, and told us that the mother would not return again to build a nest there. Sure enough, the following... the next summer season, the birds did not return. So the question that a colleague gave me was what about the cumulative impacts of the activities of the developing Snap Lake site area? Example, if the impacts of blasting, helicopter, drilling noises, do the grizzly bears return to their den sites, or are they being driven away into the tree line? And we noticed that we're reporting grizzly bears in the McLeod Bay, in the east arm of the Great Slave Lake area now.

And the other question was with the weather changes, or the globe... global warming effect, the muskox may enter into the Snap Lake regional study area. Will the introduction of these new animals become part of animals to be monitored in the cumulative effects monitoring. And we wanted to get a definition of the zone of influence. What does this mean? These are our questions from my friends who are here with me.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I'm going to address two of... two out of the three questions, Rachel, and John is going to address the other. On the issue of where the changes in muskox, would we include muskox in monitoring. We have been recording incidental wildlife observations, so in other words, if we're doing surveys and we see an unusual species, if you like, we'll record those. So muskox would be basically included under that, until such time that another need for monitoring of muskox is identified.

On the concept of the disturbance in grizzlies in their den sites and driving them into the tree line, our impact assessment deals with disturbance to grizzlies, and that it addresses the issue of... so it addresses the issue of disturbance. Like we said, we haven't found any bear dens used in the area at this stage.

Now, John is just going to comment on your zone of influence question.

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates. This is a tough question to answer with no data right now, but....

-- Interjection

...the zone of influence for... ?



-- Interjection

Oh, sorry. I misunderstood the question. I thought you were asking what is the zone of influence. The zone of influence is a... is really the spatial extent or the geographic extent that... from the mine site itself. All the project activities, the operations that go on there. So it's really an area where the habitat effectiveness or the habitat suitability for the animal becomes decreased because of the disturbance from the mine.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** Rachel for the Yellowknives Dene. There was one map that was shown earlier, and it had a circle. Would that be considered the zone of influence, or is that a study area?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. The circle is a study area, Rachel. We think that the zone of influence lies somewhere in there, and that we've provided an estimate for species of where we think that the zone of influence is. And we can make assumptions about what we think the zone of influence will be, but once we've actually, you know, the way in which we'll confirm that is during monitoring.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives. This is a point of clarification on the zone of influence that you've been talking about. Is it safe to say that the zone of influence, the area of the zone will change depending on A, the species, and B, the stressors. So in other words, the zone of influence of bird X will be larger for dust effects through the air than it will be for noise or that type of thing.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. The zone of influence will change according to those parameters that you've discussed.

**MR. TIM BYERS (Yellowknives Dene):** Actually, that's fine on that point. I had a... I had one other point, if I could remember it.

**MR. MIKE BELL:** ...let Bob speak, and then we'll come back to you, Tim, okay?

**MR. TIM BYERS (Yellowknives Dene):** Yeah, go for it.

**MR. MIKE BELL:** Bob.

**MR. BOB TURNER (NSMA):** Bob Turner, North Slave Métis Alliance. Does the baseline data include the types of habitat lost, or the types of habitat that has been covered up by the airstrip and the present weight on the area?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Yes, it does, Bob, and it includes the extension of the... the habitat will be lost with the extension of the runway, extension of the lay-down areas, and the remainder of the project footprint.

**MR. BOB TURNER (NSMA):** So was there any bird nesting areas that were covered up?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Yes, the... we assume in the impact assessment that the entire area within the mine lease, the 550 hectares, the impact assessment assumes a conservative scenario in assuming that birds will no longer nest within that area.

**MR. MIKE BELL:** Tim.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives. I just remembered my point. Basically, the question where you had to say about... for want of a better word, new immigrant species farther on down, and this is fairly speculative at this point. But I'd like to know if you do have, for whatever reason, global warming or any other reason, a species from farther north or farther south from the regional study area, start utilizing habitat in that area, what will be the trigger for your company to decide that that new species, say, for example, muskox, must be monitored. Will it be an RWED directive, or will your company be able to be proactive in determining that, well, this is a new species in our area, and we don't know beans about how we might be affecting this new species, so let's start monitoring the situation.

**MR. MIKE BELL:** Excuse me. Can I interrupt at this section? We're trying to deal strictly with grizzly bears and kind of moved beyond them. That's a question. It's a very valid question. If you can answer it quickly, fine, but I would like to come to an end of this and move on to caribou.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. The quick answer is that the impact assessment doesn't go beyond... doesn't go to that extent. What you're really getting at is that will De Beers respond to community interests and priorities in monitoring. Is that right? Because, and I'm going to state that that's a rhetorical question. I'm paraphrasing that that is your question, Tim. I'm going to say that we've said all along that we want to develop monitoring programs in conjunction with communities, regulators and governments, and that that monitoring program will include the priorities and interests of communities. So I think that we're... I consider that we're being proactive in wanting to discuss that up-front, and that any suggestions that are brought to us will be considered in an open way and will be subject to debate. It will be the subject of questions. It will be subject to all that good stuff.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Mike, I wrote down here, Robin, open-mind. Did you hear me? I wrote that down. Anyways, I have a question. Just talking about the bears, earlier this morning before I left, there was some reference made to TK studies that had been carried out and the answer from De Beers was that there had been some done with my community, Lutselk'e. And I just want to know which studies under TK were taken with us, and when were those taken please? Because I want to know if there was one done on the grizzlies.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. The study that I'm referring to, Florence, is the Lutselk'e's report, "Traditional Knowledge in the Niaquay region, An Assessment of the Snap Lake Project, Final Assessment Report." That was submitted to us in July of 2001. That was an assessment of what the community considered, or the elders considered, the effects of the project would be on the environment, and so that the topics addressed under that were essentially what the elders considered important to this project. So whether it was grizzly bears, whether it was caribou, whether it was movement, but all how it related to the effects of the project. So one of the things certainly highlighted in that report was the need for De Beers to be very proactive in ensuring that garbage doesn't get left out, or that there are attractants for wildlife.

**MR. MIKE BELL:** Okay. Florence, is that...

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** I have the... the wildlife CO will be here later today, so I'll just stay on that question.

**MR. MIKE BELL:** Okay. Just so...

**MR. ISADORE TSETTA:** (translation not available)

**MR. MIKE BELL:** Excuse me a minute. That translation is... is it being translated?

-- Interjection

Three.

**MR. ISADORE TSETTA:** (translation not available)

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Thank you for your question, Isadore.

-- Interjection

**MR. ROBIN JOHNSTONE (De Beers Canada):** Okay. Yeah. Isadore's question was, have we ever seen any really old grizzly bears, and how old do they get? I'm just going to comment on the first. We haven't seen any really old grizzly bears at Snap Lake, Isadore. But as to how old grizzly bears get, I'm sure Ray Case will be able to give you the answer.

**MR. RAY CASE (RWED):** Ray Case, with wildlife and fisheries. The studies that we've done show that grizzly bears live to the age of around 28 to 32 years old, and that adult female grizzly bears generally can produce cubs until they're 25 years old, or so.

**MR. MIKE BELL:** Okay. Isadore, was your question answered?

**MR. ANGUS MARTIN (Yellowknives Dene):** Angus Martin, from Yellowknives Dene.

**MR. MIKE BELL:** Just one second, please, I just want to make sure. We seem to be having a problem with the technical equipment here. Just a minute. I just want to... did Isadore get the answer to his questions? No. Would somebody repeat... is the technology all right now? Can you understand it? Okay. Can you understand now? Isadore? Okay. Would you just repeat, simply, quickly, what you said, one sentence.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada has not seen any really old grizzlies at Snap Lake.

**MR. MIKE BELL:** Good. Ray.

**MR. RAY CASE (RWED):** Barren ground grizzlies can live to the age of 28 or 32 years old. Female grizzly bears give birth to their cubs until about 25 years old.

**MR. MIKE BELL:** Okay. Isadore, did they answer your questions? Okay. We have another question here, please.

**MR. ANGUS MARTIN (Yellowknives Dene):** Angus Martin, Yellowknives Dene. Last year I was doing a wolverine study at Snap Lake with Conrad, and I almost ran into a grizzly bear, and I think it was the end of March... no, the beginning of April. I was just wondering what drew him out of his hibernation, if it was the smells from the mining company that awoken him to come out that early. That was my question.

**MR. MIKE BELL:** I'd ask Ray if he would have an answer to that, or does he know, or...

**MR. RAY CASE (RWED):** I couldn't speculate on why that individual was out of the den. We have records before though in areas up around Kugluktuk and such where adult male grizzly bears will be out of the den in April. Why they're out, what they're looking for, I can't speculate on.

**MR. MIKE BELL:** Okay, good. I need some guidance with the agenda before we proceed. First of all, have we finished with the questions about grizzly bears? Okay. I'd now like to talk about Caribou, but we have a problem. We're supposed to take a break in fifteen minutes, and then start a conversation at three o'clock about traditional knowledge. We've obviously got a large number of questions still to go. My question to you is what do we do? Do we want to push traditional knowledge off until four o'clock? Do we want to deal with traditional knowledge now and try and deal with some of the other questions after? It's audience participation time, folks. I've got to have some answers. Let's get some opinions.

**MR. MARK DAWE (Environment Canada):** Mark Dawe, from Environment Canada. I know that there are some people planning to come for the three o'clock traditional knowledge session and would really rather not miss it.

**MR. MIKE BELL:** Well, they won't miss it if we have it at four and they come at three, but...pardon me? No, no, I'm just saying that we've only got fifteen minutes left on our schedule to deal with caribou, the other animals, and a series of other questions, so I've got to have some direction. What do you want to do? Steve.

**MR. STEVE MATTHEWS (RWED):** Let's take a break now and deal with caribou in there.

**MR. MIKE BELL:** So you want to push traditional knowledge off until four o'clock, or something?

**MS. RACHEL CRAPEAU:** Can we continue on to caribou because we never touched on that, and then we're waiting for the fish person to come, because our elders wanted to make a statement to the fish person. Thank you.

**MR. MIKE BELL:** Who did they want to make their statement to?

**MS. RACHEL CRAPEAU:** Julie Dawe, fisheries and oceans.

**MR. MIKE BELL:** Okay. I'm still a little unclear. We're going to then continue? Why don't we take a break now, take our 15-minute break. Just a minute -- then we'll come back and start with caribou and we'll try and deal with traditional knowledge later, that's what people are saying to me? Okay.

-- Break

**MR. MIKE BELL:** I have just had a consultation with De Beers and Louie, our esteemed representative from the board, and basically, we're going to have a new executive decision. We have numbers of elders here and people from the aboriginal community. It seems appropriate at this point to allow them to deal with the issues of traditional knowledge, to ask their questions and have a response to the questions. This will mean, in effect, that some other questions, the issues that we were dealing with before, may be pushed off. We'll try and rearrange those questions either later or reschedule them, but we're just... this is the first time that traditional knowledge has been part of a technical hearing, and that's why we're trying to deal with these issues right now. So we will ask people to direct questions to the elders, or ask the elders to share their information. And then I don't know how long this will go. I wanted by the end of the day, as we get close to the end of the day, I want to talk to you about rescheduling information, if we possibly can. I realize this causes inconvenience to some people in terms of scheduling, both to De Beers and their consultants, and to the people that we're dealing with here, but there's a need to make adjustments, and we're making the adjustments as best we can. Any comments?

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. Mike, we would certainly support going ahead with the TK at three o'clock, so that anybody who's planned to be here can participate.

A point of clarification on what we've done to this point in the day, however. It was our understanding that the only item that people had been asked to save issues on so far were the... was under wildlife study design, and that those issues are being dealt with by species. I understand from my discussion with you at the break that you're under the impression that everybody around the table has stated their issues on wildlife study design linkage analysis and impact ratings, and just wanted to give anybody else who had hour misunderstanding an opportunity to get some clarification, and certainly in terms of rescheduling, it looks like we'd be rescheduling three separate issues, or three separate headings rather than one.

**MR. MIKE BELL:** Yeah, I may have made a misconception there. I just had assumed that people would have numbers of questions for the rest of the afternoon, and the rest of the day around a series of issues. By the way, I've not blocked off the conversations that people had. Adding their names to this list, I just had basically so many I could handle at the present time within the time schedule and try to go on from that. So it's not my intention to block off, and people can talk about whatever they would like to talk about around the whole area.

The problem we ran into before was trying to lock subjects in to particular areas on this agenda, because as we tried to do that, the first couple of days we found

that people would rather have a broader scope. I may have misspoke myself and assumed that people remembered this, and I should have repeated this more clearly.

We'll deal with any issues that people have around wildlife today and wildlife habitat, except monitoring and whatever we're dealing with on Monday, okay? Good.

And so now we'll begin the conversation around... Janet, did I answer the question appropriately, or...

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. I think so, Mike. I just wanted to be sure that everybody was clear on what issues they had been asked to state their concerns about.

**MR. MIKE BELL:** Is there any confusion in anybody's mind? Anything you want to talk about that has to do with wildlife, except the things we're dealing with on Monday, are on the table. And all you got to do is make sure you get recognized. Now, that's not our problem at the present time. Our problem is the timing problem. So we've got to try and adjust to that probably by the end of the day. Okay, can we proceed with traditional knowledge? Who would like to kick this off? Would De Beers like to kick this off, or would somebody else like to kick this off, or would the elders themselves like to kick this off?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I think you said that we were going to start TK at three, didn't you?

**MR. MIKE BELL:** I thought I said at 2:45, but you want to spend 15 minutes dealing with something else?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Okay, just... we'll happy to deal with whatever.

**MR. MIKE BELL:** Go ahead. John.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives Dene. Thank you for that. Robin says we have ten minutes before TK. If I could ask a question concerning wildlife, and it's fairly... well, it's a fairly specific question. During the technical sessions...

**MR. MIKE BELL:** Just... just one sec, okay. You want to ask a question, and John, you had something you wanted to say.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I think, Rachel, you also indicated that we wanted to wait for DFO before the elders addressed fish.

**MS. RACHEL CRAPEAU:** Yeah, I'm waiting for Julie, so Tim, go ahead, ask your question.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives. I understood during the original technical workshops in April, De Beers representatives stated that there were currently no established protocols in place for reporting by mine personnel of injured or dead wildlife on the mine property, or along the access road, for that matter. And I'm wondering, does De Beers have a process for developing these protocols, and if so, can we expect to see these as part of De Beers' environmental management plans?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Yes, they will be part of the environmental management plans, Tim. That protocols to deal with that are presently in the environmental management system that is undergoing ISO 14001 registration, and so we now have those plans in existence. And we were basically going to be discussing, providing you with an overview of some of the procedures and policies that relate to our wildlife on Monday in the mitigation and management.

**MR. MIKE BELL:** Okay. In the few minutes left, there's about five minutes before we start -- and by the way, we will start regardless of whether Julie is here or not, because I want to make sure there is enough time to deal with all the issues. When Julie comes, presumably sometimes between three and five, we can direct questions to Julie, but we will not wait for her to start this section. Were there other issues that people had in mind, since we're simply making the list at this point, that they have not mentioned so far? I know you've got... you mentioned some under each area, Steve, but go ahead.

**MR. STEVE WILBUR (Dogrib):** Steve Wilbur, Dogrib. I just... yeah, earlier you had started a list, and I'm wondering, are we going off that list or are we adding to that list?

**MR. MIKE BELL:** Well, we're going to suspend the list until we deal with traditional knowledge, and then try and go back to it.

**MR. STEVE WILBUR (Dogrib):** Okay. I will be leaving probably when traditional... before traditional knowledge is done, so I have some questions that... I don't know if it's relevant to ask, but... and I don't want to impede the process of everybody else's questions too, but I just wanted to be, if we have ten



or fifteen minutes, we could go down the list and see what we get done before we start TK.

**MR. MIKE BELL:** Yeah, we've got five minutes.

**MR. STEVE WILBUR (Dogrib):** Five minutes left.

**MR. MIKE BELL:** Five minutes left. That's why I'm trying to find out how many people have additional questions. Sorry about that, Steven.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada. Can I just suggest that we just let people ask questions in the next five minutes, and...

**MR. MIKE BELL:** Sure. Go, Steve.

**MR. STEVE WILBUR (Dogrib):** Thank you. Steve Wilbur. I have a question about caribou, and basically, this relates also to TK, and the use of TK. Do we have a map, or can we put together a map of the migratory patterns? I see up there in the wall, and I read a little bit of the ESA. I haven't seen a map that shows how caribou migrate through the area, and I think that would be helpful, and perhaps traditional knowledge would also be able to help develop that map.

**MR. MIKE BELL:** Okay, as a response, we have a map. Anne has a map, if it's all right with De Beers. De Beers may also have a map, but I know Anne has a map, and she was asking to show it earlier to start with, so we'll deal with that map now, and then we'll go to traditional knowledge after Anne's explained the map, okay? There's a portable microphone, Anne.

**MS. ANNE GUNN (RWED):** Is that okay? The interpreters? How will I know? Is it on?

**MR. MIKE BELL:** Yes, it's on now.

**MS. ANNE GUNN (RWED):** Anne Gunn, wildlife and fisheries. First of all, what this map shows is the baseline data that RWED has available. This is only the movements of ten satellite-collared cows from 1996 to 2001, so this is just the migration patterns of the cows. And this is all our information -- this is winter, summer, all the movements.

**MR. MIKE BELL:** Anne, just mention your name again for the... I don't know if you mentioned it in the beginning, but...

**MS. ANNE GUNN (RWED):** Anne Gunn, wildlife and fisheries. So you can see the concentration of lines north and south of Lac de Gras and MacKay Lake, so this makes... I think this answers your question of the migratory routes, but

there's 300,000... 360,000 caribou at the last count in the herd. This is the movement of ten cows, so it doesn't include the bulls. It's just the cows.

When you look at De Beers site specifically, this yellow area is a ten-kilometre circle around it, so even though the major migratory pathways, as pointed out by the elders, as shown by the satellite collars, go around MacKay Lake, a large number of the movements still go through the Snap Lake area. This gives you an idea. This is the end of MacKay Lake. You can see a greater concentration, but nonetheless, of these ten cows from 1996 to 2001, there was a movement through the area.

So the map shows the major migratory pathways and it also shows that this area is used. I don't know if Steve or any of the elders would like to add to this map.

**MS. BETTY BESWICK (Golder Associates):** Betty Beswick, Golder for De Beers. If you... could you go back to that previous map, because I lost track of, on the bigger picture, could you show where Camsell Lake is on this picture? Okay. Thank you.

-- Interjection

Okay, so the mine site would then be east of there.

-- Interjection

Okay. So it's sort of...okay, great. Thanks.

**MR. MIKE BELL:** Were there any questions while Anne is there about migratory patterns? Just about migratory patterns? Steve.

**MR. PETR COLMAS (NSMA):** Petr Colmas. Can I ask...

**MR. MIKE BELL:** I hear a voice, but I can't see a person.

**MR. PETR COLMAS (NSMA):** Yeah, here. Petr Colmas, NSMA. Anne, I just wondered if those lines can be translated into a probability of animals moving through the site, or perhaps the number of head moving through the site?

**UNKNOWN SPEAKER:** Can she leave the map up?

**MR. MIKE BELL:** Put the flaming map back up...

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I guess I'm curious, Petr, because I would say that... I would go out on a limb and I would say that the probability of caribou encountering, going

through the RSA is 100 percent. I would say that caribou are undoubtedly going to encounter the mine site, that the number of them, we don't know. And if we do know, our confidence then revolves around that estimate is going to be extremely large.

I guess I'm not sure how -- and I'd certainly be interested in your perspective on this, how much further down the track it's going to get us in terms of reducing uncertainty and impact predictions by taking that next step.

**MR. PETR COLMAS (NSMA):** Petr Colmas, NSMA. I guess you partly answered my question there, but by raising more questions. The question really is since the probability of encountering a caribou on the site is 100 percent, how many of those animals, or what proportion of the population would be affected in that case?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I agree. That is the key. Do you have an answer?

**MR. MIKE BELL:** Anne, you've been researching it. Do you have an answer. Anne Gunn, go ahead.

**MS. ANNE GUNN (RWED):** Anne Gunn, wildlife and fisheries. I guess there are two considerations here. One is that as part of the baseline put forward by De Beers, they didn't do any analyses. They presented some data and they said they used our satellite data, but they only used a small part of it for a relatively small reason. They used it to time their surveys, and even that I can come back to that, but that wasn't used correctly either. But they didn't do a probability analysis. They didn't use it to build a model to show the risk of encountering, and as Robin said, it's likely from what we've seen that some caribou will encounter the mine, and this is what we started to do.

What this is, it looks relatively obscure -- the three yellow crosses are the three mine sites, BHP, Diavik and Snap Lake. These polygons are the likelihood of encounter. What it suggests is the point that the raw data, the just straight lines on the map, that you are on the relative edge of being encountering. This is why I made the point about the 10 collars. This is the distribution of the cows, and the cows and the bulls for most of the year are separate, so in fact this can only be used for the probability of the cows encountering the mine. It doesn't deal with the bulls.

Now we know from De Beers' own results that a map like that translates on the ground into at least 30,000 caribou in their study area, and that was over a very short time interval -- essentially surveys that covered one and a half years. Having talked to a couple of statisticians, it seems like we can build probability

models that give you not only the risk of caribou encountering but will put some magnitude on it. If you don't want to do the analyses to build those models, then the thing to do is to add uncertainty to the final impact assessment. I will just go back and get my notes.

What De Beers has done, they rated as moderate to high level of confidence in their prediction of low environmental consequences, which is another way of saying residual impacts, which is another way of saying reducing harm, and it was based on and I quote: "Assuming that the number and distribution of caribou moving through the Snap Lake area approximates long-term variation..." I think the survey data that was available from the other mine sites, our assessment of the probability of the cows encountering the mine suggests that they haven't really -- their assumption isn't valid -- that they have approximated the long-term variation in the caribou and therefore it seems to me that their moderate to high level of confidence in their assessment should be down-graded to low because of the uncertainty in the information.

There are two alternatives here, and they are really two questions to De Beers. You can either redo the assessment using all the available information, or change the assessment rating to include that uncertainty. Because of how we have changed around and because the elders are waiting, I had a lot more specifics about what I perceived as the inadequacies in the base line information. I will leave it up to what you want me to do.

**MR. MIKE BELL:** I think we have the elders here. I would like to deal with the elders. You have hit a very critical point. We have obviously got to go back and address the points that you have just had. Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** If Anne could finish her presentation we want to hear it. After she has finished, we are going to start our session because they wanted to make statements about movement of caribou afterwards.

**MR. MIKE BELL:** Okay, good. Anne, please. Might I suggest you might want to put -- you are trying to work in two places at the same time. Whatever is most comfortable for you, but the graphics certainly help us. Over there put the portable mic on.

**MS. ANNE GUNN (RWED):** First I have to apologize because I had a logical sequence I thought and I now have kind of jumped around a bit, so I apologize for that. Okay, the inadequacy of the base line information. The reason it is so critical in the assessment is because, for example, if the base line is inadequate then it becomes a problem in rating for example the magnitude of impacts. The way it was set up, and I think it was an admirable scheme of how you were going

to rate the residual impacts -- in theory it was a great scheme, in practice it had a few failings. For example, for magnitude its comparison of whether the changes seen during monitoring exceed base line, so if your base line is poor your ability to change it is obviously going to be very bad.

For example in caribou behaviour there was no base line data collected on caribou behaviour, so it is a little hard to see how you are going to measure the changes. In terms of the distribution of the caribou, some of the inadequacies relate to the timing of the surveys. Apparently it was based on the satellite collared caribou. The satellite collared caribou begin their spring migration in mid-April, so it is a little hard to see why in May 1999 De Beers' survey was flown in March and early April, and the estimate for the number of caribou on the site was four. This map shows De Beers' results, it shows the number of caribou that went through spring migration just north of their Lac de Gras, BHP Ekati, and this pale area is the distribution of the satellite collared caribou.

So there are two points here. One is that the distribution of the satellite collared caribou would have indicated that spring migration was likely to -- there was a possibility to go through the site. The timing of the survey should have been more in mid-April into May. The other thing, it makes the point that we can use the satellite collars as a likelihood that the caribou should be moving into the mine site.

My second point is that De Beers didn't use all the available information. They only sampled 1999, during which they got part of the summer migration, and then in the year 2000 when they got spring and fall migration. They could have extended the time line over which to sample the natural variation in the caribou movements if they had used some of the other data. You can argue that their study areas don't overlap like Diavik and BHP are to the north, but when for example Diavik (which has information for 1995 to 1997) they showed the directions the caribou were coming from. You could either do a formal GIS analysis, which is what De Beers committed themselves to in doing their impact ratings, that they would rely on analysis as much as they possibly could. There are ways of doing a GIS information to look at the likelihood of caribou that were migrating here would be migrating there. Or they could have just simply described it. The point is that they could have used the information available. They can still do it, to expand the time frame over which they're measuring caribou distribution.

This shows you caribou wintering in two areas around Great Slave Lake. It also shows you that when the migration was a large migration through Snap Lake -- 28,000 caribou -- there was also a large migration through Lac de Gras -- 34,000. So there are two points to this. It gives you an idea of the scale, the numbers of

caribou going through and also an idea that we can use other people's information such as BHP's.

I would also point out that given the survey methods that were being used at this time, which was a relatively wide strip over which to count the caribou, it is very likely -- everything we know about caribou surveys -- they would have missed anywhere between 20 percent. Instead of that being 28,000 it might be more realistically 40,000. Even though it is not a major migratory pathway, it is still a lot of caribou.

One of the real problems is that we can't go back and resample the years -- 1999 and 2000 are past -- we can't go back and do it. But there was no winter work done. In 1999 I think the survey stopped in August, and I think in 2000 you did one survey in October, or was it ended in September? I have the date somewhere here. Anyhow there were no winter surveys done, so we don't know if there were caribou there during the winter. When we looked this spring, this shows our flight lines out of Yellowknife. This goes as far as Pellett Lake; this is in the Snap Lake area. This is a field map. This gives you an idea of what we were seeing. Here is MacKay Lake; we were seeing tens of thousands of caribou. They were not likely the Bathurst herd. They were a different caribou herd.

My point is, the timing of your surveys determines the type of information you get or don't get. We don't know now whether there were caribou in 1999 or 2000 wintering on the barrens, but we know they were there last year. This is a gap but it is a gap that relates to monitoring, and it shows how critical it is how you collect the base line information and the number of years it is collected over.

I guess to summarize my points is that either some of the inadequacies in the base line information can be addressed. It is not too late because it is a matter of using the existing information, both describing it, like mapping it, but also doing some analysis, doing some probabilities, because what you have got is a balance between a high risk or a low risk of caribou encountering the site, and a high or low risk of a lot of caribou. There are ways, there are mathematical ways of portraying those two risks. You have a low risk but a large number of caribou, or a high risk of relatively few caribou.

The other thing is that if De Beers does not want to redo some of their base line information on caribou, then it seems to me that the confidence in the rating of the final effects, the residual impact, the confidence in it can only be very low because of the problems with the base line.

**MR. MIKE BELL:** Would De Beers like to comment on this?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I have a few comments to make. One is regarding timing of the survey, and I think that some information has been taken out of context. We did use information from satellite collars -- excuse me, Anne, can I finish the statement please. De Beers used the information from satellite collars to get an understanding of when animals were likely to move through the area. However, we did not rely on this alone. A key part of also determining when caribou were moving through the area, and to maximize the timing of the surveys, were on-the-ground observations. That included things ranging from -- and we took as much information as we could and information that I think is a lot more accurate than relying on the movement of the 10 individuals -- and that was things like talking with people at Snap Lake, have you seen caribou? Talking with pilots at Air Tindi, have you seen any caribou in the area today? Talking with the likes of MacKay Lake Lodge, especially on the southern migration, have you had any indication of caribou moving through the area?

We followed up with that when satellite information indicated that there were caribou in the area to make sure there wasn't just one animals with a collar on it moving through the area. We basically flew reconnaissance surveys in a fixed wing aircraft to take a look, and looking at the main migratory pathways in terms of the areas of historical trails where we think that is most likely where caribou are likely to show up. We went out and flew around the area to determine whether there were caribou in the area. That was one aspect that I wanted to comment on regarding the timing of the surveys.

I think that Anne is basically trying to put words into De Beers' mouth stating that we are not wanting to redo the analyses. Let us be clear that that was the words of RWED, not of De Beers.

Thirdly I think there is an issue of -- the overall issue is we state in the EA that animals, caribou, are going to come through the regional study area. Certainly the elders from Lutsel'ke have told us that yes, numbers are going to vary from year to year and that some years you will see lots of caribou and other years you won't see many caribou. Certainly that is what we have seen. The critical factor is that we can do all the probability analyses that we want, and certainly Anne has projected a method here that we haven't had any opportunity to address the underlying assumptions, the statistical relevance or the confidence levels and what the analysis is.

Ultimately it comes back, is the risk of caribou coming through the area the critical issue? I would say we know that caribou are going to come through the area. It doesn't take me a model to work that out. The critical issue is, what is the consequence of that? What is the consequence of those caribou moving through the area? Whether we have models around them zipping through the area or not,

that is the main thing that we are worried about. How can we design the project in a way to minimize the impacts to caribou. Yes, there is going to be an issue of the number of caribou.

We know from the work at BHP that provides us with an indication that nursing caribou spend less time feeding in the vicinity of that project, so we assume that that is going to occur at Snap Lake, so there will be a disturbance. We don't know what that is going to be.

Ultimately I think the focus must be on consequence. In doing our impact assessment we consider that we have included the issue of uncertainty around the impacts that we have predicted to caribou, and that we recognize that monitoring is going to be important to further get an idea of just what that consequence is, and just what reducing that uncertainty around impacts to caribou. Thanks very much.

**MR. MIKE BELL:** One last comment.

**MS. ANNEE GUNN (RWED):** I would like to thank Robin because he allows me to clarify. I wouldn't have misled you that the satellite collars were only used for the timing of the surveys. I read the assessment, and I realize that they did use other information. My point was that even if they had used other information the movements like the satellite collared cows in 1999, they knew where they were on their winter range, there was a likelihood that there would be movement through Snap Lake, so there should have been, I think, a survey based when the collared cows started their migration. And that was my point. My point wasn't that satellite collars were the only thing to be used. I don't think De Beers made full use of the satellite collars. That was my point.

I also agree with Robin that the key thing is the consequence to the caribou. None of us want to see them harmed in any way, so we all share that concern, and pooling our information to meet that concern. Again, it was a question to De Beers; they have rated a moderate to high level of confidence in their prediction that the consequence to the caribou is low. I am suggesting that perhaps given the inadequacies in the base line information that the uncertainty, or the confidence in the prediction of the consequence to the caribou, perhaps they should reduce that confidence.

So we are agreeing that we are both concerned about the consequences to the caribou. I don't share their confidence in their prediction about the consequence.

The other thing is that it was not an RWED statement about redoing the environmental assessment, the base line analysis for caribou. It was a question as if they would consider redoing it and including some of the other information. I



am sure, I know I can speak for RWED that we would be glad to work with them on this. We have always made the satellite information available. We would be glad to share our preliminary models, and I am sure some of the other stakeholders might be interested too. Thank you.

**MR. MIKE BELL:** Okay because of the elders being with us, we would just like to summarize what my view is at the present time and you can take it or leave it. I think we have a difference of opinion in relation to the methodology and the assumptions that are basically on both sides. I think that much is clear. I also think there is common ground. In other words, I don't think doors are closed. I think there is common ground for people to work together on these two situations; to reconcile and find a common ground between the two situations. If things stay the way they are, it seems to me we are just delaying and pushing off the inevitable thing of having to deal with it because it is going to be in technical reports that are going to come after this. So the logical situation, it would seem to me, is to find a way for De Beers and the department and whoever else is involved in this to sort out and find a common ground around this situation. Having said that I suggest -- I am not telling you that you should do this -- I am just basically saying in terms of my role here is to summarize what I have seen in these proceedings. There is a willingness for cooperation in these types of things, and I would think the logical point at this point is to have a side bar somewhere along the line to discuss this situation and to move on it from there. Having said that, I would now like to go to the question of traditional knowledge, if that would be appropriate. Okay.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** So more work in caribou studies is an issue? Okay, thank you. (No translation available)

So we are going to start with Isadore. He mentioned a few words this morning and he wanted Fisheries & Oceans to hear something that he wanted to say about fish, but he will also give his comments. Thank you.

**MR. ISADORE TSETTA (Yellowknives Dene):** (No translation available)

**MR. MIKE BELL:** Anne.

**MS. ANNEE GUNN (RWED):** The satellite collared cows are up north-west towards Great Bear Lake, so they are north-west of Rae Lakes. If you shoot a collared cow, sure you can eat her, use the hide. We would like the collar back, but otherwise it is no problem.

**MR. MIKE BELL:** Isadore, did you have a further question there?

**MR. ISADORE TSETTA (Yellowknives Dene):** (No translation available)

**MR. MIKE BELL:** Would De Beers wish to comment or respond to Isadore at this point, or would you -- I know that we have asked that some questions be directed to Julie and some were to be directed to De Beers. Would De Beers like to comment first, and then if Julie wishes to comment that would be fine?

**MR. RICK SCHRYER (Golder Associates):** I will answer Isadore's last question first. Snap Lake is part of the Lockhart River system, so the water flows through MacKay Lake and then eventually into Great Slave Lake. In response to the blasting issue, the blasting will be conducted underground, well under the lake. During the exploration -- sorry...

**MR. MIKE BELL:** Isadore doesn't have his ear phones on right now. Would you repeat again, Rick, please.

**MR. RICK SCHRYER (Golder Associates):** Are we ready?

**MR. MIKE BELL:** Yes, we are ready.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** What is happening, somebody is answering his question?

**MR. MIKE BELL:** Yes, we want to make sure that the technology is working. Can you hear properly? Okay, Rick, please.

**MR. RICK SCHRYER (Golder Associates):** To answer the last question first, Snap Lake is part of the Lockhart River system and the water ends up in Great Slave Lake. To address the issue of blasting, blasting occurs underground, a considerable distance underneath Snap Lake. We conducted monitoring of the blasting during the exploration phase when they were collecting the bulk sample, and we monitored in the lake the effects of blasts directly above the blasting area in the lake, and we found that the instantaneous pressure change and the peak particle velocity (which are the two criteria that DFO has as far as their guidelines for the protection of fish) we met, we were below both of those guidelines during that monitoring program.

**MR. MIKE BELL:** So can I summarize that it did not have a significant adverse effect on fish?

**MR. RICK SCHRYER (Golder Associates):** Yes, that is correct.

**MR. MIKE BELL:** Okay. Isadore, did you understand the answers to the questions you asked?

**MR. ISADORE TSETTA (Yellowknives Dene):** (No translation available)

**MR. RICK SCHRYER (Golder Associates):** We measured the effects of blasting directly over the blasting event at the bottom of Snap Lake, and there was no disturbance to the sediments because, as I mentioned, both the peak particle velocity or the instantaneous pressure change were well below the DFO guidelines for that. There was very little shock that was perceived or measured directly right at the sediment-water interface directly above the blast. I guess I will end my response there. Thank you.

**MR. MIKE BELL:** Okay. If I can just summarize what I heard. You did blasting under the lake as part of exploratory work, and the blasting under the lake did not have a significant effect, either on the fish under the lake or on the sediment. Is this correct?

**MR. RICK SCHRYER (Golder Associates):** Yes, that is correct. Thank you.

**MR. MIKE BELL:** Okay. Now Isadore has asked another question, if I am trying to be clear. He asked about how blasting will likely affect fish in the deep areas and in the shallow areas. Could you respond to that please.

**MR. RICK SCHRYER (Golder Associates):** The effect -- or lack of effect -- will be the same whether it is in deep or shallow water. The measurements showed that there was no effect from blasting anywhere in the lake.

**MR. MIKE BELL:** Thank you. Isadore, did you understand the explanation? Was it clear enough?

**MR. ISADORE TSETTA (Yellowknives Dene):** (No translation available)

**MR. MIKE BELL:** De Beers.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Thank you for your question, Isadore. In 15 or 20 years -- I will just wait until you are back to listen.

**MR. MIKE BELL:** Robin, go ahead.

**MR. ROBIN JOHNSTONE (De Beers Canada):** In 15 or 20 years the mining will be occurring much farther under the lake. The testing that was done was relatively close to the lake, so as mining continues and we get further underground the effects on the fish will become less and less. We will have so much more rock above our heads, Isadore.

**MR. MIKE BELL:** So if I can summarize, in 15 to 20 years there will be less of an effect on the fish because you are much deeper under the lake than you would have at the earlier stages. Isadore.

**MR. ISADORE TSETTA (Yellowknives Dene):** (No translation available)

**MR. MIKE BELL:** Okay. I have a question from over here, but I would rather have questions from the elders first, and then if you have questions of the elders after we can answer those. Okay.

-- Interjection

**MR. MIKE BELL:** If Isadore wants to take it -- we can do that after. I want to make sure that we hear them first, Chris, Okay. Julie to this.

**MS. JULIE DOLE (Fisheries & Oceans):** There was another part to the question that didn't get answered. I think there were concerns raised with the chemicals that will reach the water because of the blasting. Perhaps De Beers could address that issue that was raised.

**MR. MIKE BELL:** Okay.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Isadore, the chemicals from blasting will not travel up through the rock to the lake. Any chemicals from blasting will come up to the mine surface and be treated, along with water, in a water treatment plant before the water goes into Snap Lake.

**MR. MIKE BELL:** I want to make sure that everybody understands that blasting and all these types of things are occurring under the lake and not on the shore, so the mine is going out under the lake and the blasting that will occur at times will occur under the lake. This is not blasting on the shore that people may have seen previously that caused difficulty for fish.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** I think the question about blasting came about because of the blasting under Great Slave Lake, and we live in Dettah and sometimes when there was blasting we could feel the effects of it out in the community. We would think that our house was shaking and we were wondering where they were doing blasting. It has some effect, so this is why he was asking about that.

**MR. MIKE BELL:** Okay. More comments or questions?

**MS. RACHEL CRAPEAU (Yellowknives Dene):** This morning Isadore wanted Fisheries & Oceans to watch out for the effects on the fish and if there are going to be some serious impacts. Maybe in the future when we are going to be talking about how to do mitigation we could do some work on it together, so that is why we were waiting for Julie to be here. Michel Paper is going to talk and he is going to talk about how the traditional land users, the people, used to work together before.

**MR. MICHEL PAPER (Yellowknives Dene):** Hello. (No translation available)

**MS. RACHEL CRAPEAU (Yellowknives Dene):** Just some words of advice. The first thing I was thinking about when Isadore talked was, in my mind I thought time will tell. Time will tell us down the road when and if we see impacts and changes; we will know. The same thing with Michel. Alfred is next, and he is going to talk about mitigation measures and how we will work together on TK (traditional knowledge).

**MR. ALFRED BERGERON (Yellowknives Dene):** Hello, my name is Alfred Bergeron. (No translation available)

**MR. MIKE BELL:** I would like to thank the elders very much. I wanted to ask the participants if you have questions of the elders.

**MR. TIM BYERS (Yellowknives Dene):** Actually, a point of clarification on the blasting issue because it is obviously something that is very important to the elders and to the younger people. I was just wondering if you could tell us, when you were testing for the effects of blasting on fish what the shallowest depth of rock between the blast location and the bottom surface of the lake. If you could tell us linearly, not the amount of rock, but just linearly 150 feet, 50 feet, how much rock was between the blast and the bottom surface of the lake. That might help.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Tim, there were 143 metres of rock above our head, between basically above our head and the bottom of the lake through a net testing.

**MS. JULIE DOLE (Fisheries & Oceans):** I just would like to make, for the record, a bit of a clarification point for the blasting study. Like the elders, DFO did have that concern and that is why we asked De Beers to do the study and to measure what the shock wave could be in the lake. That is why the study was undertaken and I believe the results are included in the EA. Are they in there?

**MR. RICK SCHRYER (Golder Associates):** Yes, they are Julie.

**MS. JULIE DOLE (Fisheries & Oceans):** Thank you. So the results are in there because we were concerned at the minimum shallowness of that [inaudible], how close are they getting to the lake bottom and would it be of concern, so that is why they monitored it there. Another point I just to make sure that people don't go away with a misconception, especially the elders. A concern was raised regarding chemicals and blasting, and the answer that was provided is not incorrect. Of course the chemicals will not percolate through the rock. They will be collected in the mine and pumped out with the rest of the mine water. I don't

want the elders to be left with the misconception that the treatment plant is designed to specifically target some of the things in the blast residue -- and a lot of those are primarily nitrogen -- and there is predicted to be an increase in nitrogen in Snap Lake. I don't know for sure, but I am assuming that a large portion of that is due to blasting. That is why there is nitrogen to be increasing in Snap Lake. I just want people to be aware of that connection there.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Just a point of clarification. In no way did we mean to infer that that treatment plant did that -- that it was just basically that mine water would be treated.

**MR. MIKE BELL:** Thank you. Florence.

**MS. FLORENCE CATHOLIQUE (Lutsel'ke):** Florence Catholique, Lutsel'ke. (No translation available).

**MR. MIKE BELL:** Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The discussion of blasting related to mining underneath Snap Lake only. The testing about the potential affects of blasting took place 143 metres, that is about 400 feet underneath the lake. There were many other things you addressed, Florence, and I am not sure how to narrow down the question.

**MS. FLORENCE CATHOLIQUE (Lutsel'ke):** I only had one question. I wasn't clear as to whether the elders from Yellowknife were questioning the blasting effects only to Snap Lake or if they were questioning the blasting effects in general to water as it distributes itself within that area and the surrounding lakes, and what I understood was that under Snap Lake where the blasting is going to take effect into that slate of rock, water will accumulate in there and the things that are going to be taken out of there are going to be repasted back in there, which will have water pumped out and then treated. But water will also seep into the ground, that will also lead into the lakes in that area. I wanted to know if their question with regard to blasting was only beneath Snap Lake or if they were questioning the blasting effects of the surrounding lakes. That was my question.

**MR. MIKE BELL:** Was this question to the elders?

**MS. FLORENCE CATHOLIQUE (Lutsel'ke):** Yes because I think the reference to the blasting was only to Snap Lake, and I wanted to know if that was their question or if they were questioning in general.

**MR. MIKE BELL:** Did the elders have a question about the effects of blasting on other lakes and other waters besides Snap Lake?

**(UNIDENTIFIED MALE SPEAKER):** (No translation available)

**MR. MIKE BELL:** Robin.

**MR. JOHN MCCONNELL (De Beers Canada):** It is 143 metres, 450 feet.

**(UNIDENTIFIED MALE SPEAKER):** (No translation available)

-- Laughter.

**(UNIDENTIFIED FEMALE SPEAKER):** (No translation available)

**(UNIDENTIFIED MALE SPEAKER):** ...400 feet. (No translation available)

**(UNIDENTIFIED MALE SPEAKER):** (No translation available)

**MR. MIKE BELL:** Okay. I want to know if anybody has any questions of the elders, or whether the elders wish to make any other comments.

**MR. ANGUS MARTIN (Yellowknives Dene):** I don't have a question to the elders, but I was just wondering about the cumulative effects and everything, like on the winter road that is going out to Diavik and BHP, plus Snap Lake. I just wanted to know if anybody did any studies on the fish -- not only on the fish but like the fur bearing animals that are on the lakes on the way through. Last year they had 9,000 trucks go through there. I don't think any of those beavers or muskrat on the route of the convoys -- I don't think anything survived on that lake. They didn't do any fish studies on the fish, the mortalities or whatever, all the way to Lupin. That is a big concern for me too.

In the spring nobody comes around, nobody does the spring clean-up. All along the winter road there is oil and gas, every fuel that is available, it is spread out all along the winter road all the way up to -- and the only time you see it is in the spring when you take a satellite photo of the whole winter road. Then you see all the oil and everything all along the winter road. That never gets cleaned up. That has been there for about 30 years and then they are expecting another 30 years out of this. Talk about cumulative effects. Who is going to clean that up? Another 10 years from now that whole winter road is going to be all polluted. Now what do we do? That is my question.

**MR. MIKE BELL:** A response from De Beers.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The De Beers EA did not do studies on the fish and the fur bearers on the winter road.

**MR. MIKE BELL:** Okay. Bob.

**MR. BOB TURNER (NSMA):** I just want to make some comments and probably end up with a question to the elders. It is with regard to, I guess, the predictability of the movement of caribou and what I have heard from a couple of the elders and from my own elders are stories of the past of how the caribou were plenty and used to come down around this area. We have even got photos of thousands of caribou in the Yellowknife Bay here, and caribou that were always in between here and Rae in the past before there were winter roads and before there were mines. They always used to be coming down in this area.

But over the last few years with my involvement in environmental issues and in wildlife issues, and hearing reports from biologists and RWED, they have come to the conclusion that the movements of the caribou are now unpredictable. I think the major cause of their unpredictability is the extensive activity in the region of the Bathurst caribou range. There are numerous mines in the area, there are numerous outfitters in the area and there are winter roads, so in that case when you come to your conclusions as to whether or not the caribou may come through that area you can't predict one way or the other.

One season you may have the whole herd pass through that area if they are unpredictable, so in the end I guess you would have to conclude that you would have to take measures to mitigate against having a whole herd travel through that area. It probably might be an opportunity for getting all of the elders of all the aboriginal groups that are affected together to discuss that. Would the elders be interested in something to that effect?

**MR. MIKE BELL:** I didn't quite get your question. I just couldn't hear you. What was the last question you asked?

**MR. BOB TURNER (NSMA):** You didn't hear me?

**MR. MIKE BELL:** No.

**MR. BOB TURNER (NSMA):** I guess I am not talking loud enough.

**MR. MIKE BELL:** I heard the comments, but I didn't get the very last sentence when you asked would the elders be interested, I don't know what you were talking about.

**MR. BOB TURNER (NSMA):** Okay, I will ask the elders. Would they be interested in meeting together with the elders of the Lutsel'ke, the Dogrib, North Slave Metis and determine, I guess, some recommendations and concerns as to how De Beers could deal with mitigating the issue of a lot of caribou traveling through the mine site; and also is De Beers interested in accommodating that sort of a process?



**MR. MIKE BELL:** The question first I guess would be to the elders. Would you like to meet with the elders of the other groups to discuss mitigating circumstances. That question is to the elders. Then there is a question to De Beers. Would one of the elders like to respond?

**(UNIDENTIFIED MALE SPEAKER):** (No translation available)

**MR. MIKE BELL:** De Beers.

**MR. JOHN MCCONNELL (De Beers Canada):** Certainly we have met with the elders of the various groups, probably not as often as we should, not so much because there is not a desire to get together, it is being able to arrange dates. Certainly the elders I think we all know are very over-taxed in terms of everybody's desire is to meet with them and consult with them, but we would certainly welcome the opportunity to meet with the elders of all the regions in the area together if Bob Turner can pull that together.

**MR. BOB TURNER (NSMA):** With the proper resources I could probably pull that together, John, but I guess just to refresh the memory of the Yellowknives when we went through the assessment for the Diavik project we had a workshop in Dettah with regard to fencing issues around the Diavik kimberlite containment area and other areas that they didn't want the caribou to migrate through. I think that was a very good process where all the elders came together and shared their knowledge and experience as to how the caribou migrate. There were recommendations that came out of that workshop that Diavik are implementing.

**MR. MIKE BELL:** Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** I am thinking, when are we supposed to have our technical report done by, the beginning or the end of February?

**MR. MIKE BELL:** My official representative of the Board went to Banff unfortunately, so I don't have the answer to that question. You will have to ask that question on Monday I guess.

**MS. JANET HUTCHINSON (NSMA):** It is February 14th.

**MR. MIKE BELL:** February 14<sup>th</sup>.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** Okay. I think if we could get our heads together, me, Bob, Lawrence and Douglas, and who else -- we could probably get together and figure out a date when we could do it. We could do it again in Dettah. We could probably try to figure out how we are going to do it with as much resources as possible. The workshop that we did in Dettah on caribou

when I think Andy, he was there with the Inuit elders, it was a very good workshop. If the elders are going to give me direction to work on it, I would do it.

**MR. MIKE BELL:** If I may, I would like to make some concluding comments. It is 10 to five. I want to make sure we know where we are going next, and how we are going to proceed...Rachel go ahead.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** I am glad that Isadore, Michel and Alfred were here to help us this afternoon, and I hope they helped everybody here. I am thankful that Julie was here to listen to the elders. I hope that helped her, and that mitigation and monitoring were thought seriously about, especially we want to work more towards collaborative efforts on how to use TK in our work. We had three people here who work with MacKay Lake, Lawrence Goulet, Paul MacKenzie and Morris Martin; and James Sangris and Angus Martin. They all worked at MacKay Lake, they know the lake, they know the movement of the caribou. They have been there hunting and they want to figure out how they could work in a collaborative effort in monitoring. We could talk more on this down the road.

The elders are going to here next week if you guys want to ask them any questions, I will be happy to direct you to them and help you with translating for them if we are going to go downstairs and talk with them on our own. I am just thinking that without them and their stories and how to work together really well, it would not really be possible -- I think we might end up misunderstanding each other too much. And trying to figure things out in feet -- I don't like the metres measurements either. I want to school in Fort Smith and I used only feet. There I a big difference. The blasting effects within a few feet or between here and Lutsel'ke, would you feel it? Thank you.

-- Laughter.

**MR. ROBIN JOHNSTONE (De Beers Canada):** So it is a long way to go to work.

**MR. MIKE BELL:** Okay, another comment.

**MR. JASON MCNEILL (RWED):** Actually I have a couple of questions on traditional knowledge but I saved them because they are not directed at the elders, they are directed at De Beers. I was wondering if there would be an opportunity to ask them and when that would be.

**MR. MIKE BELL:** I guess at this point we are going to have to put those questions off until Monday. I just want to tell you what I think is happening. First of all, on behalf of the group, I would like to thank the elders very much. I was

just about to get to that, but I didn't quite make it. We do appreciate your coming. We do appreciate what you have told us, and I could see as you were talking that people were nodding so I think you should know that the people understood what you said to them very clearly. Thank you very much for coming. We would hope that you will be able to continue with us and come as often as you are able all next week.

We have to sort out a change in the schedule. The only thing I can say at this point is that some of the issues and questions today that we did not get to will be transferred, I would imagine, to Monday after we deal with Monday's schedule or somewhere along the line, but what I will do is meet afterwards for a few minutes with De Beers folks to just sort out basically what is happening because I am probably not going to be the facilitator or animator on Monday. I think you will have somebody else working with you. I expected to hear an "oh heck" but I didn't hear that.

-- Laughter.

But be that as it may, somebody else will be here on Monday. I am sure they will do a worthy job. I would like to find out what it is I am supposed to pass on to them and what we could possibly do. The only thing I can say at this point is that some of the issues that were not resolved today will probably be moved to Monday. That is the best I can say at this particular point. Does anyone have any questions on that? Chris.

**MR. CHRIS O'BRIEN:** I can't see you, but Mike could you pass on to whoever is going to be doing the facilitating next week -- it seemed to me there were some major talk that wasn't resolved there between RWED and De Beers on caribou. I would sure like to hear the debate continue, and I think it is extremely important so I assume that somehow that can be continued next Monday.

**MR. MIKE BELL:** Yes, when I came to the conclusion of that particular discussion I indicated that there were unresolved differences at that particular point. I indicated that there was a common ground, I think, for the basis of understanding, and I think the implications are that probably the groups would talk to one another if they wished to talk to one another, and I think that was very clear. Whether they are going to do that on Monday at the meeting is another matter, but in effect I am sure they will come back with recommendations as to how to address the issues that were raised.

**MR. CHRIS O'BRIEN:** If I might break in there, Mike, you talked about side bars which is really out of sight of the process dealing with certain issues. I am not sure if this needs to be a side bar or should be a side bar, but maybe more of an in public view debate. That is just my point of view.

**MR. MIKE BELL:** Chris, we have had a process here during the week where we have to raise some issues on side bars simply because we have run out of time. The obligation of those people in the side bars is to report to the whole group. At that particular point it is possible for the whole group to get involved in the discussion. That is all I can say about that. One more question please.

**MS. VANESSA CHARWOOD (Environment Canada):** I am just wondering, it looked from the schedule that at 1:30 p.m. we were supposed to talk about VEC selection, the definition of impact ratings, breeding birds, etc. I am just wondering are those items going to be covered on Monday then?

**MR. MIKE BELL:** We are going to have a discussion in a few minutes and find out how many of those things can be covered. I wish I could be more exact at this point, but I can't. You are going to have basically try and check on Monday to find out what we do deal with on Monday. If they can't be dealt with then, we will try and deal with them later in the week.

**MS. VANESSA CHARWOOD (Environment Canada):** Will they be dealt with at some point before the sessions are over?

**MR. MIKE BELL:** I would certainly hope so.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think we need to point out, Mike, that the agenda is participant-driven and that like today we will have one or maybe two presentations at most, so it is going to take a short period; so the agenda is entirely open and it is up to participants how they prioritize their questions. Let that be clear.

**MR. MIKE BELL:** Right, okay. I will see you on Monday at 9:00 a.m. Thank you.

-- ADJOURNMENT



# MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD

## De Beers Snap Lake Technical Sessions

December 2, 2002

### Yellowknife, Northwest Territories

**MR. HAL MILLS:** ...for the day. My name is Hal Mills, I am one of the facilitators, but as you will recognize I was not with you at the end of last week, but I will be for the next few days. We will move around to the left.

**MR. MIKE BELL:** I am Mike Bell, group animator and story-teller. I am happy to be back somewhat to my surprise.

**MS. VELMA STERNBERG (DIAND):** I can't follow that kind of introduction. Velma Sternberg, DIAND Minerals and Petroleum Development Division.

**MR. FRASER FAIRMAN (DIAND):** I am Fraser Fairman, Indian and Northern Affairs Canada, Environment Conservation Division.

Comment:

**MR. ISADORE TSETTA (Dettah):** Isadore Tsetta, Dettah.

**MR. MICHEL PREDUE (Dettah):** Mr. Michel Predue (Dettah).

Comment: check

**MR. MARK DAWE (Environment Canada):** Mark Dawe, Environment Canada.

**MS. VANESSA CHARWOOD (Environment Canada):** Vanessa Charwood, Environment Canada.

**MR. DEAN CLUFF (RWED):** Dean Cluff, North Slave Region for RWED, GNWT.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee, on behalf of the Review Board.

**MR. MIKE MULLEN (De Beers):** Mike Mullen, who is with De Beers.

Comment: check

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada.

**MS. BETTY BESWICK (Golder Associates):** Betty Beswick, Golder Associates, for De Beers.

**MR. JOHN MCCONNELL (De Beers):** John McConnell with De Beers Canada.

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates, for De Beers.

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**MR. RICH RYDER (Golder Associates):** Rich Ryder, Golder Associates, representing De Beers.

**Comment:**

**MS. SANDY MARKHAM (Golder Associates):** Sandra Markham, Golder Associates, representing De Beers.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, consultant to the Yellowknives Dene Land & Environment Committee.

**Comment:** check - Byers or Butters - had butters on other tape - maybe wrong

**MR. ROBERT MULDER (RWED):** Robert Mulders, Wildlife & Fisheries with RWED.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews, Wildlife & Fisheries, RWED.

**MS. ANNE GUNN (RWED):** Annee Gunn, Wildlife & Fisheries, RWED.

**MR. RAY CASE (RWED):** Ray Case, Wildlife & Fisheries, RWED.

**MR. PETR COLMAS (NSMA):** Petr Colmas, Wildlife Biologist for the NSMA.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, legal counsel for the NSMA.

**MS. LISA FACE (Geo North):** Lisa Face, Geo North.

**Comment:** check

**MR. MORRIS MARTIN (Dettah):** Morris Martin from Dettah.

**MR. PAUL MACKENZIE:** Paul Mackenzie ...(inaudible)...

**MS. COLLEEN ENGLISH (De Beers):** Colleen English, De Beers Canada.

**MR. JAMES SANGRIS (Yellowknives Dene):** James Sangris, Yellowknives First Nation, Dettah.

**Comment:**

**MR. GAVIN MORE (GNWT):** Gavin More, Government of the Northwest Territories.

**MR. JASON MACKINNEL (RWED):** Jason MacKinnel, RWED, GNWT.

**Comment:**

**MR. RAYMOND BORGET (RWED):** RWED North Slave Office.

**MR. HAL MILLS:** Okay, thanks very much. Everybody was very good about going up to a mic and of course that is important so that things actually get on the recorded transcript of the sessions. Just a general reminder to keep doing that through the day and at any time you are speaking to give your name as well so that the transcripts can be easily understood. Thank you.

We will start off the day with the presentation from De Beers and then Petr Colmas from NSMA has asked to give a short presentation following that. Then we can have a discussion on those presentations and review how we are going to pursue the agenda for the rest of the day. I was just reminded that we were supposed to do a recap of the sessions to date that my colleague on my left hand side is prepared to give. A question though?

**MS. JANET HUTCHISON (NSMA):** Just a question. As I understand it, we hadn't actually finished up on the issues that were on the agenda for Friday. Are we now moving on to a presentation on the next items on the agenda, or will we be wrapping up with the issues on Friday?

**MR. HAL MILLS:** The presentation is on the reminder of things that need to be addressed, but that is not excluding that we go back to the issues that weren't covered on Friday, but the presentation has been geared to what was expected to be covered today. Okay a recap of the technical sessions to date. Mike.

**MR. MIKE BELL:** I am not exactly sure what happened Friday. I was thinking of the expression "drowning in information but starved for knowledge". However, we did get a lot of valuable knowledge and information that was communicated during the day. We started off by talking about the wildlife study design and then we got into bears at great length and began starting in the area of caribou. We continued that for a while and then after lunch we had the elders in and we talked a great deal about traditional knowledge.

There were unresolved questions and concerns on Friday. However, to a certain extent we have a different cast of characters here this morning, so what we would propose is first having the presentation from De Beers on today's subject, then a combination of finding out what concerns people have about the issues De Beers is raising this morning -- whether they are concerns about what is being raised this morning -- but there are a number of issues unresolved from Friday so we will put these together and deal with both sets of concerns. I think what we will do probably after the presentation for De Beers, and I think Peter was going to do a presentation immediately after the De Beers presentation, we will consolidate everything and go through one more time. Even though I have the list from Friday, it is sitting right here, I have no sense of which ones of these are still valid and which ones are not valid because we didn't have time to consolidate things.

So after both presentations we will go around the table, find out from people, just list the issues that people have and then go back and deal with them just as we did on Friday. Okay, everybody clear about what we are doing? Good.

**MR. HAL MILLS:** Okay, over to John then for the presentation.

**MR. JOHN MCCONNELL (De Beers):** We have a short presentation this morning on wildlife mitigation. Our speaker is Andy McMullen. Andy has been

Comment: check



working with us for the past few months, helping us put together -- I wouldn't say putting together but taking the implementation of wildlife mitigation one step further. Certainly through the exploration phases it was necessary to implement a number of procedures, and Andy has been working with us to further develop those. I don't think I really need to introduce Andy to this group. He has over 20 years of wildlife experience, 13 here in the NWT, primarily specializing in bears, grizzly, black and polar bears. So I will turn it over to you, Andy.

**MR. ANDY McMULLEN:** As John said, my purpose here today is to talk about wildlife mitigation measures, they are in place and proposed. They tie back to the EA predictions being based on the competence in the mitigation measures. Many of the mitigation measures and techniques that are practiced in the North are not new. They have been around for quite a while and have proven effectiveness. Mitigation needs basically is a need to provide for safety of humans and wildlife, not to be separated, one is not more important than the other. Safety of humans translates into occupational health and safety issues. Safety of wildlife equals conservation, ensuring that animals are not impacted by the operation, don't become injured or die as a result of it.

De Beers understands the need for mitigation, understands the need to minimize habitat loss, understands the need to minimize disturbance, understands the idea of preventing attracting wildlife to the site and avoiding habituation of the animals living in the area; preventing injury and mortality to the animals in the area or animals that visit the site. Limit the number of human-wildlife encounters through proper mitigation, and the bottom line is ensuring workers safety. All the bullets except the last basically are aimed at ensuring the safety of wildlife.

De Beers has proven experience in mitigation in the North through exploration leading into advanced exploration. RWED, and myself when I worked for the North Slave Region, Ray Case and Raymond Borget have continued to work with the company over the years and have a fairly positive relationship. Over the years my involvement with De Beers as a wildlife officer and working with them on mitigation has been since 1991. This is my personal experience. Our records don't show any grizzly bear mortalities prior to that, but my own personal on the ground experience with the company goes back to 1991 and in that time De Beers has had one black bear mortality in all its operations in Nunavut and the Northwest Territories. They have a proven record, but they didn't get that record by just sitting there and hoping things went well. They took proactive mitigation steps to do it.

### **Snap Lake Advanced Exploration Program**

Built on the experiences of their other projects as well as the exploration lessons, it gave them an opportunity to develop and practice these procedures to minimize the interaction with wildlife, to further refine these things. No feeding of wildlife is only one of the examples of policies and procedures that they have implemented to ensure the limited impact on the animals. There have been no

mortalities or injuries of wildlife at Snap Lake during the advanced exploration program for now. That doesn't mean that all the animals have left. The animals still continue to occupy the area, but they are not attracted to the site because the attractions have been removed.

The proven practices start with education. Education is probably the most important mitigation tool you have. It does no good to have a whole bunch of policies if you can't communicate that to the people on the ground -- employees, contractors and visitors. Everybody visiting a site, everybody having business there, goes through the general site orientation where they are advised that wildlife is in the area, wildlife is a concern and there are measures, steps and responsibilities that they have.

Bear safety training has been provided by RWED and myself over the years, and continues to be done. Raymond, I believe, has taught some of them on-site how to use the bear deterrents that are available to them.

Waste management is probably the next most important item in the mitigation plan for preventing wildlife from being attracted to the site. Waste management doesn't just mean incinerating the garbage. What you do from the time food arrives on-site until it goes into that incinerator; minimizing the number of steps, minimizing the number of places things can go wrong. Daily incineration of food waste is one method. As things progress, then it becomes every meal three times a day depending on the volume of people and the volume of garbage.

De Beers has maintained communications with the regulators. RWED is one example. Maintaining open lines of communication with field staff, regional staff and adaptive management. One example perhaps of adaptive management or a mitigation technique is when during the construction of the existing camp facility and prior to them being able to get the skirting on a wolverine showed up. The attractant was the potential shelter. It wasn't attracted because of the food. It was attracted because there was potential shelter. They completed the skirting of the buildings and the wolverine wandered off on its own accord because that attractant was removed.

The next step we are currently working on is refining. There are different policies, procedures and practices starting with project design. A small footprint minimizes the amount of area you have to monitor to see if things are working, keeps things manageable. Incinerator at the kitchen -- the incinerator will be in the kitchen building or in a building attached to the kitchen so as in other places, food garbage does not get outside. It goes from the kitchen, into the garbage can into the incinerator without ever getting outside. That will eliminate almost 90 percent of their problems, especially with attractants.

Education again -- refining it so that employees, visitors and contractors get appropriate levels of training. Taking all the positions perhaps at De Beers during construction and during production and figuring out the level of exposure to risk

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and the amount of exposure that people will have to risk, and providing them with the appropriate level of education. Everybody going to the site will know about wildlife being in the area, what steps and measures are in place and their responsibilities.

Someone on the survey group, for example, who is out on the land a lot, they will require more detailed training. People responding to a bear or other wildlife on site (not just bears) -- responding to a caribou -- will be taught how to do it properly.

We are working with local knowledge, and I think my 24 years in the North is local knowledge, and working with the communities and working even with the regulators -- people who have lived here all their lives.

Food storage - there are policies in place that will cover from the time the food arrives on site until it goes to the incinerator. How it is handled, where it is stored, why and that will be communicated to the people responsible for that.

Food waste disposal -- again all the way along telling people what is expected, why we are doing it and what the results are going to be.

Storage of chemicals in safe manner -- keeping it away from wildlife.

Roads -- they already have a reduced number of roads, but on roads the wildlife have the right-of-way. Speed of traffic, these type of things, to prevent and reduce the chance of injury to wildlife; and appropriate deterrents. When we talk about deterrents, everyone thinks we are out there with rubber bullets immediately -- that is what comes to mind -- a wildlife officer out there with rubber bullets. A deterrent can be this -- simply clapping your hands is enough to get a lot of wildlife to move. There is not one deterrent for all species. There are different deterrents and there are different deterrent methods. Determining what the appropriate deterrent method, technique and tool is is important.

De Beers is setting this policy to commit their employees, contractors and visitors to these things. It is not just going to end up on paper. There is a method to commit everybody visiting the site to these ideals. The overall plan would be called a deterrent plan which would cover all wildlife species. How you perhaps move a caribou off the runway if you have to. How do you get a caribou out of the tank farm if it is in that area.

We have to remember, we are not only looking after human safety when we are dealing with wildlife on site, it is the safety of the wildlife. There are certain places where you don't want wildlife because there is a chance of their injuring themselves. We don't want them wandering all around the camp where they could get hurt. The first step in the deterrent plan is identifying the risk, the prevention measures if they are available, possibly negative reinforcement technique, monitoring and evaluating these things.

It seems that we can't stress the education enough, but it keeps coming up because it is such an important method and tool in mitigation. Wildlife safety training for the appropriate people, wildlife sighting reporting, wildlife encounter procedures have been developed, mortality and injury reporting, bear response plans -- all these critical components, all these here, these reporting ones -- any encounter with wildlife is reported to RWED so RWED is aware of what is going on. There are no secrets. It is communicated to them as early as possible because De Beers may need some help or may need some further direction on how to deal with it.

Food product management we have talked about. Waste handling to the incinerator use, these things have been further and further refined and are adaptive. Right now there are only three people on site. Next week there might be 10, next year there might be 200. These things change in scope but the underlying principles are all the same.

Monitoring and evaluation of mitigation effectiveness. Is it working, and its cost and improvement. The implementation of the environmental management system, that is the bible basically, but constantly looking at, are these mitigation measures working? Is talking to people about not littering or feeding wildlife working? Are people still feeding wildlife or are they not? Constantly checking to see if these things are working. If they are not working then figure out why and do something.

Keeping track of these things, recording any problems, any failure and the remedies so that we can learn from that, and others can learn from our learnings, our mistakes and how we fixed it. It is based on the continual improvement by plan, do, check and act. This is the underlying principle of the ISO 14,001 which De Beers has implemented.

That is the end of my presentation on mitigation. If you have any questions they are welcomed.

**MR. HAL MILLS:** Thank you, Andy. I would like to differentiate here between questions that you might have on wildlife issues related to that and questions on the presentation itself. Please hold your questions on the issues, but are there any questions on the presentation itself right now? Okay we will be coming back to the issues shortly and doing up a list, but Petr Colmas has asked to make a short presentation himself right now, so over to Peter.

**MR. PETR COLMAS (NSMA):** At the end of the Friday session we tried to figure out for ourselves as to where we are along the map of the environmental assessment. The environmental assessment is a complex process and so I thought for own benefit and perhaps for some of yours and De Beers is to try to summarize where are questions fit into this whole process. We would like to start out -- I will first give you a bit of the map as we see it of the environmental assessment process.

First of course we need to start with the data collection -- to gather information about the process that is being proposed, then the data will be analyzed. Now here in this stage the analysis does not only reflect what is out there in terms of grizzly bear, caribou, plants, water and whatever, but it also refers to the analysis of the proposed project. What exactly are the components of the project, and De Beers of all people are, of course, the ones most familiar with that. You are ultimately familiar with that. So in that analysis stage we overlap the environmental things that are happening out there with the proposed project.

Now once we have that overlap, the analysis of the interaction between the project and the environment, we come to a first set of impact predictions from which we then get through the mitigation measures that we have just heard about from Andy here. Now what happens at that stage -- this is not a one-way street -- we have to go back. Once we have a first set of impact predictions we say -- let's say there is a road that is being developed and the potential impact here might be that there could be a lot more mortality. We say let's mitigate that by putting up a fence. The feedback then goes back into the impact assessment and say that a fence would represent a barrier to animals and we can't do that. So we have to come up with a different mitigation and there could be a loop that goes several times around until we are satisfied with the mitigations as presented here by Andy. And we come up to the residual impact. That is the impact that cannot be mitigated. Those are the left-over things which we just basically have to live with.

We are, as we understand it, at about this stage of the game of the environmental assessment. The problem is of course that the residual impact here, are all based on the previous set or stages of the impact assessment. Starting with the data, the better the data the stronger that whole building becomes. The poorer the data, the poorer the analysis, the weaker the impact predictions and hence the weaker the residual impacts. With the inherent weaknesses here - or say increasing weaknesses in this project -- we have a greater uncertainty of the residual impacts and that are some of the things we have been talking about on Friday.

We need to deal with those uncertainties. Because we have uncertainties there, in academic and scientific terms we can address those uncertainties here and the residual impacts as hypotheses, and in order to test those hypotheses and to verify that our predictions for the residual impacts are correct we need to do monitoring. Those are my arrows here in red, that is presumably the future part of the environmental planning process that we are about to engage in.

In monitoring we measure whether our impact predictions are true. From monitoring though alone -- we cannot be satisfied with monitoring alone. We need to move on into a next stage where the proponent, De Beers, will be responding to the results. So measurements alone and monitoring programs are nice, but we need to also have some ways of implementing the results of the monitoring programs. That is called adaptive management.

Now, that adaptive management, of course, feeds back into the mitigation measures, which then will adjust some of the residual impacts and verify the residual impact, and there is basically a loop here, those red arrows, that from this stage on that we're at now, onward for the life of the project will continue, or should continue, to circle. And we have questions to each stage of this process. Now, we're talking quite a bit about data, and I'm sure the questions are not totally resolved yet and they may never be resolved. And we have acknowledged the difficulties in measuring things in the ecological processes out here in a very remote area.

But Robin, you asked for us to be very specific, and I would like to ask this one specific question to the data stage, and that is can a new information, including traditional knowledge, be provided on the movements of animals? Now, we have been talking about caribou. I'm talking about many of the others of value ecosystem components, such as wolverines, the bears, other animals, wherever their movements can be affected. As far as we see it, there was essentially no solid answer to the key question 2 on many of the BECs that have been listed in the EA. So there's the specific questions on that. But I'm sure there will be other specific questions from data quality.

Now, let's get to another set of, to the other phase and another concrete question, and that's on the residual impact. Now here, the impact predictions are stated in the EA relative to natural variation. And that is something that we had trouble with. Basically, what we are dealing with when we're saying, well, an impact is high or low or moderate, whatever it might be, according to the definitions in the EA, it is related to natural variation. Are we over, exceeding natural variation, are we below it, whatever. In itself, that's a good definition. The problem with that is that we just don't know what the natural variation is out there.

So basically, I'm suggesting one of two things. Either we go, or you go out there and measure natural variation, or you change the impacts definitions to something that you actually measured. And that could be wildlife movement. That could be the amount of habitat lost. And if one percent of habitat loss is below say a ten percent threshold that you define as being high, then so be it. We at least at that point would know how high the predicted impacts are.

Question 3 relates to the monitoring, and that to us is the quintessential important environmental planning tool that we need to focus at. Now, of course, that is based on this foundation here, but relative to the strength of that foundation, we have to pay attention to this monitoring stage.

Where monitoring programs include measurements that can actually detect trends... why am I asking this? If you go back to the data stage, there are a lot of things, and De Beers has acknowledged that it's difficult to measure. Even the movements that I've been talking about, many of those things have not been possible to measure adequately. The question now is, of course, and yes, that is

a challenge to De Beers, and in fact, it's a challenge to any environmental protection or environmental planning. That's a difficult thing to do.

The question is can we develop a monitoring program that actually measure the trends that you are predicting, that really verify the impacts that you are predicting?

And finally, the fourth question relates to the adaptive management, and in the way that monitoring, this monitoring process will be built into the operational functioning of the proposed project. And the fourth question, how will the adaptive management reflect the monitoring results? And that, of course, includes the traditional knowledge and any of the imports that you may receive from the local communities. Thanks very much.

**MR. HAL MILLS:** Okay, Hal Mills speaking. Thanks, Peter. How does De Beers want to proceed here? Do you have quick responses to those questions? Do you want to leave them to be dealt with through the day? I'm not quite sure what to do at the moment.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I think that Peter's questions and I... my initial reaction is that it would be good if we could have some time to think about some of these issues. And I would suggest that we either get back to them after the morning break or after lunch, if that's appropriate with people.

**MR. HAL MILLS:** Okay, Hal Mills speaking. Thank you, Robin. Okay, what we're into now is adaptive management of the agenda. Things didn't go exactly as slated in the agenda on Friday -- surprise, surprise. There are a number of things left over from that. We're going to... and you have some concerns or issues that you want to make sure fit in to today's agenda, so we'll try to mitigate those things to the extent that we can today, while pointing out that we can't be flexible and have all sorts of adaptive management and mitigation related to the agenda for today, but my understanding is that we don't have flexibility as of tomorrow. Early tomorrow morning, we start on geotechnical, not wildlife. So at the moment, we're looking at how can we adapt things today to take care of and mitigate your concerns to the extent possible, and then what are the residual impacts, I guess, sticking to wildlife terminology here. How well are you going to find that your issues have been looked after today, and what are your options for dealing with them, either in sidebar sessions this afternoon, this evening, things that will have to be dealt with through other mechanisms in the future.

So we're going to try to... Mike and I are going to try to be as flexible as we can on dealing with things today. There may be limitations on that, and you may find as the day's discussion progresses, that you're going to have to focus on some of the higher priority issues, possibly.

But I think at this point, we want to brainstorm and hear from you what are the issues that you want to have discussed right now, and Mike here is going to develop a list on that. So we're open to the floor for your suggestions as to issues that you want discussed.

**MR. MIKE BELL:** I know we may be going over some ground that we already went over, but let's try and do that. Isadore wanted to say something.

**MR. ISADORE TSETTA (Dettah):** (translation not available)

**MR. MIKE BELL:** Just a minute, please, Isadore. One moment...does everybody have their gear out?

**MR. ISADORE TSETTA (Dettah):** (translation not available)

**MR. MIKE BELL:** Why don't we respond to these two questions, and then we'll make our list.

**MR. JOHN MCCONNELL (De Beers):** John McConnell with De Beers. Certainly Isadore is correct. I think we've seen mines in the North open and close. Certainly economics are dependent upon commodity prices, so there's always a possibility that the mine could be shut down at sometime between now and the exhaustion of the oil reserve.

I think we, in terms of both regulators and mining companies, we've learned from the mistakes of the past. Part of the permitting process is there'll be a determination of what's required as a security deposit to ensure that at any stage of the mine life, that there's funds aside that can be used for the clean-up of the mine. So De Beers would have to post a bond or a security bond so that say at year five, the costs of clean-up were \$15 million to clean everything up, and there would be that money put aside for that. If at year 10 it's estimated that the cost of clean-up is \$30 million, then there would have to be \$30 million be put aside before the mine goes into production. So there will be, as part of the environmental agreement, or as part of the licensing with the land and water board, those amounts determined and the money put aside to ensure that at any point, the land can be cleaned up and returned to as close as possible to what it was prior to the mining operation.

**MR. HAL MILLS:** Okay, Hal Mills speaking. Thanks, John. Okay, what we want to do now then is develop a list of the key issues that you want to have discussed this morning. Over to you.

**MS. FLORENCE CATHOLIC:** Florence Catholic, Lutelk'e Dene First Nation. In regard to the scheduling, I have people that will be arriving here tomorrow to address the wildlife issue, just in regard to the schedule.



**MR. TIM BYERS:** Tim Byers, Yellowknives. I'm just wondering where on the schedule we can include reclamation and post-closure issues. I wasn't sure if they should be in today or where.

**UNKNOWN MALE SPEAKER:** I've got a question in relation to re-vegetation.

**MR. HAL MILLS:** I believe that's on at the end of the geotechnical sessions.

**MS. VANESSA CHARWOOD (Environment Canada):** Vanessa Trowd, Environment Canada. I have a couple of questions about migratory birds and their mitigation measures.

**MS. VELMA STERNBERG (DIAND):** Velma Sternberg, DIAND. I still have the question from last Friday and would like to address that. You've probably got that written down.

-- Interjection

It's the question for De Beers on raptors, and then another question directed to people who are studying the raptors with the territorial government.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews with RWED. I'd like to come back to the issue that Tim raised about reclamation. I think there is certainly the opportunity to discuss some of those reclamation issues as they pertain to wildlife, so I'd like to see that on the agenda.

**MS. ANNE GUNN (RWED):** Annee Gunn, wildlife and fisheries. I have issues relating to the confidence in the impact ratings and those issues about the competence ratings are tied to issues about monitoring and mitigation. And that's specifically for caribou.

**MS. HEIDI KLEIN (Gartner Lee):** Heidi Klein with Gartner Lee. Later today if we're holding with this agenda, I'll have a few questions related to cumulative impacts, but I do see that there's opportunity in other days to discuss cumulative impacts, particularly the last day, so if it comes down to it, I could hold off on those questions until then.

**MR. HAL MILLS:** Okay, thanks, Heidi. Although hopefully we will get to that this afternoon -- hopefully.

**MR. ROBERT MULDER (RWED):** I understand that grizzly bears... pardon me?

-- Interjection

**MR. ROBERT MULDER (RWED):** Oh, Robert Mulders with wild and fisheries, RWED. I understand that grizzly bears were touched on Friday, but I might have a couple of questions relating to impact predictions for wolverine.

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**MR. MIKE BELL:** Do the elders have any... Isadore and Michel, do you have anything in particular that you want to have discussed this morning?

**Comment:** check

**MR. MICHEL PREDUE (Dettah):** (translation not available)

**MR. HAL MILLS:** Hal Mills speaking. Thanks, Michel. Thanks very much for sharing your wisdom on that with us.

I think we'll move into discussion of the things that we've done a list on, and the first Tim raised...

**MR. RAYMOND BORGET (RWED):** Raymond Borget with RWED. I wasn't aware we had finished making our list. I wanted to add to that the attraction and mitigation of wildlife to the mine site please.

**MR. HAL MILLS:** Okay, I wasn't sure that we finished the list either, and we probably will want to finish it until five o'clock this afternoon, but... Patty.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee. Raymond might've covered what I was going to say, essentially, on site wildlife management training, waste management, all those kinds of issues, so it may be under his heading as well.

**MR. DEAN CLUFF (RWED):** Dean Cluff. Again, I have a wolverine question which Robert might get to as well, but I just wanted to be on the record just to follow up on it, and then perhaps a comment at the end, too.

**MR. HAL MILLS:** Okay. I think I would like to get started on discussion of issues. I'm sure that things will come to you through the day that you want to add to our list, but I think the first was raised by Tim in terms of reclamation and Steve Matthews pointed out that there are some reclamation issues related to wildlife, so we'll open that one up first.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives. Thanks, Hal. I guess my question in regard to reclamation deals with re-vegetation, and this was a question that also came to me through the Yellowknives elders as well. When you're re-vegetation programs begin, will you have protocols in place to determine what is successful reclamation, and that is probably twofold. How will you know that the plant life is successfully reclaimed, so that when you walk away from the reclaimed area, the vegetation will be sustainable? And number two, will you be able to assure the people after your vegetation has been successfully grown, that there will be no heavy metal or other contaminants taken up by the plant life, that the wildlife will perhaps be meeting? So we'd like to know if you will have protocols in place to be able to measure success of your re-vegetation efforts?

**MR. HAL MILLS:** Louis, a comment on that?

**MR. LOUIS AZZOLINI (MVEIRB):** Yes. There are specific post-closure requirements or closure requirements as part of the licensing process, and so at this point, we can't predicate if that's going to be a function of that licensing process. So unless De Beers makes an explicit notation of reclamation, you may be a bit ahead of the cart.

**MR. HAL MILLS:** Okay, Hal Mills speaking. That last person who neglected to identify himself was Louis Azzolini.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Tim, the answer is yes, we will develop protocols for that purpose.

**MR. HAL MILLS:** Are there other wildlife questions related to reclamation? Steve.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews, RWED. I have a few questions for De Beers. In the environmental assessment report, you use the term equivalent capability in terms of reclamation. I guess I'd just like to know how do you actually define that? So what does it mean in terms of reclamation? That's my first question.

My second question relates to the level of confidence that you're actually going to be able to create ecological land classification units, which you also say is going to be part of the reclamation effort. So I'm wondering how, when you say the reclamation of landforms has not been demonstrated, I would like to know how you come up with a level of confidence that is moderate, that in fact you<sup>1</sup> will be able to establish ecological land classification units that have some capability.

And my third question is what is the basis of the statement that the North pile landform will be established as heath boulder... heath boulder land class unit? And I guess my question relating to that is does a heath boulder classification unit on the top of the north pile have the same ecological value as heath boulder tundra somewhere else around the mine site? Thank you.

**MR. HAL MILLS:** De Beers.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Sorry for the delay, I was just getting the questions down. Steve, the person to address those questions specifically will be here on Wednesday afternoon...

-- Interjection

Thursday, sorry, as per the agenda, so I'm not in a place to give you an answer here, so I would suggest we postpone those questions for that, if that's okay.

**MR. HAL MILLS:** Steve, is that all right?

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**MR. STEVE MATTHEWS (RWED):** Yeah, I suppose that's okay, as long as, again, they are addressed on Thursday's session, whether I'm here or not. They could be read into the record.

**MR. HAL MILLS:** Okay. Velma, please.

**MS. VELMA STERNBERG (DIAND):** Okay, actually, if Steve Matthews... Velma Sternberg, DIAND. If Steve Matthews wouldn't mind, he had some questions about raptors on Friday, and I think, Steve, I recognize that you're a lot more of an expert than I am on raptors. Would you perhaps be willing to address your questions and issues first, because they may be covered and covered more accurately than mine.

**MR. HAL MILLS:** Steve.

**MR. STEVE MATTHEWS (RWED):** Steve Matthews, RWED. Sure, we can go ahead with those now. In the environmental assessment report, you say that eight species of raptors were found in the RSA, the regional study area, around the mine site. I couldn't actually find the table in the appendix that refers to that, that information. So my first question is, is that information available?

And I guess...

-- Interjection

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Your answer to the first question, Steve, is yes, it is available.

**MR. STEVE MATTHEWS (RWED):** Okay, I'd like to have that available to us, if we can. And the reason I raise the question is because certainly in the tundra, our experience is that nesting habitat is certainly limited in this environment. The amount of cliffs that are available for nesting birds of prey. And certainly, if there are other species of raptors nesting close to the mine site, and again, without that data, I don't really know, certainly there's the possibility that peregrine falcons and deer falcons, a species that you focused on, could use those nest sites as they do. They typically will use rough-legged hawk nests and raven nests, because they don't make their own nests. They either use cliff ledges or nests of other birds. So that would be interesting. It would be interesting to look at that data to see whether in fact that is an issue.

So I guess my question is will you address that issue of other birds nesting in the area and their potential to provide nest sites for peregrines and deer falcons?

And the other issue -- I'll raise one more question and then I'll stop -- is the assessment of impacts to raptors from mine infrastructure. And I didn't see that in the assessment report either. And certainly the experience we're seeing from BHP, and I'm not really sure about Diavik, is that certainly birds are using the infrastructure of the mine site for nesting on, and therefore that linkage between

birds of prey being attracted to the mine site is certainly a valid one and needs to be addressed. Thank you.

**MR. HAL MILLS:** I believe Robin is preparing to respond.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I'll address your first question. That information is available, and we will make it available to you regarding the species.

The second issue was the issue of, first of all, other raptors, other breeding raptors were not detected during the study program. Now, that's an aside. That's an aside of where you were going, which was do they... are available, rough-legged hawk or raven nests in existence that could use it, because nesting habitat is limited.

The response to that is that we were looking for raptor, nesting raptors. We focused essentially on preferred habitat, so, you know, primarily...(inaudible)..., knowing that raptors on the barren lands can occupy a broad range of habitat, down to nesting on top of a... that sort of thing. We looked for all those features. And basically, we searched for those species in relation to the mine site.

So we didn't identify any rough-legged hawk nests that were either identified by a rough-legged hawks, or represented, or that other raptors were nesting on. So I think that's about the best that I can answer that question two, Steve.

The third question was an assessment of the impacts by mine infrastructure. This issue was not discussed in the environmental assessment, because it was an issue that didn't come up during the consultation. It certainly wasn't highlighted as an issue, and I think that in part because the nesting of raptors on mine infrastructure has been a more recent phenomenon.

Raptors can certainly successfully breed on, you know, features that are vertical. They nest in downtown cities, all of that good stuff. There's a question on whether we want them breeding on the top of a mine site. We would basically need to develop a policy and a practice on whether we wanted to encourage that or if we don't want them near, essentially how we would potentially discourage a bird of prey from setting up shop on the top of a tank farm.

**MR. HAL MILLS:** Okay, Hal Mills speaking. Thank you, Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada would certainly be interested in what RWED's position on raptors utilizing mine infrastructure for nesting would be though.

**MR. HAL MILLS:** Steve.

**MR. STEVE MATTHEWS (RWED):** Okay, again, the reason I raise it is it certainly has become a recent issue, as you're probably aware, with birds of prey

nesting on the pit walls at Ekati, and certainly other infrastructure around the mine site. So it's certainly something to be aware of, and as you say, policy and procedures are certainly needed to address that issue. It's something we can perhaps discuss at a later date.

**MR. HAL MILLS:** Okay, Hal Mills speaking. Thank you. Alfred has indicated that he wishes to speak, so we'll hear from Alfred and then we'll take a short break. Alfred.

**ALFRED:** (translation not available)

**MR. HAL MILLS:** Okay. Thank you, Alfred. I think that perhaps warrants an answer first, and I think, if I could paraphrase the basic question, it is what is the relationship between the security deposit and potential impacts on wildlife. John.

**MR. JOHN MCCONNELL (De Beers):** Sure, it's John McConnell with De Beers. You know, we're probably not the best people to answer that question. I think in terms of setting up the security deposit, DIAND has generally taken the lead on that. Now, it's my understanding that security deposits are generally for reclamation, to try to turn the site back to as close as possible to what it was before the development takes place. But perhaps, you know, somebody from DIAND can respond from their position in terms of security deposits.

**MS. VELMA STERNBERG (DIAND):** Velma Sternberg, minerals and petroleum development, DIAND. I'm not sure if I can respond fully enough to satisfy everybody, but I agree with John's statement that reclamation has to do with trying to restore the land, not necessarily... well, let's just say that it's recognized that it is difficult to restore the land back to its original condition, but that every effort is made to do that. And I think something that's inherent in the policy is that if all those efforts have been made, and this includes water, such that if restoration has taken place, then the wildlife, the fish, the birds will hopefully come back and repopulate the area. And that's all I have to say for now.

**MR. HAL MILLS:** Steve, your comment is on this point, is it?

**MR. STEVE MATTHEWS (RWED):** It is. I think typically the issue of wildlife loss, and perhaps what Alfred's talking about is the compensation issue, and that's the tool that we've used in the past. And perhaps his question is, is there a compensation mechanism that the company has to address the issue of wildlife loss?

**MR. HAL MILLS:** Okay, thanks. I think a short break will be in order now and then we'll come back to the list of questions.

**MR. STEVE MATTHEWS (RWED):** Sorry, I think that... I was phrasing that as a question for the company. Do they have a compensation policy? Thank you.

**MR. HAL MILLS:** Would the company care to answer before the break?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. De Beers' policies for dealing with First Nations includes a policy of compensation where there is a demonstrative loss of harvest.

**MR. HAL MILLS:** Okay, thanks. I think a break would be in order. If there are issues related to this, we can come back to it after a break. Thank you.

-- Break

**MR. HAL MILLS:** Thank you very much. We'd like to start off by turning to Velma, who has an extra comment or question related to raptors.

**MS. VELMA STERNBERG (DIAND):** Velma Sternberg, mineral and petroleum development, Indian and Northern Affairs Canada. I just want to say that Steve Matthews' third question was the same question that I had, and Andy MacMillan's presentation this morning touched a bit on it, with this policy, to prevent habituation, so I just want it noted for the record that my question was identical to that of Steve's. And I think De Beers has answered the issue satisfactorily.

**MR. HAL MILLS:** Okay, very good. Thank you. I believe next is Vanessa... sorry, a comment there?

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee. I just wanted to take the raptor question. Just one more thing for clarity, if I can. You mentioned that... Robin, you mentioned before the break that you focused on preferred habitat and looked at all those features. And I note that the raptor survey was conducted in conjunction with the carnivore survey, which focused on eskers. So I was just looking for clarification with regard to did you look for a preferred habitat outside of that survey area of eskers, when you say that you looked for all those features of preferred habitat? Or did you mean within the study design of the raptor survey that was done along with the carnivore survey?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Thanks, Patty. De Beers Canada, Robin Johnstone. The raptor surveys were flown at the time of esker surveys, but before we started those, we looked at a topographic map to identify where there were cliffs. And we basically, you know, while the map shows a major, a couple of major eskers to the south, there were itsy-bitsy pieces of esker basically dotted around the study area, with the exception of pretty well that north... there were certainly less features like that in that northeast quadrant of the RSA.

So the first step was we looked at a map. We identified cliffs that we'd like to visit. Then, when setting up our flight plan to do the esker survey, essentially we would deviate from those points to visit those cliffs. Secondly, when we're flying along eskers, and there was a habitat, you know, where there was a landform that we thought might've supported a raptor, we diverted off the flight line, visited that place, and basically then came back to where the flight plan was.

Finally, when we did the intensive survey of the regional... sorry, of the 11 kilometre area, it provided additional focus where we were looking basically at not any landform, but we were a lot less specific. If there was an erratic, which we thought might support a raptor, we would basically visit it. So it was... a lot more habitat was visited on that.

**MS. PATTY HOGG (Gartner Lee):** Okay, thank you. Patty Hogg, Gartner Lee. Thanks, Robin.

**MR. HAL MILLS:** Okay, thank you. I believe next then is Vanessa with a question on the migration of birds.

**MS. VANESSA CHARWOOD (Environment Canada):** Vanessa Charwood, Environment Canada. I have a couple of questions. This morning, you... one thing. I should say that I have a couple of questions and maybe a comment. Reading over your environmental assessments report, you make reference to a wildlife management plan. And I don't think it's in the document and I just want to make sure that it's not like an actual document in your environmental assessment.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Sorry, Vanessa, I'm so used to writing down all the questions that I was waiting for the rest of them.

The wildlife...the intent is that mitigation measures will be incorporated under a wildlife management plan. And basically referred to it as a global wildlife deterrent plan. Ultimately, all wildlife management issues will be incorporated under our environment or management system. So you can think of wildlife management as a subset of the environmental management system, and you don't have it.

**MS. VANESSA CHARWOOD (Environment Canada):** Okay, and so... you don't have it?

**MR. ROBIN JOHNSTONE (De Beers Canada):** No, you don't have it.

**MS. VANNEESSA CHARWOOD (Environment Canada):** Oh, I don't have it. Okay, good. And so I guess to then, under definition of wildlife, migratory birds are still included in that?

**MR. ROBIN JOHNSTONE (De Beers Canada):** They've got feathers.

**MS. VANNEESSA CHARWOOD (Environment Canada):** All right. Okay. And then, I guess this morning in the presentation, you made reference to wildlife encounter procedures. And do you have a plan in place for encountering migratory birds or their nests? I mention this because under the migratory bird regulations, there, section 6 of those regulations suggests that no one shall destroy or disturb active nests or birds. And so this may be something to



consider, especially during construction and maybe your exploration programs, if you're going to be encountering nests or birds, that you might have to have some measures in place to identify nests before you go in, and a buffer zone or something, just to minimize your contact with them so you don't destroy them or disturb them. Is that something you've thought about yet?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. We'll include that. That's obviously going to have to be a component of the overall wildlife procedures. You know, the impact assessment does assume, essentially, that the breeding birds within the footprint of the mine will no longer nest there. We've done that for conservatism purposes, but certainly the next step is to basically take the migratory bird act and ensure that we're basically following on with that procedure.

**MS. VANNEESSA CHARWOOD (Environment Canada):** Okay, good. Yeah, I figured that for your footprint that you already have in place, that is assumed just when you're expanding now for your next set of construction, just something to keep in mind. So it was migratory bird regs, section 6.

**MR. HAL MILLS:** Okay. Thank you. Next on our list is Steve Matthews, but the things we've noted there he's already brought up, so I'm not quite sure if they've been properly covered or not -- things related to reclamation and the nesting of mine infrastructure and so on. Is there anything else there, Steve, that you had intended to cover?

**MR. STEVE MATTHEWS (RWED):** I think that's probably it for now, thanks.

**MR. HAL MILLS:** Okay, moving just to his left then, next is Annee Gunn and questions about confidence limits and ratings.

**MS. ANNE GUNN (RWED):** Annee Gunn, wildlife and fisheries. I think Robin raised an important point last Friday when he emphasized that, you know, our concern is for the consequences, that we don't want any harm to come to the caribou. Well, we need the wildlife, but obviously in particular, the caribou. So my issues, but I think they're resolvable, but I think it probably is going to have to be a question of us working together. I am sure that I can speak for wildlife and fisheries, that we would certainly play our role in this. If the issues cannot be resolved, then it seems that the effect of that is to reduce the confidence in the residual impact ratings. At the moment for caribou, that most affects are rated as medium to high, and it seems that if there is... if we can't resolve some of the issues about mitigation, monitoring and impact assessment, that confidence rating should be low.

Now, I've got some questions specifically on mitigation and then on monitoring, and then on the impact assessment. So first of all, mitigation. Andy's presentation, for which, thank you, it added a few details but still lacking details to have a lot of confidence that it would avoid harm to the caribou. One specific

question that comes to mind is the thresholds for triggering mitigative activity. Some of the mitigative plans. How will they be scaled, for example, to caribou abundance, when you're dealing with either a few caribou to tens of thousands?

Part of that is how did De Beers arrive at the less than one percent of the herd? Perhaps Robin could explain that, because I don't quite understand it.

And the second specific question is, how will De Beers incorporate the experience of Diavik and BHP into their monitoring plans? Andy didn't mention the fencing, but I understand that the tailings pond will be fenced. There will be herding. This is something that has been tried out at Diavik, and also, for example, convoying traffic. What are the triggers, what are the thresholds to implement, if indeed they are going to implement these, what sort of specifics will be made available? Perhaps I'll wait there for answers, and then I'll go on to some other concerns.

Or, alternatively, I mean, we've talked before about sitting down and perhaps pooling some of our knowledge, so, you know, I'm not necessarily looking for these to be kind of resolved in the next five minutes, but perhaps Robin could shed some light on some of them.

**MR. HAL MILLS:** Okay, Robin or Andy.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I think your first point, Annee, really hit on the issue, that the issues that we're dealing with are extremely important, so I'm actually just staring at the fence post straight ahead of me, and I'm trying to look you in the eye, but it's very difficult. Don't fall over. Don't rock in your chair.

The issues are extremely important, and if anything, that really increases the need for us to work hard to resolve them, and De Beers is prepared to come to that table and basically work through that.

Regarding specifics, I can't provide you with all of the specifics, and that... it's those details that essentially we work through, and that it's basically De Beers' intention to basically come to the Department of Resources, Wildlife and Economic Development to discuss those issues, and identify things like thresholds, as to when we implement mitigation methods. If it's an issue with are there three caribou on site, it's still going to give wildlife the right of way, whether it's three or it's ten thousand, but recognizing that some of those details will change. We have to come and talk to you and we want to come to the communities and basically review those plans.

**MS. ANNE GUNN (RWED):** I guess, I mean, I understand what you're saying, but it seems that you're asking us to take a lot on trust that the details will all be worked out, rather than presenting them as a former plan, which was the approach, for example, that Diavik took. But it seems that, as well as talking to Resources, Wildlife and Economic Development and to the communities, it would

be useful to have the experience of the other companies involved in these discussions, because they've had, well, in the case of BHP now, several years of experience of applying mitigative measures, and it seems we could learn a lot from them.

The point about scaling them is an important one that shouldn't just get lost. I mean, I realize, you know, I appreciate what you said about protecting just a few caribou, but it's not just an order of magnitude. It's a different problem when you've got, because of their behaviour, 10,000 or several, or few tens of thousands of caribou on the site compared to a few. They behave differently and they'll require different types of mitigative measures.

Okay, monitoring...

**MR. HAL MILLS:** Annee, Louis wishes to comment on that.

**MR. LOUIS AZZOLINI (MVEIRB):** Louis Azzolini with the review board. I was looking at section 2.11, follow-up programs, in the terms of reference. And De Beers is specifically required to describe its approach, objectives and proposed methodologies that would be used in any proposed monitoring programs, so just to put the requirements into context, or the discussion into context with respect to monitoring.

**MR. HAL MILLS:** Okay, thank you. I'm not sure if De Beers wishes to respond or comment on that. Annee, you have further?

**MS. ANNE GUNN (RWED):** Okay, in chapter 10 on page 177, De Beers identifies, and I'm quoting, the real question, and this is in regard to the passage of caribou in the zone of influence, is whether the exposure of the caribou will decrease the caribou's feeding time. De Beers then goes on to state that the information needed to look at that question is the number of caribou, the time they spent near the mine, the time they spent feeding, the caribou's condition, whether they are in good shape or not, the weather in the state of the winter range. De Beers then goes on to state that they will monitor the distribution of abundance, and that further monitoring is required. Will the further monitoring include the behavioural data? Will it include the necessary environmental data? How will it compare with the methods that Diavik and BHP use? And will they be standardized?

This not only relates to how the monitoring is done, but it's a key question in cumulative effects. But I guess we'll stay with the monitoring aspect for the moment.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. De Beers has stated extensively in the environmental assessment that project specific information will be collected in a manner comparable with other monitoring initiatives. So being explicit, that means that, you know, just like with, included, just like we're standardizing the times to visit raptor nest sites, for

the likes of Steve's work at Deering Lake, that will basically standardize where necessary and where, basically, techniques already exist.

I mean, that's why we have people like John Bergell, that's knowledgeable about the monitoring and the techniques being done at BHP, being done at Diavik, and why we have people like Andy, who knows the state of the art for mitigation techniques. So certainly we'll be looking for standardized methodology.

**MS. ANNE GUNN (RWED):** Annee Gunn, wildlife and fisheries. So I'm correct in assuming then that De Beers will be monitoring the behaviour of the caribou, so their feeding, and it will be using the same techniques as the other companies, and presumably any other stakeholders involved?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Yes.

**MS. ANNE GUNN (RWED):** Okay, thanks, Robin. Now I guess my major point relates perhaps more to impact assessment than cumulative impacts, so perhaps we want to move on with, if there's any more on monitoring or mitigation.

**MR. HAL MILLS:** Actually, the next topic is Heidi's on cumulative impacts, as long as you want to address it now, rather than this afternoon.

**MS. HEIDI KLEIN (Gartner Lee):** I can leave it until this afternoon.

**MR. HAL MILLS:** We've actually gone completely through the list that we drew. Oh, sorry, he just showed me another page.

-- Laughter

**MR. ISADORE TSETTA (Dettah):** (translation not available)

**MR. HAL MILLS:** Yes, Isadore, you certainly can.

**MR. ISADORE TSETTA (Dettah):** (translation not available)

**MR. JOHN MCCONNELL (De Beers):** John McConnell, with De Beers. I guess in terms of the underground mine, when the mine is closed, the entrances to the mine would be concreted over, so there would be a cap put on any of the entrances, and then there would also be put rock over top of that to try and get the topography back to as close as it was in the beginning.

In terms of your question on chemicals, I guess as we discussed last week, probably the most significant chemical used in the mine would be during the... using the explosives we use. So it would be ammonia nitrate, which has been raised as a concern. The water from the mine would be pumped to the surface, and then it would go through a treatment plant, and it would be treated before it's discharged to Snap Lake.

**MR. ISADORE TSETTA (Dettah):** (translation not available)

**MR. JOHN MCCONNELL (De Beers):** It's not really... I guess it's a chemical, but... John McConnel, with De Beers. The chemical is ammonia nitrate, which is essentially fertilizer that farmers would use on their farmland down south. When you mix ammonia nitrate with a small amount of fuel oil, it makes it an explosive, which can be used in the blasting operations.

**MR. HAL MILLS:** Is that satisfactory, Isadore? Thank you. Hal Mills speaking. Okay, the next I have then deals with wolverine. Bob Mulders raised it originally, and the I believe Dean Cluff also indicated that he wanted to speak on something related to wolverines, so perhaps we'll try combining those two. Bob first.

**MR. ROBERT MULDER (RWED):** Yes, Robert Mulders with RWED. Since 1998, an estimated 16 wolverines have either been killed or removed from mines for winter road camps in the Lac De Gras region, suggesting that mining activity may in fact be serving as a sink for their regional wolverine populations.

As well, in the environmental assessment report, there's not much mention to any analysis that would suggest how many adult wolverine might reside within the 3,000 kilometre regional study area. Over the last three years, De Beers has been conducting spring snow track counts in an effort to index the relative abundance of wolverine within the regional study area.

In my view, this methodology has limitations in that the survey is difficult to conduct in a standardized way, and secondly, difficulty interpreting the significance of the derived indices, or the number of tracks per kilometre. For example, it's difficult to determine how many transient animals versus resident wolverine represent those tracks, or how many animals in total are represented by those tracks.

So given the limitations of this monitoring technique, it's not clear to me how sensitive or reliable the tracked densities are in detecting a significant change in wolverine abundance, or in assessing what impact the project is having on the local wolverine population.

So in other words, can these snow track densities adequately detect or address residual impacts?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. Thanks for your question, Robert. You know, I think there are a couple of things. Snow tracks are valuable for determining presence, and certainly that's what we discussed when we came to RWED to talk about them. But the reality is that, you know, as you've pointed out, and as we agree, we think that they are relatively poor for determining abundance, that it's a blunt tool. And we are certainly interested, as we've stated before, in moving beyond that in terms of working with RWED to identify state-of-the-art techniques that can be used, recognizing that they're a secretive species. I'm preaching to the converted, I'm sure.

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The critical thing is it gets back to your point of those 16 individuals, and the reasons why they were removed. And when we're doing an impact assessment, we're doing an assessment based on the residual impacts. We apply mitigation on the assumption that it's going to be successful, and then we look at what the residual impact is likely to be.

Now, we think that we have learned from the experience of what happened to those 16 wolverine. You know, I think Andy addressed the issue that mitigation can be successful. It has to be systematic. It has to be rigorously enforced, and we have to work on it every single day. We've done that since basically starting the advanced exploration program and prior to that.

So your answer is snow track surveys, in my opinion, do not adequately address the issue of abundance of wolverine. We are most happy to work with RWED in the application of techniques for monitoring purposes to basically come to a better understanding of what the potential changes in abundance to wolverine population are. You guys are going to have to work out whether it's a sink or source population, and where all the other wolverines come from. In the meantime, our focus, we're happy to work on that, but our focus will be on ensuring effective mitigation.

**MR. ROBERT MULDER (RWED):** Robert Mulders with RWED. Just a couple of comments. Just the location of the mine in proximity to the Bathurst calving grounds is also an issue that, I would think you have a bit of a corridor there, that you are going to get transient animals from further north and central barrens passing through. These could be dispersing juveniles. These could be adult animals later in the winter, trying to access caribou. So that's going to further confound your winter track counts, and another reason why the limitations, and like you say, a fairly crude instrument in detecting change.

A second point is that despite your best efforts to limit your odours and waste, evidence which suggests that wolverine can be fairly motivated and can in fact compromise chain link fences, barbed wire fences, and so I think, based on the evidence to date, that some of the mines to the North, I think some mortality is inevitable. I would have thought that in the base line work, there might have been some analysis to sort of look at the cumulative impact, or sort of look at the likely level of mortality and some predictions as to what impact that might have within the regional study area, and also a broader regional perspective.

And I agree with you that RWED would be willing to work with De Beers on exploring new techniques to better index wolverine abundance. This summer, by the way, we've been collaborating with biologists in the states, trying to use DNA hair snagging, and we're doing some experimental work to sort of look at other means of quantifying or getting a better estimate of carnivore abundance within areas of your regional study area scale, that size. That's it.

**MR. HAL MILLS:** I don't know if there's a question there or not.

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**MR. ROBERT MULDER (RWED):** Nope, those were just comments following up to Robin's.

**MR. HAL MILLS:** Okay, fair enough. Hal Mills speaking. Heidi wishes to comment.

**MS. HEIDI KLEIN (Gartner Lee):** Heidi Klein with Gartner Lee, and this question probably goes to either De Beers or to RWED. Out of your studies where trapped and relocated animals have been tracked, their success rate isn't very high. Any kind of indication on the relocation of these wolverines, whether or not they thrived or actually did get killed in the end anyway?

**MR. ROBERT MULDER (RWED):** Robert Mulders with RWED. I could attempt to address that. To date, I believe we've relocated eight wolverine. Six of them were marked. Two of them, unfortunately, were not ear-tagged, so we have nothing to follow up on.

And one adult female from Diavik was moved down to treeline to south, and a couple of months later, she got into a camp, I believe at MacKay Lake. Raymond might just confirm the location. But she was killed as a problem animal.

One of the main problems of relocating animals is that we have no follow-up information. Unless we collar these animals, we have no idea of the fate of these animals. And it's quite likely that when you take an animal, a juvenile... sorry, a yearling or an adult, and place it into someone else's home range, that one of those animals will not survive, and so we have to assume that the chances of survival are fairly low. And so it really is a management strategy. Relocation is not really a good, long-term strategy.

We've been doing it as a last resort. This could be another research component, that if we do more relocations, looking at collaring and that, but in general terms, it is not a desirable strategy.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers, Robin Johnstone. De Beers would just like to comment that we don't think that relocation is an answer. That, in the absence of information about the survival of those wolverines, or about their effect on surrounding populations, that those wolverines, on the principle of conservatism, should be considered as a direct impact.

Now, the critical thing is relocation doesn't solve the problem, and the problem is what got them into trouble to begin with. De Beers' attitude is we have to work on what the problem is, the attraction of animals. But the reality is that it takes more than motivated... a few motivated proponents to do that, that the relocation of a wolverine to another area, it all depends on the mitigation measures being implanted there, so, you know, protection of wolverine populations is a... overall, it must be a cooperative effort across outfitters, et cetera, across all parties in the Slave Geological Province.

**MR. HAL MILLS:** Thanks, Robin. Mark Dawe.

**MR. MARK DAWE (Environment Canada):** Really, this is just a comment. It's Mark Dawe from Environment Canada. I just wanted to follow up on a question raised by one of the elders in reference to blasting chemicals. It should be clarified that while it's true the mine water is treated before it's released into Snap Lake, the treatment is not effective for measures...(inaudible)...released by blasting. So, just a point of clarification.

**MR. HAL MILLS:** Dean, has your question or issue related to wolverine been addressed to?

**MR. DEAN CLUFF (RWED):** Dean Cluff. Yeah, pretty much. I was just going to comment again on the snow tracking and how it... we all note that there are many flaws associated with it, and even if it is working well, there have been problems with the snow conditions in order to get a number of efforts, tracking efforts done. I was looking for something that De Beers would say that yeah, we're looking at other alternatives, whatever they be.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada. You guys are the wolverine experts. We're all ears.

**MR. DEAN CLUFF (RWED):** Okay, just one other question. I won't comment on that part, but one other question, I'll just put wolves on the table just briefly. De Beers has acknowledged in the report that, you know, two or three years of baseline data is a small period of time to make any inferences and detailed impact statements for wolves, but one of the things that we looked at with the other mine sites is the den sites, and De Beers has done that. And I just wanted assurance that if De Beers would continue in that monitoring aspect of just... of monitoring the active den sites.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. We look for direction for RWED and communities, and that we have continued that monitoring activity, following the completion of the impact assessment, and we'll continue to do that as long as it's identified as a priority by regulators and communities. So for the upcoming year, we will, in the intervening period, we will do that.

**MR. DEAN CLUFF (RWED):** Thanks. Just one other general comment then too is, I would understand that... or expect that for De Beers, one of the things that they're looking at is to reduce any wildlife conflict, but can you help me a little bit by, what is the overall, riding goal when you have a situation like that and you mitigate? In terms of the permeability of your footprint, are you looking to, in an area, completely exclude an animal or are you allowing it to pass through unhindered? And maybe that will help direct some of the options too.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. There've been a number of questions around... or comments



certainly related at fencing as a method of exclusion. Our concern is that you may create a situation with the extensive use of fencing that you actually end up, what happens if an animal gets inside. And the potential for harm to that animal or to humans increases significantly.

De Beers, the approach, and Andy alluded to this, the approach that we're wanting to go towards is somewhat different than projects to date. We're taking on the lessons and we're learning a little bit more, and that is that we don't think wildlife belongs in an industrial setting. So that we're not going to impede on animals that are moving through the property, but it's not going to become home, and that what we've been discussing is essentially using the gravel pads essentially as a no-go area. The reality is that if a grizzly bear is 150, 300 metres away from the project site, we have very few alternatives, or very few options in terms of deterring him. We can use a helicopter, but if it's 300 metres away and it's minding its own business, we're not going to do anything. If it's in a position where it's coming towards the mine and there's a risk of human safety, then that's where the negative reinforcement comes. A lot of those details around that negative enforcement, we have to work out.

**MR. HAL MILLS:** Okay, thank you. Hal Mills speaking. Next, I have Raymond Borget, I believe wanted to talk about the wildlife attraction.

**MR. RAYMOND BORGET (RWED):** Thank you. Raymond Borget with RWED. I'm talking through the post here, Robin, so...

**MR. ROBIN JOHNSTONE (De Beers Canada):** I know what you look like.<sup>4</sup>

-- Laughter

**MR. RAYMOND BORGET (RWED):** A few comments and questions here regarding attractants and mitigation. First of all, one question is, in Andy's presentation on the incinerator, he alluded to it would either be in a kitchen or in a building. If it is in a separate building, will there be an enclosed corridor linking that building to the kitchen, so that the garbage, the food waste does not actually go outside the building.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. It is De Beers' intention not to have food waste go outside. So in terms of... the food waste is not going to have to be carried to another building and go outside.

**MR. RAYMOND BORGET (RWED):** Okay, Raymond Borget with RWED. Thank you. Another question I have is in looking through the report that was done and at the analysis of attractants, it appeared that there was not a thorough analysis of all the potential attractants that are on site. Things, for example, grease, oil, rubber hose, and then things such as kitchen food odors -- it tended to be more of a lump, everything lumped together into a large, yeah, it's attractive. I don't think that you can be very successful in mitigating if you don't look at each

individual component. I'll give you an example, the food smells coming out of the kitchen. You can put on just a general fan and have all the smell of the steaks going into the air, or you can put on certain filters that will greatly reduce the amount of odors. The specific question was submitted asking if De Beers had looked at these sort of things, and the answer was no, they looked at the whole thing. Will De Beers systematically look at all the potential attractants on site and come up with mitigating factors for each attractant, basically looking at the idea that, you know, the solution needs to be a sum of all the parts, and if you don't know what the parts are, it's pretty hard to come up with the sum.

So will De Beers look at a huge potential attractant, right down to how the grease is stored, shelters such as open garage doors and that sort of thing, and develop mitigation factors for each attractant?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. It's De Beers' intent to go through that in a systematic way, Raymond. And that certainly there is the concept of risk and obviously we're going to be applying more attention, you know, the greater emphasis is where the greatest risk is. But we will basically be going through that systematic process to ensure that we're limiting the opportunity for rewards, whether it's glaco, whether it's a rubber hose, or whether it's grease or shelter.

**MR. RAYMOND BORGET (RWED):** Raymond Borget with RWED. And will the... will that information be provided to us so that we can go through it and assess the work that is done on that?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Raymond, you're a key individual on the list. Yes, RWED will be heavily involved in basically that process.

**MR. RAYMOND BORGET (RWED):** Raymond Borget with RWED. Thank you. There was another question submitted by another agency, and that was regarding consequences for personnel who are caught feeding wildlife. Is there going to be something very definite on consequences? And if so, what consequences will that be?

**MR. JOHN MCCONNELL (De Beers):** John McConnell with De Beers. We presently already have a disciplinary policy on site that involves, you know, if individuals are caught doing something, whether it's feeding animals or not wearing their personal protective equipment, or smoking in the camp, there's a system that is a series of advice notices and counseling, which ultimately can lead to dismissal. But, you know, it's sort of... I say four strikes and you're out, but we've never had it come to that. Usually when you can sit down with an individual and explain what the problem is, they'll usually correct their actions.

So again, I guess it comes back to what Andy talked about. It's really education.

**MR. RAYMOND BORGET (RWED):** Raymond Borget with RWED. Thank you. Another question is on the skirting. In the document, you mention that buildings will be skirted to remove the potential for shelter. What we've found in some places is that skirting is not put all the way down to the ground. There are holes, and so wildlife gets in underneath, and then it's "Oh my, we've got a wolverine under here. What should we do?" Will De Beers commit to ensuring that the skirting is put all the way down to the ground, and any holes are plugged up so you don't have just a denning situation with a nice hole for a wolverine to get into?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. We have to be proactive in all our mitigation methods, Raymond, so we have to ensure that skirting is working, and that it's the same level of attention to skirting as it is to incineration. I mean, we're going to be proactive at all of that.

**MR. RAYMOND BORGET (RWED):** Thank you. Those are all my questions.

**MR. HAL MILLS:** Okay, I guess that was skirting around the issue, was it?

-- Laughter

**MR. ROBIN JOHNSTONE (De Beers Canada):** We're going to fill that one in right now.

-- Laughter

**UNKNOWN MALE SPEAKER:** That's why we've got to limit this guy when he's doing that kind of stuff.

-- Laughter

**MR. HAL MILLS:** Okay, Hal Mills speaking. Thank you. The next or last that I have on this list is Patty, and she wanted to ask about wildlife -- I'm not sure if it was migration or mitigation.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee on behalf of the review board. It's a continuation, I guess, essentially of Raymond Borget's inquiries, so your answer is mitigation. It has a lot to do with, actually, as you said, Raymond asked a few questions with regard to consequences and what not, but it has, I guess the general question in terms of policy. It's the sort of feedback loop in terms of training, in terms of employees knowing what the consequences are and I guess responding to training and what level of awareness they will have through that training -- all those kinds of issues.

Basically, the experience that we have from other mines is that we need policies and procedures in place beforehand. I would suggest that some level of those would need to be in place now because we're creating waste, no doubt, already

and obviously on-site management with regard to wildlife needs to be in place as well now.

So there's a number of things there, but I guess my overall question is, in terms of policies and procedures with regard to on-site management and waste in training and this feedback loop that I talked about in terms of the individual being trained, and aware policies and procedures, and what the consequences are if they don't follow these. When will, I guess, these be available for our review? I know I am sort of, said that that's a lot for us to trust in terms of that you will have something developed, but do you have something in place that we can review now?

**MR. JOHN MCCONNELL (De Beers):** John McConnell with De Beers. You're right. I mean, we are generating waste on site now, and so... although right now, we only have two or three people on site at any one time, certainly in the past we've had, you know, over 100 people on site as part of the bulk sampling exploration. So yes, many of those procedures are in place. I don't think you were here at the beginning of last week when we talked about, you know, our environmental management system and the fact that, you know, we are implementing ISO 14001 and are actually at the last stage of being audited, Tuesday and Wednesday of this week. So we would expect to be ISO registered by the end of the year. I guess sort of on that, we were talking about that yesterday, and that perhaps we haven't done a very good job of getting that information out to people. And I'm not even sure how many people understand what ISO 14001 is.

So we have a suggestion, that although it's not on the agenda, that perhaps Wednesday at lunchtime, so that we're not interfering with the overall agenda, we would make a presentation on ISO 14001, covering what it is and what procedures have been put in place over the past year, so that we can attain registration.

So I guess I put that out to the forum, that perhaps we would even provide sandwiches on Wednesday. And if people don't have to dash up-town, we could make a presentation on ISO.

**MR. HAL MILLS:** So that's Wednesday at lunchtime, sandwiches and an ISO 14001 presentation?

**MR. JOHN MCCONNELL (De Beers):** If the forum is receptive to that idea.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee. Thank you, John. I certainly think that would be a good idea, likely, for clarity for everyone's part. But specifically, I guess, with respect to the wildlife, I realize that's a more general, sort of environmental-based approach, specifically with regard to wildlife, and I know Andy had, with his presentation, he had a lot of good points out there. Is there something that is already in place or that is being developed that addresses

those points, as I said, with regard to the on-site management, with how people will be trained in terms of consequences, how many... you mentioned strikes, just what these specific rules are with regard to those concerns.

**MR. JOHN MCCONNELL (De Beers):** John McConnell with De Beers. And that's what we would like to present on Wednesday. Certainly there's procedures in place for not everything that Andy talked about today, because some have to still be developed, but certainly in relation to bears, in relation to incineration of wastes, those types of things. There's procedures in place now.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I think just to add to what John said, the key thing is that any...(inaudible)... certainly to ISO standards, includes the requirement that you have to train people and that you have to communicate what your policies are, what your procedures are, and what an individual's responsibility is to fulfill that. So the question is, will there be training? Yes, there will. The question is, will there be policies? There already are, and we'll be developing those policies further to reflect the change in scale of development. We're going from an exploration program where we've had up to 100 people to construction and operation. So it's important that we scale that environmental management system appropriately. That's why it's going to change.

You know, your comment on training, we are required to provide people with the appropriate training. They have to know the content of the ENS and the policies that they work with. Not everybody needs to know what the policy is in terms of emergency response to a bear. So identifying an emergency response between a general wildlife encounter, so the level of training is appropriate to the position that people are in, and the risk of those encounters, if you like. So that's incorporated in how the ENS is developed and how it's implemented and delivered.

**MR. HAL MILLS:** Okay. Patty, I believe Louis wants to add a comment on that.

**MR. LOUIS AZZOLINI (MVEIRB):** My understanding is that the IS... Louis Azzolini with the review board. My understanding is that the ISO systems required periodic reporting and some independent auditing of those systems by individuals, and the submission of reports by the company and those individuals. Would those reports be made public?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Audit will be made available to the public.

**MS. PATTY HOGG (Gartner Lee):** Patty Hogg, Gartner Lee. Thank you, Robin, again, for clarifying that. I guess I just have... I'm not quite sure if it's a comment or a last question, but maybe you could comment on it. Will you be developing your procedures, your policies, sort of the whole gambit of the mitigation approach, in conjunction with the other mines, representatives from the other

mines, garnering their experience, individuals from communities, the folks from RWED?

**MR. JOHN MCCONNELL (De Beers):** John McConnell with De Beers. That's been our approach to date. I mean, we've learnt lots of lessons from Diavik and Ekati. You know, our team that's based here in Yellowknife are all guys that have been working in the North or the Arctic for the past 20 years, so, you know, they bring a lot of experience. We've had guys like Angus Martin up at site. He's shared some of his experiences with us. We're in the communities regularly talking to the elders and community members, so that gets incorporated. You know, sometimes you're not going into a community asking a specific question about a procedure, but just by being there enough, you start to learn what people are looking for, so that's been our approach -- just spend a lot of time with people and learn from their experience.

**MR. HAL MILLS:** Okay, Alfred wishes to speak.

**ALFRED:** (translation not available)

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. Alfred, we did get out of the helicopter. We spent a lot of time on the ground. The key is that we used the method that was appropriate to the species. For breeding birds we spent a lot of time on the ground, usually between three and eight a.m. making sure that we understood how many birds there were nesting in an area.

Then for some other species like birds of prey like peregrine falcons it was important that we didn't spend long near their nests because our presence there would disturb them. In those cases we changed the method to ensure that we were only there for a very short time and at times that were appropriate to use a helicopter; to go in very quickly, only get as close as we needed to know what was happening there and the move out very quickly again.

**MR. HAL MILLS:** Okay, thank you. Patty, did you conclude your questions?

**MS. PATTY HOGG (Gartner Lee):** Yes, I just wanted to say thank you.

**MR. HAL MILLS:** Okay, thank you. What I would like to do now before we break for lunch is do a quick review of the issues raised this morning to see whether there is still an issue or whether you are satisfied, and then this afternoon we can -- we have four questions that were raised in the presentation earlier this morning. We have the cumulative impacts which we deferred questioning on until this afternoon, and we can draw up another list. But before doing a review, over to Chris.

**MR. CHRIS O'BRIEN:** I have some questions that came up from answers to previous questions, so what shall we do, go now?

**MR. HAL MILLS:** Certainly if they are likely to be fairly quick go now, otherwise we could put them on the list for this afternoon.

**MR. CHRIS O'BRIEN:** I will see how we do. You want to split it at noon I guess, so I will just carry on here. Robert, this would be a question to de Beers. I may have missed something, but Robert suggested that there is going to be a wolverine mortality in spite of all the best efforts. That is just the way things are. I think he suggested that de Beers do some estimation of the impact of wolverine mortality -- because of the mere presence of their mine the impact of that mortality on the regional population of wolverine. I am not sure if de Beers responded to that particular point. Would they be willing to do that?

**MR. ROBIN JOHNSTONE (De Beers Canada):** We did that in the environmental assessment, Chris.

**MR. CHRIS O'BRIEN:** That is great.

**MR. HAL MILLS:** Robert, are you satisfied with that?

**MR. ROBERT MULDER (RWED):** Actually I didn't see too much discussion in the environmental assessment dealing with the impacts or cumulative impact of added mortality.

**MR. HAL MILLS:** Okay that is a point to be...

**MR. ROBIN JOHNSTONE (De Beers Canada):** We did not do a population...(inaudible)... analysis or impact on wolverine populations in the Slave Geological Province by ...(inaudible)... cumulative impacts. The number of wolverine that we could impact out of that population depends on the population estimates on the Slave Geological Province presently available. That information basically starts with RWED. I will just see if John Bergell would like to comment further.

Just talking with John, it is probably best that we discuss that further during the cumulative impacts this afternoon. We can address that issue.

**MR. HAL MILLS:** If I could, the intention of the facilitator was to review each of the questions now to see if people are satisfied with the answers they got before we break for lunch. Would that be okay to do that, and have your questions come on right after lunch?

**MR. CHRIS O'BRIEN:** Sure that would be fine.

**MR. HAL MILLS:** Thank you. With that in mind then I will just review this briefly again. The technique we have been trying to use as we go through the different sections and I think it would be best to do them by groups of questions such as we have had this morning. We will go back around fairly quickly and get the people who raised issues to indicate whether they feel this is still an issue or not,

or whether they are satisfied with the answers or the issue has been resolved sort of thing.

We will go around. First we had Tim Byers with respect to reclamation, and I guess Steve Matthews was in on a lot of these topics as well.

**MR. TIM BYERS:** I am satisfied that de Beers is going to be making a commitment to design protocols for measuring successive revegetation.

**MR. HAL MILLS:** Steven, did you have anything to add?

**MR. STEVE MATTHEWS (RWED):** My issues were deferred until Wednesday.

**MR. HAL MILLS:** Thank you. Velma with respect to raptors.

**MR. STEVE MATTHEWS (RWED):** Sorry, I was dealing with reclamation.

**MR. HAL MILLS:** Did you want to address raptors now?

**MR. STEVE MATTHEWS (RWED):** I don't have any issues with regard to raptors. De Beers is going to provide information on the other species, nesting in the regional study area. I think the other answers were satisfactory.

**MS. VELMA STERNBERG (DIAND):** I am satisfied with the responses that de Beers gave to Steve Matthews with regard to how they will address the nesting and habitat of raptors on the mine site. Thank you.

**MR. HAL MILLS:** Thank you. Vanessa on bird migration.

**MS. VANESSA CHARWOOD (Environment Canada):** I am satisfied with the answers that de Beers gave with regard to encountering migratory birds. I would just like to see the monitoring and their wildlife management plan with regard to migratory birds when they get a chance.

**MR. HAL MILLS:** Thank you. Annee left, let's defer that. Robert Mulders.

**MR. ROBERT MULDER (RWED):** I appreciate some of the difficulties there are in current monitoring of wolverine densities. I am still have some outstanding concerns about the base line work that has been done and whether sufficient analysis has been done on what densities wolverine reside in the regional study area, and what impact predictions are being made and whether the proposed monitoring would be adequate to deal with those predictions.

**MR. HAL MILLS:** Thank you. Raymond has left, has he? Patty.

**MS. PATTY HOGG (Gartner Lee):** I would say that most of them have been addressed. Other folks have mentioned some of my same concerns.

**MR. HAL MILLS:** Dean, anything related to wolverine or wolves?

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**MR. DEAN CLUFF (RWED):** No, I just wanted to say that in the past de Beers and RWED have worked together in the few years we have known each other and I just got that clarification that it is going to continue. I have every expectation of working together in the future, and to resolve various surveying methods for monitoring and mitigation.

**MR. HAL MILLS:** Thank you. Is there anyone that we have left out in this go-around, or just anyone who would like to comment at this stage? It is lunch time then. Try to be here to start again at 1:30 p.m. Thank you.

--- Break

**MR. HAL MILLS:** We are ready to go. For the afternoon then, once again from this morning we deferred discussions on cumulative impacts. I am going to suggest that we slot those in for right after coffee break this afternoon. Before then, we didn't get to hear from Annee because she had to leave in terms of the recap of her issues from the morning. We will do that first. We had cut Chris off in terms of his questioning, so we will go back to Chris secondly for him to ask his questions. Then Peter's four questions, we will go back to those and see their status. Plus anything else that has come to mind in the meantime that you want to discuss as an issue. That is the way I suggest proceeding with the afternoon. Everyone more or less okay with that?

Annee, for your benefit then, before lunch we did have the brief recap where we asked people who had raised issues to indicate whether it was still an issue, had been resolved, things of that nature. Do you have any comments on the things that you raised this morning?

**MS. ANNE GUNN (RWED):** Going back to Friday, recapping the issue there is to whether de Beers would be revisiting the adequacy of the base line or whether they would revise the level of competence in their impact rating. That was one thing that I guess I didn't have a clear understanding of whether it was resolved on Friday or not. As I understand it, the issue was resolved only to the extent that there was an acknowledgement that we need to work together, but there still remains the lack of details about the mitigation that otherwise we are going to just have to put on trust.

You cannot analyze the impacts because they are after mitigation if you don't really know what the mitigation is going to be. Given the scale of the caribou is from a few to tens of thousands, and that will trigger different thresholds of mitigation, then it seems that it is not clearly resolved. There are still some substantive issues there.

There is still the issue that the assessment document refers to less than one percent of the caribou of the Bathurst caribou herd being exposed. My calculations suspect that it is closer to ten percent based on the numbers that de Beers has presented.

I guess the short answer is that although there is agreement on the need to work together I don't think the issues have been fully resolved.

**MR. HAL MILLS:** Thank you, Louis.

**MR. LOUIS AZZOLINI (MVEIRB):** I appreciate that in the technical sessions we are getting into the discussions obviously of the technical substance of the environmental assessment and how it was conducted. Just a reminder that at the end of the day the board is going to want some advice from you, or some suggestion as to what it means. As you are putting forward, Annee, you either do additional work to bring up your certainty or you reduce your certainty to low. Those are technical conclusions or a technical analysis of the evidence as it might be. Hopefully you can put that into context for the board in terms of what that means because they will only have an understanding of what you are communicating, but they are being asked to make a decision on significance; and significance being their determination they are going to want to know, okay Ms. Gunn or de Beers, what does that mean? Is it a big or a small problem, is it overcomeable or not?

They are going to be looking for some direction from the Government of the Northwest Territories, as well as from de Beers, in terms of what the consequences or the significance of that impact is.

**MR. HAL MILLS:** Thanks, Louis, and I take it that that wasn't necessarily just directed at Ms. Gunn; that could apply to a number of the issues that have been raised. Chris, we sort of cut you off this morning. You have some questions to ask.

**MR. CHRIS O'BRIEN:** I just crossed off my last question since Annee was here. The last question was going to be, when will all this discussion take place? I thought I was going to get an answer to that, but I guess not. Will this be dealt with during these sessions, or (shall we say) this ongoing debate between RWED and de Beers working this issue out? I am not sure. When can one look forward to all this being discussed? Will it be here or off on some side bar, as I think Mike calls it.

**MR. HAL MILLS:** Just in terms of these sessions, and in particular the wildlife part of it, we can cover whatever can be covered in the remainder of the afternoon. Whether there are side bars or other things that I don't even know about depends on what people here wish to -- I don't think there is any precise answer to that but there are a number of things that are possibilities.

**MR. CHRIS O'BRIEN:** I assume that we will be revisiting all that. I will just ask my remaining two questions. Earlier de Beers mentioned in response to I think a question from Isadore Tsetta about compensation, if the caribou are affected by the mine -- I think Robin's response was that their policy is that there will be compensation if there is proven loss of harvest. I am wondering how such things

can be proven, proven that there is lost harvest or proven lost harvest caused by de Beers. I can see this as an extremely difficult situation to deal with. I guess it gets into cumulative effects and long-term effects on the Bathurst herd. Perhaps I could just confine the question then to loss of harvest if proven to be caused by de Beers. Is that the policy?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Chris, to date the de Beers policy around compensation is for loss of harvest. It has basically been done in places like Northern Ontario where an exploration program has impacted an existing trap line. There has basically been negotiation on what we think the net worth of that would be, and it has been a two and fro arriving at that compensation. That is where it has been applied. That is a case where it is relatively measurable, what the loss would be. The concept around the Bathurst caribou herd, that is in part what a large part of the purpose of impact benefit agreements are -- is to compensate for loss of harvest. There are two methods. One is by the existing policy. The second is through impact benefits agreements. I don't think I can provide -- there are mechanisms in place but it all depends on - - issues have to be brought to de Beers attention and we have to work through it from there.

**MR. CHRIS O'BRIEN:** Yes I can see that this is going to be a real problem -- it probably is already a problem -- in how does any one company proved to be the blame for loss of caribou and therefore loss of harvestable caribou shall we say. It seems to me that all the companies that get work within the Bathurst caribou herd's range should have some sort of agreement that everybody will -- because no one company (excepting I guess in rare circumstances or special circumstances) can be proven to have caused the decline in the herd.

It is a very difficult thing to prove in the first place given natural variability, but it seems to me that something has to be worked out, and compensation for whom? Just people who actually shoot caribou? That is not necessarily just, of course, aboriginal people. There are other people who have an interest in the herd; me for instance. There are many people to be compensated if something happens, but how to deal with it. I think somehow it has to be and I don't know what the policy is right now. Maybe it is something that the board can look at. Otherwise we might find ourselves years down the road with a seriously reduced caribou population and no one knows why and no one can prove anybody caused it. I think that somehow that situation has to be dealt with otherwise it is just each company saying well it wasn't us and it is not our responsibility to deal with it.

I just raise the issue I guess because it has huge implications, cumulative effects and such.

My last question is very specific -- reclamation. I remember BHP originally said that they were going to reclaim their area to a productive landscape, and then a year or so later in a follow-up with other week-long monitoring meetings I think,

suddenly I found a statement that they were going to reclaim to a "stable" landscape. That seemed to me to be quite a significant change.

I am wondering, and I have heard tell that Giant over here is going to be officially reclaimed to "industrial" -- I don't know if it was called landscape but an "industrial" condition which apparently is just basically go and get the big chunky bits out of there. There is not going to be any great effort to re-contour and all the rest. I would like to know what sort of -- either a productive landscape, a stable landscape or an industrial landscape? What is de Beers approach there? When they talk about reclamation, what do they have in mind?

**MR. HAL MILLS:** I wonder if I could jump in here. We have a major item on the agenda for Wednesday afternoon on reclamation in general. We had some questions this morning related to wildlife as part of reclamation. I think you are getting into Wednesday afternoon's discussion.

**MR. CHRIS O'BRIEN:** Okay I will pass on given that we want to\* get on with other things.

**MR. HAL MILLS:** Robin, did you have something you wanted to say? Thank you. Tim.

**MR. TIM BYERS (Yellowknives Dene):** Further to what Chris was asking about compensation for loss of harvest, I think a big concern of the Yellowknives Dene is a potential deflection of caribou migration away from traditional hunting areas. If a cumulative effect in the nature of deflecting caribou migration away from traditional hunting areas is shown, and if it is shown down the road that yes de Beers is contributing to that effect (not the sole cause of the affect but contributes to a cumulative effect of this nature), I think people in the communities want to know is de Beers prepared to fund transportation for community hunters to go out farther to meet where the caribou are to be able to do their traditional community hunts?

**MR. ROBIN JOHNSTONE (De Beers Canada):** That question should be addressed through the impact benefit agreement negotiations, Tim, for the Yellowknife Dene to bring up with de Beers.

**MR. TIM BYERS (Yellowknives Dene):** I understand that that is perhaps the appropriate place to put that question, but I guess I am trying to get a sense or a flavour of what direction de Beers might lean as far as any future commitments to assisting communities in being able to go farther afield if it is shown that caribou have been deflected farther away. Is there any sense we can get as to whether at this stage de Beers can tell us if they are willing to commit to including that in.

**MR. JOHN MCCONNELL (De Beers):** I don't think you were here the first day, Tim, when we talked about IBAs and the progress that has been made on those. Certainly there is a whole host of issues that are being dealt with in IBA negotiations, one of which is that. Where those negotiations go I can't give you, I

guess, any direction. I am not sure that at the table we have heard that as being a big issue to date.

**MR. HAL MILLS:** Thank you. Next I want to come back to the questions that Peter -- excuse me, Louis, do you have a comment to make?

**MR. LOUIS AZZOLINI (MVEIRB):** You have gone into the IBA box in terms of bringing it up, and I can caution you that if it is an IBA agreement and you are providing compensation for an impact, one presumes, and it has been the subject of significant discussion at the board level, and they are looking at that. During the BHP process there was a request made by the board that if the parties wanted to disclose their IBA. That whole question is something that the board is looking at, but not in the sense of wanting to know what the compensation is but trying to understand what the impacts are because it is an impact assessment board. Just a heads-up.

**MR. JOHN MCCONNELL (De Beers):** I think it is fair to say that to date there has been very little discussion of impacts. Most of the discussion has revolved around benefits.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. John, just a reminder that at times the parties at those tables -- at least in our case -- have been advised that impacts should be discussed at this table, but I think there is a willingness to discuss them at the IBA table if that is the preferred approach with de Beers.

**MR. JOHN MCCONNELL (De Beers):** You are looking at me for an answer, Hal. I think that was a comment, not a question.

**MR. HAL MILLS:** My apologies. I thought I heard an implied question, but that is fine. Once again we will try to move on then, back to the four questions that Peter raised. Peter, do you want to reintroduce them?

**MR. PETER HOLINIK (De Beers):** Actually I don't have them in front of me, but John if you can project them again.

Somebody might have to close those blinds. The sun's coming directly in on the projector. As long as we can have the sun back afterwards.

-- Interjection

-- Laughter

**MR. ROBIN JOHNSTONE (De Beers Canada):** Okay, I think we can all read those. This is Robin Johnstone, from De Beers. So the four questions that we have, Betty and I are going to -- Betty Beswyck, from Golder Associates -- and I are going to tag-team on these. The first question that came was can new information, including traditional knowledge, show the movements of animals.

And the direct answer to that is that I'm sure new information can show the movements of animals, that whether information from... whether it's information from traditional knowledge or satellite tracking, we're certainly interested in it. So the answer is yes, we're sure that new information can show the movement of animals. And I'll hand it over to Betty for the second question.

**MR. PETER COLMAS (NSMA):** Peter Colmas, from the NSMA. Just for a clarification, can you give us some statistics as to what you intend to do in terms of collecting information? I guess we were talking yesterday about selecting the BECs that you can measure. We've heard from a number of the various ways of tracking caribou and differences of scale there that need to be worked out. Where would you get the information from? Now, of course, you can point the finger at the government and say, you know, get us some information from there. But surely there must be also information on some of the more local animals, like perhaps the wolverine and the wolves and so on. Other than caribou, is what I mean, where we could at least map out some wildlife trails, perhaps, with the help of traditional knowledge.

**Comment:** Not sure of name -- microphone does not pick up right away

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I guess there are two examples that I can think of. One is that Dean Koth has been doing some work -- sorry, Dean, didn't mean to wake you up. I know it's after lunch.

-- Laughter

He had a bit of a heart attack there. You know, a key piece of... you know, basically, we've been cooperating with an RWED study of wolf behaviour, some of which appears within the regional study area. And we would expect that study, for instance, might provide information that's of use to us. And we've certainly been doing some collaring of wolves that again may provide information.

The second source is traditional knowledge. And the North Slave Metis, as we've discussed previously, has certainly expressed the interest in contributing knowledge to the... one example is that the North Slave Metis have stated their interest and contributing traditional knowledge to the program. So that's also another example. The key is that we're interested in using existing information, and that we're certainly open to hearing people's interests, and basically collection of further information. But part of that is not driven by us.

**MR. PETER COLMAS (NSMA):** Just a quick follow-up question on that. In getting that information, providing new information, what do you anticipate will be the process, especially in terms of the time line, particularly in relation to designing mitigation measures. I mean, you need to design the mitigation measures, given on what you know about the animals that are out there. So you're saying you will get more information. How long will all of that take, do you think?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada. We already are applying mitigation measures. The key is are we going to include new information to refine those measures? The answer is yes, we are, and we'll basically refine those as said information becomes available, and is pertinent to whether it's refining mitigation or whether it's monitoring techniques. I'm sure that there's going to be advances in monitoring techniques over the next 25 years. So whether it's monitoring or mitigation, you know, it's a work in progress. It started a couple of decades ago when mistakes were made by mining industry and other land use... land users, and it's a spectrum that will continue through this process.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. Robin, is De Beers willing to make a commitment to gather that TP information and apply it to refine those measures before the project commences? Before there's actual production on site?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. It very much depends on the ability and interest of the communities, and the holders of traditional knowledge. Our work that we did with Lutselk'e really, we went to them and we discussed with them that what we wanted to get was basically their impact assessment of our project, and worked well together to achieve that. But I can't make commitments to whether traditional knowledge holders have specific information on wolverine migration, or that they want to share with us that's pertinent to the Snap Lake project. So I'm not in a position of being able to make that commitment. We certainly want to basically, if people have that information, we want to ensure that we have a process that will allow that information to come through.

Beyond that, I cannot make the commitment that that information will be basically implemented before the start of production, because I don't know what the community's timelines are. I would say that, given the amount of time between here and now, that it's very reasonable that we're going to be able to come to an agreement by which we receive information that's going to, whether it's traditional knowledge or scientific, that's going to refine monitoring in mitigation measures.

I think that's about as far as I can go, Janet.

**MR. HAL MILLS:** Thank you. Anything else related to the first question?

**MS. BETTY BESWICK (Golder Associates):** Okay, Betty Beswick, Golder Associates for De Beers Canada. I'll answer Peter's second question, because it's something that's near and dear to my heart, and essentially, it's how we define impact definition.

And Peter's question is can new impact definitions reflect the measurements actually taken in the field? Well, we try to quantify the way that we describe impact characteristics. And we also try to provide transparency to how those are

arrived at. We've also tried to keep in mind that the impact assessment parameters, we want them to be consistent with approaches that have been taken in other environmental assessments, and they're not identical, but they're approaches, and the logic that goes behind them is the same.

Having said that, there is nothing sacred about the way those definitions are derived. My point though is that changing of definitions doesn't change the actually project impact to the resource. Therefore, we focused and will continue to focus measurements in the field on environmental characteristics that we can measure, and that will give us meaningful information.

-- Interjection (many people talking at once)

**MR. LOUIS AZZOLINI (MVEIRB):** I can add something to that from the board's perspective. You'll notice in the terms of reference, De Beers is explicitly asked not to make any reference to significance, because only the board makes determinations of significance. De Beers has provided its interpretation of the consequences of its actions on the environment, its impacts on the environment.

Now, you can take their ideas for whatever they're worth. It's up to you if you have a different way of looking at the consequences or the outcomes of that impact to demonstrate that they are something different than what De Beers demonstrates them to be. In other words, if you think that the way they've provided an understanding, ways of comprehending the nature of the impact or the consequence of that impact, the process allows you to try and convince the board that it's not what they say it is, based on the actual change or the impact that occurs in the environment.

So just to summarize, the board is the only one that makes the determinations on significance. Significance is a key word. De Beers has not done that. De Beers has informed you of the consequence, or the environmental change that will occur. You have an opportunity to present another way or another method of determining consequence, which the board will then determine significance from.

**MR. PETER COLMAS (NSMA):** Peter Colmas, NSMA. Thanks, Louis. I guess I'm going to respond to that first. We are not at all asking about significance. We are asking about the impact ratings, which means, you know, an impact was high, low, moderate, whatever it might be. Whether the board thinks a high impact is significant or not, that really is up to the board.

The question that we have, and that goes back to Betty now, I really appreciate your answer. I made the point earlier to in one of the IRs, I believe, that in fact, your approach was very transparent to the impact assessment. And that is great. The definitions are clear. However, there are definitions of things that are not actually measured. The result of that is that when you say at the end that an impact is of low magnitude, you, by way of your definition, refer that to a natural



variation, because that's how you define impacts. But that's not what you measured.

So the quintessence of that whole process is that while your definitions are clear, we at the end don't really know whether an impact was high or not. And again, Betty, I do agree with you that the most important thing -- I'm still behind the post -- the most important thing is that we know what the environmental consequence of that is, but why not then say in your impact definition, the impact is low because the effect is less than one percent of habitat lost? Something that we can actually really bite into and understand as to what you mean by that impact assessment.

**MS. BETTY BESWICK (Golder Associates):** I think maybe, so that we're really clear, we... Betty Beswick, for De Beers. I think maybe what we need to do is go through some of those things and you can tell us exactly where you think that disconnect is so that we can talk specifically to each one in particular.

**MR. PETER COLMAS (NSMA):** Okay, that's fair.

**MR. HAL MILLS:** Anyone else with comments related to question number two? Annee.

**MS. ANNE GUNN (RWED):** Anne Gunn, wildlife and fisheries. Perhaps an example of what I understand Peter to be talking about is that with the application of the criterion magnitude, okay, it depends on measuring changes, comparing them to the baseline, the natural range variation and... so it needs the natural range of variation and the baseline, and then you compare the current conditions to those two things. But if there's any inadequacies in the base line, there's a problem. But also, the natural range of variation is... I did not find any convincing or any clear explanations of what is meant by that, but it's a requirement in order to be able to understand the rating of magnitude. And as I understand this, this would require, say for caribou, it would require for field measurements, because there is no baseline behaviour information on the amount of time caribou spend feeding, and I'm not quite sure how natural range of variation would apply to that, that specific one.

So there's a couple of other examples that we could talk through, and this is where I'm having trouble with it.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Can you clarify what we're meant to be addressing at the end... was that a question or...?

**MS. ANNE GUNN (RWED):** I was asking for an explanation of the magnitude, the application of the criteria. And because Betty was nodding, I assumed that...

-- Interjection

**MS. ANNE GUNN (RWED):** Oh. Okay, well, I guess what I was asking about was how it's applied if there's any problems with the baseline, or in that context, what the natural range of variation means.

**MR. JOHN BERGELL (Golder Associates):** The natural range of variation -- oh, John Bergell, Golder Associates -- it really reflects the baseline conditions, okay? Here we're assuming that the project hasn't gone into construction operation yet, so it's those conditions that are out there right now, and they vary through time and space. And so measurements that we have for caribou, like the number within the regional study area during the past four years, during both the northern and the post-calving migration, the relative abundance of those, of caribou, okay, along those transect lines, the behaviour of caribou groups when we flew the aerial surveys, the group composition, the proportion of nursery groups to non-nursery groups... those things we do have baseline measurements for.

**MS. ANNE GUNN (RWED):** Anne Gunn, wildlife and fisheries. I don't want to hold everything up in just being the only person arguing some of this, but I wasn't arguing that you didn't have data on the abundance of caribou in the regional study area. You didn't present any variance attached to your measures. I don't know whether, when you use the phrase "baseline and natural variation", you're talking about the variation of the measured baseline, or whether you're talking about natural environmental variations such as whether it was a hot year or a dry year. I mean, one of the years that you have baseline pull was exceptionally moist.

So what I was trying to get at is, what's the variance attached to the measures of baseline, and what is natural variation? Is it environmental variation and the range of conditions, like exceptionally wet or dry year, based over what time period? That's more why... because you separately identify them in the definition of magnitude. You have baseline and natural variation. I assumed they were two different things. And I didn't think that natural variation was the statistical variance associated with the baseline measures. I guess that's the difference I'm trying to get at.

**MR. PETER COLMAS (NSMA):** Peter Colmas, NSMA, if I can add to this, Anne, and you clarified that for me quite nicely, actually. I guess the quintessence is there is two ways of going about answering this. Either you would provide information of the natural variation. Let's say you measure or you know about the natural variation of caribou being from two to ten thousand, and then, according to your definition, you would say, well, you know, we're only going to change it by three, which is within the natural variation, so the impacts are low. Or else you measure a certain number of animals. You cannot, with any degree of certainty, talk about the variation, then you can change your definition and say, well, if the change as a result of the projects that result in a decrease by a thousand animals, we consider that a high impact. That's where this is going to. And that's also, of course, a hold for any of the other BCs, not just caribou. Thank you.

**MR. ROY ELLIS:** Roy Ellis speaking. I take it that there is some concern over how in particular the term natural variation is defined and used in the impact assessment.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. As you can tell by our discussion, we're having problems nailing down where the... where and how this issue gets resolved. We have the issue of natural variation. And then we have the issue of how disagreement in ratings that we used for the impact assessment is incorporated or considered in your technical reports, or outside of that forum.

I'm not sure of what that answer is. I think it comes back to the idea of how sure are we about the impacts. How sure are we about... are we sure that caribou will come through the property? Yes, we are. How sure are we that caribou will not be impacted by habitat change resulting from the project? Well, we know that it's a relatively small habitat change within the scenery on the landscape of the Slave Geological Province.

And the focus ultimately comes back to what are we going to do about those animals on the... that basically encounter the mine site, and ultimately, what other mitigation and what other monitoring that we're going to apply to do that.

You know, at this stage, I'm not sure where we're really going here is another look at the impact assessment, and basically, that's not where De Beers would go, in terms of you've got the opportunity for technical reports. Then comes the idea of, well, do we then need to revise monitoring and mitigation? Maybe this is something where the key issue is working beyond this to identify the relationship of those parameters as per monitoring.

You know, Peter's third comment is will monitoring programs include measurements that can detect trends? Monitoring implicitly includes, you know, in our minds, monitoring has to include whether they are a direct effect or whether they are an indicator of an effect. I think this gets down to -- I think an example would be the population of wolverine in the Slave Geological Province, similar to caribou. We do not know exactly how many caribou there are. We do not know exactly how many wolverine there are, and we don't know how many of those are going to come across the mine site. We can provide some estimates of it, but in that there is going to be some variation. The key still comes back to what level are we mitigating and then following through with monitoring.

That is a broad comment and I am going to basically leave that open. I think, Peter, maybe you are the one that would like to respond to some of the comments there.

**MR. PETER COLMAS (NSMA):** I guess the best way of resolving this is through ongoing discussions, but just one thing that just caught my ear was that you mentioned that this has to do with the certainty of the predictions. But the

question is much more basic than that. The question relates to what you think the impact magnitude is, not how certain you are about your statement. Basically what I am saying is give us a statement that we can understand. If you say .01 percent of the caribou's range will be affected that is a very small number and that sounds like it is a very small effect. Again we are zooming on to the caribou issue here, but just as an example.

If that .01 percent in some way reflects or relates to a natural variation, that is great, give us an idea of how it relates to natural variation. If it doesn't, then just give us a threshold definition and say, we are cutting it off at one percent or something. Just so that we can understand your rating and impact assessment. The certainty of that rating is a different level.

**MS. BETTY BESWICK (Golder Associates):** I think what you just asked if perhaps we can't do our impact prediction ratings based on something that doesn't depend on a definition of natural variability. Is that where we are coming from?

**MR. PETER COLMAS (NSMA):** Yes, you can. I mentioned that before, you can approach it in two ways, either you can use your impact definitions in something that we can measure or if you really want to stick to measuring or defining natural variation then you have to give us a measurement from the real world about natural variation.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Ultimately I don't think we can respond further at this stage. We have to think some more.

**MR. PETER COLMAS (NSMA):** I am sure you do, and so do we I guess.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I will answer the fourth question though. The question is...

**MR. HAL MILLS:** Did we get through the third?

**MR. ROBIN JOHNSTONE (De Beers Canada):** My response to the third was that monitoring programs implicitly have to focus on measurable parameters, whether that is the measurement of a direct effect -- for instance an example would be the number of habitat units lost within the mine footprint or it may be an indirect measure, for instance the number of wolverine that we sight at the mine site. So we can rely on direct and indirect measures, Monitoring has to focus on parameters that are measurable.

With respect to whether they can detect trends is very much dependent on what the specific indicator of interest is -- the number of wildlife encounters. Certainly that should be able to be quantified on a trend basis, so the number of wildlife encounters over time, whereas behaviour related to zone of influence may or may not be a trend. It may be a fix in time and providing that project activities

basically stay constant a zone of influence may not change. It is really going to depend on the species.

I will just finish up on the fourth because I think that the two of them go together, and that is how will adaptive management reflect monitoring results and traditional knowledge. Adaptive management is a tool. Adaptive management includes monitoring. It is really the process by which you -- it is the ISO mantra of plan, do, check and act. You do it to make sure that things are working, and the monitoring issue comes under the check topic of that. Monitoring results can include traditional knowledge. It doesn't have to include just scientific knowledge.

One example that is being raised was the concept of a caribou deflection method if there were years where high numbers of caribou were going to basically approach the mine site from the north shore, the concept was basically perhaps flags and people could be used to deflect caribou from crossing over at that narrow point by the north peninsula. If that is the case, that would be a mitigation method that would be implemented. Then monitoring would establish whether in years of high caribou numbers it actually worked. Then through the process of adaptive management we would take a look at that after seeing whether it worked and decide if we need to make changes to the method or do we need to find another method?

I would hope that that answers the question, Peter.

**MR. PETER COLMAS (NSMA):** Thank you, I am tempted to say that you are starting to speak my language. With respect to the answers to both the questions, the last one first, #4 the adaptive management, yes that is pretty much exactly how we understand adaptive management as well. I guess what I would like to add to that is you are talking of the ISO 14,000 and so on. When or how can we get anything tangible about your possible approaches to adaptive management? Number 3 is really even much more closer to our hearts in terms of the monitoring programs. You were talking about the measurement of habitat units lost, or certain animals, the number of animals lost and so on. That is exactly what we are getting at. In the monitoring programs how can we be assured that you will be able to detect any changes of significance that would prompt any adaptive management responses.

Not only do we have to have an assurance that you actually can measure things, but also an assurance that you will respond at a certain threshold level to that. I guess the primary concern in terms of looking at the measurements themselves comes from the base line data that were provided in the EA itself. We have seen in the last one and a half days that it is not trivial to come up with good measurements out there. There were many questions to that effect here. The concern is, how are you going to measure during the monitoring program the effects, and in particular the effects of the project as it is proposed.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I am going to reply to that in two phases. The fourth question and your comment on adaptive management is that what you are asking us to do is apply good practice, when it boils down to it, truly what it comes down to. You are asking us that, if you see something that isn't working, you are going to do what you can to fix it -- that you are going to implement a process to do that, and then you will follow through with that. This is where the quandary gets because we have been doing that the whole way along. We have been doing that well before we started the environmental assessment. Good practice is good practice for a reason. It is the way you should do business.

We have been doing that, and it is one the reasons why we think that things like ISO 14,001 standard is a really good idea. It holds us to international standards in how we are going to apply environmental management, and it has an audit function which will tell the public. As we have stated, we are going to share the results of our audit, whether or not we are living up to our environmental statement and environmental policies and procedures that we are applying.

One of the tests of that comes (as John said) within the next couple of days when we go through our registration process. In a couple of days we are going to know whether we meet international standards on whether our environmental management system basically meets an international standard. That is more than just asking you to trust us. We are basically saying trust ISO. We are going to take it a step beyond that and for the purposes of time and for the purposes of internal mechanisms we wanted to get, and we needed to get, that ENS up and running. I would say that basically says that you essentially can't register a program that doesn't exist. We can't register a mine site because we don't have a program under construction.

We are taking a model that we use now and we will build on that using some issues developed by Andy, but we are going to be coming and talking with people about it. The presentation on Wednesday, lunch time at noon, will hopefully provide you with a bit more of an indication of what we do have in our AMS. The reality is that that applies to an advanced exploration program which is presently under care and maintenance. If you are asking us to trust us, then the other alternative that organizations have is a thing called an environmental agreement, or it is a recommendation from the MVEIRB. We need to see evidence of these programs before you proceed.

The second issue is how are we going to monitor effects of the project, and you pointed out that this isn't a trivial exercise. We take that exercise seriously, Peter, and that is why we have always stated that monitoring programs are going to be developed in conjunction with communities, regulators and governments. You guys need to have a say too and we want to hear your ideas.

I think the key thing is that we are wanting to put in place a rigorous monitoring program which reflects community concerns, includes community participation

and that is balanced with scientific interests. That is where we are at the moment, and we will work to do that.

**MR. PETER COLMAS (NSMA):** Thank you. That is pretty much what we wanted to do here too, is your commitment to working with the communities for development measurable targets. Of course we cannot expect to develop a monitoring program now as we speak, but we would be quite interested in hearing about the ISO 14,000 and how we go from there.

**MR. HAL MILLS:** Thank you. Any other questions or comments related to the four questions on the screen? Louis.

**MR. LOUIS AZZOLINI (MVEIRB):** I thought ISO 14,000 was specific to internal operations related to industrial or semi-industrial practices and you were measuring how you actually did things on the factory floor and how you were continually trying to improve them. So it is much more internal to the organization than how the organization is affecting the environment. Am I wrong there?

**MR. ROBIN JOHNSTONE (De Beers Canada):** To a certain extent you are right, Louis, but to a certain extent you are not, because basically what we are looking at is we essentially as part of the ISO process have to essentially identify the aspects and impacts, the way in which we might impact the environment. That includes a wide range of things. It essentially means that it can be focused very narrowly or it can be extremely wide. The EMS that we presently have is focusing on what are the major ways in which we can impact the environment. We can impact the environment through omissions, so we are looking at how do we limit and how do we ensure performance of fuel burning for instance. It focuses on each aspect of the operation from an activity point of view and then breaks it down, but there are some basic categories in which we are doing that. We have the opportunity to bring in some of the broader environmental issues.

**MR. HAL MILLS:** Did you have a comment, Anne?

**MS. ANNE GUNN (RWED):** No I don't have a comment but I have a couple of questions or issues yet relating to the assessment of the residual impacts. Is this the time for them?

**MR. HAL MILLS:** No. I think we will take a coffee break and then come back. We have cumulative impacts to deal with after the coffee break and other questions such as Anne is referring to. We will find out from the rest of you what other questions you want to raise as well and see to what extent we can deal with them this afternoon, or have to look at other options. A short coffee break.

-- Break

Welcome back. We want to turn now to cumulative impacts as a rather fortuitous thing. It turns out that Anne's questions are relative to cumulative impacts so we will get a chance to combine things here. As you know, we have sort of deferred

a couple of things related to cumulative impacts to this point on the agenda. I think perhaps though as a way of proceeding we have a couple more hours within the scheduled time for this afternoon. I think we will go back to the procedure that we used this morning and if we draw up a list of the questions that you wanted to ask related to cumulative impacts, then we will try to manage the time we have at our disposal, and then at the end of the day we will see if there are outstanding things and whether you want to look at other options for dealing with these in a side bar or whatever.

With that as an introduction then, I would like to have people briefly indicate which questions they would like to have addressed in the cumulative impacts section and we will develop a list. Over to you.

**MS. ANNE GUNN (RWED):** I have a couple of issues about how the residual impacts were assessed, and those then relate to cumulative impacts which use the same system. I have a question on resilience and I have a question on uncertainty, then a question on the numerical categories. Should I just go ahead?

**MR. HAL MILLS:** No, please don't go ahead with them right now, we are making a list at the moment. Other things for the list.

**MS. JANET HUTCHISON (NSMA):** Mike and Hal, of course being a lawyer I have to be disruptive. There was just one item I had to follow up on about our discussion before the break, and just wherever you can fit it in.

**MR. HAL MILLS:** Heidi.

**MS. HEIDI KLEIN (Gartner Lee):** I will have several questions related to the process applied and then some more specific questions getting clarification on some of the information provided.

Comment:

**MR. HAL MILLS:** Anyone else care to get on our list?

**MS. GLENDA FRATTON (Gartner Lee):** This is the file diversity issue that we agreed would go under cumulative effects, so I have just got some clarification questions on that.

Comment:

**MR. HAL MILLS:** Tim.

**MR. TIM BYERS (Yellowknives Dene):** A couple of questions relating to cumulative effects. One is inclusion of Tehera, their new EIA in cumulative assessment and inclusion of advanced exploration and exploration camps in environmental assessment of cumulative effects. Also while I have the microphone one thing that we neglected to bring up earlier, I guess, was what possibilities does de Beers foresee for including aboriginal groups in monitoring.

**MR. HAL MILLS:** Anything else, or should we start in? Chris.



**MR. CHRIS O'BRIEN:** I would just like to ask a general question on thresholds and limits.

**MR. HAL MILLS:** Okay, let's go for it. First then back to Anne with respect to residual impacts.

**MS. ANNE GUNN (RWED):** I think an issue is that the system processing the residual impacts, included magnitude, extent, time and duration frequency, those were addressed; but resilience was left out. De Beers argument that they give in their EA was that because it was controversial in the literature. I think the stage it is at in the literature allows for flexibility in its application. I don't think there is discussion, but that is not the same as controversy. Because there is discussion about it I don't think makes any sense that it be dropped as one of the criteria for rating those residual impacts. The reason is that resilience is in essence how an animal buffers changes, both natural changes and changes from our activities.

It is also a measure. It is an index to an individual's vulnerability or to a species vulnerability, and probably its inclusion -- because it carries a lot of ecology with it -- would explain for example why species as different as small birds, grizzly bears and caribou, without resilience being added in, they end up with the same rating of residual impacts. Both intuitively in terms of our ecological knowledge that doesn't make a lot of sense.

The other advantage of resilience, as well as the explanatory path, it has to add to those ratings is that it offers a mechanism by which you can measure cumulative effects. If you understand how an individual is buffering change, you can probably measure how much change it can buffer. For caribou the keys are body fat and foraging time. If you measure how much time a caribou is spending foraging you can relate it to the probability of how much fat they will have, which relates to the probability of pregnancy. I suspect pretty much the same logic applies to the large carnivores. I am not sure about small or large birds, but I suspect the same logic applies.

So it allows you to measure, it allows you to measure the effects of different projects or different components of the same project. So its exclusion reduces the value of rating the impacts because you are taking out a lot of ecology. It also removes from the table a mechanism to assess cumulative effects. That is my issue with resilience -- that it was taken out.

**MR. HAL MILLS:** Okay an issue is identified there. Not exactly a question, but Robin or anyone care to respond?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Yes I would like to know what your question is, Anne.

**MS. ANNE GUNN (RWED):** I guess my question is -- given the importance of resilience in rating residual impacts would de Beers explain again their rationale for deleting it.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The terms of reference, the tools that a proponent uses to determine the impact of its proposed project on the environment provide specific -- the terms of reference allow variation in what tools we use. In our opinion, ecological resilience had limitations that outweighed its advantage. On that basis it was basically excluded from the impact assessment. We basically had -- any proponent has the option of which tools are used. We didn't think that resilience was implicitly -- we decided not to use it. In many ways -- actually I am going to hand you over to John Berger to continue.

**MR. JOHN BERGELL (Golder Associates):** Instead of using resilience we used reversibility, and it does get to your question about using those things about life history traits to come up with a means of modifying the impact predictions based on the reproductive rate, the intrinsic reproductive rate, of caribou versus a grizzly bear or a wolverine.

**MS. ANNE GUNN (RWED):** I still don't understand what the limitations were. I do appreciate your point about reversibility being part of the concept of resilience, but you can approach it through population and viability models. There are ways of dealing with reversibility. The point about resilience itself is that, in fact, it lends itself to more direct measurement and therefore it has a greater role in monitoring and in impact prediction, but still I don't understand what the limitations were on resilience.

**MR. JOHN BERGELL (Golder Associates):** Again resilience is a very tough thing to define. It is one thing to try and define natural variation, as we have already had an in-depth discussion about. Resilience is in the same ball park. You can nod your head and I can sit here and say yes, there is stability in populations and there is resilience in populations, and that resilience is really the adaptive ability of species or populations to respond to sudden changes in the environment that really decreases their population and how much they can basically absorb or adjust to those changes to be able to persist. So you can write words around those things, but to actually come up with a measurement of it at this point in time, given our current knowledge and understanding of these systems, we basically just thought it would be just more uncertainty going into the impact assessments.

**MS. ANNE GUNN (RWED):** I guess my comments would be, there are a number of papers that at the eco-system scale describe approaches for measuring it, and during the Diavik environmental assessment part of their assessment was looking at changes in body condition and therefore the likelihood of a cow becoming pregnant. That approach was developed into a model for resilience to measure at the individual and the herd level. I can't speak for large carnivores or those little birds, but for caribou we certainly have the techniques and the definitions to apply resilience. As I say, there is literature and there are papers being published on how to apply it to the eco-systems.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Our point is that for every paper that is published on how to apply it, there is a paper on why not to apply it. That was the decision making role that the board leaves up to de Beers to make.

**MR. HAL MILLS:** I detect that there is in a way an issue here that is not going to be resolved here today. Basically you are saying that this was considered and you chose a different path. Rachael.

**MS. RACHAEL CRAPEAU (Yellowknives Dene):** I trust that you all have your translation systems.

-- (translation not available)

My worry is that sometimes we hear differing opinions and this is where I want to include TK knowledge because young hunters and trappers have the knowledge that their elders taught them, and if I hear differing opinions why don't we try something to include the Dene of the North, even the Metis, all of us. We could do your groundwork with you, and Offer does not like you guys doing the work with all expensive equipment that uses up dollars. We could use up dollars to measure resilience and measure the health of the caribou and the female cows, how are the calves when they are born. We want to be part of this type of study. This way we can say that we have a paper that will support what you are doing, or supports what Anne has read. Just my take on what I was hearing. Thank you.

**MR. HAL MILLS:** Thank you, Rachael. I believe I heard a question there basically if I could risk paraphrasing Rachel, correct me if I am wrong. You are asking why not use Dene and Metis, use their TK, use them in the study to measure resilience.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers has stated it before in this forum and I will state it again, de Beers will work with communities, government and regulators to design monitoring programs, and that community participation is a goal of de Beers -- as is the contribution of traditional knowledge. It has been for the impact assessment, it will be for the mitigation and for monitoring.

**MR. RAY CASE (RWED):** I just thought it would be an appropriate time to mention that the Bathurst Caribou Management Planning Committee is looking at the larger picture of range-wide monitoring of the Bathurst caribou herd. As part of the monitoring program we are looking at, for the wider range, we are looking very much to the communities on the range like Lutsel'ke, Dettah, Ndilo and the Dogrib communities to be able to provide the type of information that Rachael was discussing -- the information on the health of the animals, overall condition, pregnancy and really use the knowledge of the hunters who have a lot of experience out there to help rate the overall health of the range.

The key is to feed this into the overall monitoring is in some ways linked to resilience in that clearly a very healthy population has an ability to withstand

different impacts on it. On a range-wide level we are certainly looking at doing exactly what Rachael is putting forward.

**MS RACHAEL CRAPEAU:** I understand what the Bathurst Caribou Management Planning Committee is doing because we are part of those meetings. My worry is that every mining company that is going to be working out on the land, we want to be there with them, working with the company on the ground where the mine is going to be. All I remember at BHP was that I saw somebody working over there from another community. Nobody from our community was there. At Diavik they only do seasonal work, and I don't know what de Beers is going to do.

We would feel much more comfortable if we heard reports from somebody from our community who has done some work over there, doing this kind of work, monitoring of wildlife on-site. The elders would feel much more comfortable if a person came back from working on the site, and reported back to them and said, yes we saw 20 caribou, they were okay, there is nothing wrong with their health, no caribou broke a leg. These kinds of things develop a zone of comfort within the community, and this way when we do our fall hunts we notice the health of the caribou to see if they are okay.

This past hunt that was done in the spring a lot of people were talking about skinny caribou. They noticed the changes in the condition of the meat, so this way we can figure out how to deal with the problem together instead of separately. Just my idea on how we could do things in a collaborative effort. Thank you.

**MR. HAL MILLS:** Okay, Rachael, thank you. Okay hearing nothing else on that topic. Chris.

**MR. CHRIS O'BRIEN:** De Beers says that it is up to them to determine the methods they use to find out about residual impacts, and they have decided not to take the resilience approach and the reversibility approach. I am afraid that I am just not up on my science enough to know whether there is a huge difference between those two approaches, but it just struck me and I wonder how much it is up to just de Beers to determine how they come to these conclusions about what they should be allowed to use.

Anne said, I think, that the thing about watching the caribou whether it is looking at their fat, looking at how much foraging they are doing, observations like that, can be used in other ways as well. It seems to me -- the question I would ask of de Beers is why re-invent the wheel? We have two other diamond mines that have already gone through and a lot of work has been done in determining how to go about things. Why would de Beers come along and do their own thing? My impression is that, and again my science background is so-so, but it seemed to me that surely we must have developed a way, a sort of a system, of doing things which is all laid out for you.

You seem to be re-inventing the wheel to a certain extent. Why not just use the benefit of the experience of these other two mines and how to do it is all laid out. All you have to do is fill in the blanks. If I read what Anne was saying right on Friday, was that some of the blanks you have filled in you didn't fill them in very well. I think she was saying was go back and fill them in better and then you will get a better analysis from how you fill in those blanks, and then you will get a surer understanding and a more certain understanding of what you think the impacts will be.

What she was saying, as I remember, was because you didn't fill in the blanks as well as you could have, she is questioning the medium to high confidence levels you have in the impacts being low. It seemed to me that she was saying either go back and fill in those blanks, get the information better, or if you are not going to do that, then lower those confidence levels in your impact assessment -- your assessment of the residual impacts.

It seems to me that using reversibility instead of resilience -- I wish I knew much more about what that was all about -- you are trying to re-invent the wheel. I would have thought that after how many years we have been looking at diamond mines and the impacts of diamond mines on caribou and grizzlies, why not just take the benefit of that experience and use it. It seems to me that you are resisting doing that. When you said that it was up to de Beers to determine how they are going to do the -- there is already a system in place. How are you going to fit the conclusions you come to if you have come to them from a different approach into what is going on with the impacts that BHP is seeing, the impacts that Diavik is seeing.

When we talk about cumulative effects we are not just talking about your cumulative effects, it is the cumulative effects of everything that is going on in the range of the Bathurst herd for instance when we are talking about caribou. If you are using a different method, how are you going to fit that together as seamlessly as it needs to be fitted together? There is a flow that you could fit into it seems to me, but I am not sure if you seem willing to fit into that flow.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Chris, I think you are completely off track personally. I think that we are basically given the terms of reference for which there is a conformity period, for which we were found in conformity with. Basically we have done the job, we have done essentially what the board expects of us. That is why there is a consultation period around the terms of reference, so that -- whether it is you, whether it is RWED, whether it is the communities, whether it is an individual sitting at home -- they can make a comment on what we should address in the terms of reference.

I think your comments are misleading, Chris, and that your comments I think don't reflect what has been going on in this room for the last week and a half, that we are not going to stick with the method used by either Ekati or with Diavik because what we have heard through the consultation process is that both could

be improved upon. Why would we stick with that? Because we want to develop environmental assessment methodology where advances have been made, and we want to do the best impact assessment that we can, that stands up to the rigour of the process. So I fundamentally disagree that we are swimming against the current.

**MR. HAL MILLS:** Rachel.

**MR. LOUIS AZZOLINI (MVEIRB):** Can I just jump in front of you, Rachael, for a sec?

**MR. HAL MILLS:** Okay, Louis, jump.

**MR. LOUIS AZZOLINI (MVEIRB):** Just basically de Beers is correct, to an extent, bear with me. The board did not say that de Beers absolutely had to provide the residual effect of cumulative impacts and use resilience as one of the elements for defining or explaining what that impact is. Having said that, I come back to the question that the board is going to decide on the significance of the method that they have chosen. De Beers had made its case for why it is doing things the way it is doing. If you can convince the review board that the case that they are advancing is less than suitable, then the review board will make a decision accordingly, and then it will fall out the way it falls out. Thanks for letting me cut in front of you, Rachael.

**MS. RACHAEL CRAPEAU:** Can you finish your last sentence -- it will fall out the way it falls out. What do you mean?

**MR. LOUIS AZZOLINI (MVEIRB):** I don't know what the board would decide. I am not the board. Let's say, for example, that they look at what de Beers says and de Beers conclusions and how they have arrived at that. They look at your analysis and your suggestions about what is wrong with it and how you would have perhaps used another method. If they are convinced by what you tell them -- as a group of people if they sit down and they are convinced by what you tell them -- then the board could decide that there might be a significant impact and they could suggest remedial measures.

While de Beers can choose how it explains its environmental consequences, you are free to challenge that and you are free to provide alternative ways of presenting them. You are free also to try and convince the board of whatever you think is the right way of doing things. Ultimately the board will weigh the evidence on the record in its own way and decide on what it believes the conclusions are.

**MS. RACHAEL CRAPEAU:** Since the terms of reference make suggestions that a lot of items had to meet conformity, my understanding is that maybe all wildlife issues that de Beers dealt with met with conformity, or did it? Is there something missing? I get the impression that there is something missing still.

The other item that I wanted to ask about is that de Beers say that the regulators will decide what will be the methodology, or what measures or what plans will follow. I am thinking, who are the regulators in this case? I am wondering and worried about methods. I want to be clear about who the regulators are. Two things I want to know about. Thanks.

**MR. LOUIS AZZOLINI (MVEIRB):** I can respond to the first question about conformity. The board looks at conformity in a very simple way. Did de Beers provide information relevant to the terms of reference? It doesn't look at the quality of that information or the depth of that information. While Robin is correct that de Beers did conform, I don't want anyone to think for a moment that conformity means adequacy. Just because you conform doesn't mean that it is good enough. In other words, just because you have a driver's licence doesn't mean that you can drive a Ferrari. So the board said, yes you have responded to what we have asked for, and now it is trusting the technical experts, it is trusting government regulators and it is trusting First Nations to provide views on what de Beers has provided; and to provide opinions and technical opinions on that.

I don't want anyone to think that just because you conform that you have sufficient technical rigour.

**MR. HAL MILLS:** Anyone care to respond to the regulatory authority part of that? Obviously there are different regulatory authorities for different things.

**MR. ROBIN JOHNSTONE (De Beers Canada):** In retrospect I may have left you with the incorrect impression there. What I was referring to was that the interveners in the process have all had an opportunity to comment on the terms of reference. That is included in the environmental assessment, so that is the Yellowknives Dene through to GNWT, through to all of the parties on Louis' list.

**MR. HAL MILLS:** Okay, let's move on then. Next on my list, and I am not quite sure if I was being invited to make a judicial ruling or not, but I had Janet next who had indicated that her question was actually relevant to the morning. Would it be appropriate to bring it up now, or should I rule you out of order?

**MS. JANET HUTCHISON (NSMA):** I think I am too biased to answer that question, Hal. I think it would fit into the discussion now if you are willing to let me go ahead. Thank you.

Earlier this morning we were talking about some of the monitoring programs and adaptive management, and Peter made the comment that we are starting to speak the same language, and I think we are at least getting closer. One thing that I just wanted to follow up on, Robin and John, is whether or not de Beers would be willing to commit to providing the parties essentially with almost a work plan, almost like what we saw for the EA process, setting out your mine plan and your fence posts in the mine plan and where in that plan you will be fitting in --

stuff like for instance the ISO explanation this Wednesday would be one of those fence posts so we would see that somewhere on there.

Another fence post might be when in your mine plan you expect to distribute a proposal about methods for community consultation regarding monitoring programs. Another fence post might be when you hope to have a draft or proposed monitoring program in place within your mine plan, and when within those activities on the mine site you expect to have monitoring programs actually in place and up and running.

I know that was a long question, but I am just wondering if you are willing to make that commitment to provide the parties with that overview of how that process will develop, and the time lines for it.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The answer, Janet, is yes.

**MS. JANET HUTCHISON (NSMA):** Thank you.

**MR. ROBIN JOHNSTONE (De Beers Canada):** You are welcome. See we are not swimming against the current at all.

**MR. HAL MILLS:** A clear-cut one. The next one is Heidi, she wants to raise some issues with respect to the process applied.

**MS. HEIDI KLEIN (Gartner Lee):** Actually, Hal, I had a resilience question.

**MR. HAL MILLS:** You are just trying to demonstrate your own resilience!

**MS. HEIDI KLEIN (Gartner Lee):** My first question actually I will follow up with a resilience question, and it ties in with what Anne has already brought up. I will probably end up using the term "threshold or tolerance to change" by a particular species. My question is, in the absence of having some kind of threshold or some kind of indication of tolerance to change how do you propose to do your adaptive management program? I am thinking in particular from a cumulative effects perspective because frequently adaptive management programs require some kind of measure or threshold to change to know what you are working towards, and reversibility will not work in this case.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Can you provide an example.

**MS. HEIDI KLEIN (Gartner Lee):** Of what?

**MR. ROBIN JOHNSTONE (De Beers Canada):** A threshold that would relate through to adaptive management.

**MS. HEIDI KLEIN (Gartner Lee):** Sure, I won't use a northern example, but anyway. A chicken, okay.



-- Laughter.

Suppose you are in a situation, the issue is cumulative impact and you realize that possibly a particular population (say elephants) is at risk of going extinct in a particular area, and you want to know how much more pressure or change it can take. You know that there are multiple development pressures in the area that affect that population. Therefore you will work out a threshold that suggests that in order for this elephant population to be viable it needs these conditions, and we want to make sure that in any one of these circumstances the conditions aren't breached which then puts the population at risk. Therefore an adaptive management process -- you are constantly measuring against some threshold and adjusting your processes to make sure that a particular threshold isn't breached. It is not unlike the examples in the Cumulative Effects Guide which you used for your cumulative effects process.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The key thing with cumulative effects from a management perspective is what, in this case the Snap Lake diamond project, would contribute to that cumulative effect. How much would this project bump those elephants closer to being susceptible to that effect? The issue around the threshold, a single proponent can't develop that in isolation. This was a point that de Beers raised at the single regional monitoring agency workshop a couple of weeks ago. We think that there is no substitute for land use planning, and it is at that level where the threshold was appropriate to be set.

I think an example would be wolverine populations, but the reality is that mining projects are a portion of the impacts that occur on a population -- for instance traditional harvest and sport hunting -- so it is not up to de Beers, or it is inappropriate for de Beers, to then suggest what a sport hunting quota should be for wolverine as an example. Sorry I wasn't continuing with the elephants. So that threshold is basically, I think in many cases, it has to be defined elsewhere. But that is not to say that that threshold wouldn't be incorporated into adaptive management, but I think that that is certainly why the concept of a regional monitoring of regional cumulative effects is valuable. I think it is well beyond a single proponent to basically identify what that threshold is.

**MR. LOUIS AZZOLINI (MVEIRB):** Just for the hell of it, let's say the caribou are getting banged around. If there is a problem with the elephants, the solution lies collectively, right, because it is a collective problem. What elements of your project is de Beers willing to engage in adaptive management to lower the residual effect on caribou? In other words, you are designing a project to achieve a residual outcome. What additional efforts are you willing to put on the record to further reduce those if necessary, because if it is a collective problem then you have to recognize that there are key effectors of that herd and you have to be willing to collectively find points to reduce that affect.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers Canada. Louis, that scenario is so hypothetical that it's... it's inappropriate, and I

can't identify what portion of a project would need to implement that management to be able to do so, so...

-- Interjection

So you're using the example. It's hypothetical. It's... we can't respond to, you know... it's way out there, Louis.

**MR. LOUIS AZZOLINI (MVEIRB):** I do appreciate what you're saying, but I disagree that it is not hypothetical. That if you don't know what elements of your projects are affecting the caribou, then you don't know what you can turn down, metaphorically speaking, to further reduce impacts.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. That is what we've done in the environmental assessment. We've identified the elements of the project that are likely to impact the caribou.

**MR. HAL MILLS:** Did you want to jump in here, Heidi?

**MS. HEIDI KLEIN (Gartner Lee):** Heidi Klein, Gartner Lee. In the absence of land use planning and regional cumulative monitoring program, or a response is actually the more important thing. Monitoring is only useful in terms of collecting data. It's actually the response that it's important in the cumulative effects scenario.

The mitigation measures that have been proposed for the key wildlife species in the environmental assessment report really are those for which De Beers has control over by itself. Has any effort been made to get in contact with the other agencies, mines, what have you, that contribute to the cumulative effects problem? In particular, I'm thinking about wolverine, to see if there is a collective response until such time as land use plans and other mechanisms are in place.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. We don't have a mine in place and we don't have a permit to build a mine. That means that in the absence of doing that, our efforts are focused on reducing the impacts that we might possibly have on the environment, that we're using professional practice through people that have been involved with other projects to develop that. But I think that that's where cumulative effects has to be managed on a regional basis, that the mining industry, and this is a point that we made at that workshop, the mining industry certainly represents major industrial development in the Slave Geological Province. On the whole, there is pretty good cooperation between those... between those different companies. Now, but that's leaving out a substantial portion of land users and, you know, that's why I think that in terms of managing cumulative effects within the Slave Geological Province, more efforts have to be made to include some of those land users -- outfitters, tourism camps.

So I think that we've got a long way to go in terms of cooperation. I think that industry is doing pretty well, but there's room for improvement, and that's what we're focusing on doing, is improving that.

**MS. HEIDI KLEIN (Gartner Lee):** I'll move on to another question. In the terms of reference, under the cumulative effects section, it talks about looking at hunt camps and outfitter camps, things like that. And I note that you didn't include those in your cumulative effects analysis. Is there a particular reason that you limited yourself to the larger projects plus the winter road?

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates. They were not included specifically... they were included for noise, cumulative effects noise, and also on traditional land use. They weren't included for wildlife, which is one of the only other components that was identified as a potential for cumulative effects. And the reason being is that we don't know what the actual effects are. There's no impact assessment for these types of activities, and without an impact assessment, it's really difficult to know. What is the zone of influence, or the expected zone of influence? What is the influence of hunters directly on animals, and the indirect effects of the camp just being there? We don't know these things, so it's really impossible to determine an effect.

**MS. HEIDI KLEIN (Gartner Lee):** Heidi Klein, Gartner Lee. Did you avail yourself of the preliminary screenings, or the documentation that DIAND has on the effects of some of these camps at all?

**MR. HAL MILLS:** Heidi, if I could ask, are you referring to information gathered during the land use permitting process?

**MS. HEIDI KLEIN (Gartner Lee):** That's one source, and certainly over the years, Indian and Northern Affairs has provided or prepared, actually, documentation on the impact of camps and such, and reported these in their blue guidance documents, and that provides direction on how exploration camps should be managed, water issues and things like that. It just seemed to me that information in these documents would be appropriated for this analysis.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. You're now referring to exploration camps specifically, Heidi, are you?

**MS. HEIDI KLEIN (Gartner Lee):** No, not entirely. I am also thinking about the hunt camps, the outfitter camps.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. And which specifically in relation to the Snap Lake diamond project?

**MS. HEIDI KLEIN (Gartner Lee):** Sorry, I missed that?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Which of those camps, hunting or exploration, are you referring to?

**MS. HEIDI KLEIN (Gartner Lee):** Heidi Klein, Gartner Lee. What I'm looking for I don't see evidence of in the documentation, if you went say to the Mackenzie Valley Land and Water Board and looked to see if there were land use permits and water licenses applied for and the proximity of your camp, or between the other... yourself and the other diamond mines, to see if they would factor in from a cumulative effects scenario.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. No, we did not.

**MR. HAL MILLS:** Anything else?

**MS. HEIDI KLEIN (Gartner Lee):** Yes, I have a couple more questions. On the... and this is more in terms of clarification. This is Heidi Klein, Gartner Lee. In the cumulative effects chapter on page 131, there's discussion about the direct habitat loss will stop with the closure of the mine. And I interpreted that paragraph as to mean immediately, but I don't notice in that discussion that the habitat loss will be ongoing, there will be an ongoing influence until the reclamation is in place. And I'm just wondering if you could provide a time frame for the reclamation when there will be a restitution to habitat.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. The reference around direct habitat loss stopping with mine closure refers to there is not going to be accumulated, no further direct habitat loss is going to be further accumulated. So in other words, at the end of the project, we're not going to be adding to direct... further direct habitat loss. And that, for conservatism's sake, we assume that it is going to be... one second... reversible in the long term.

**MS. HEIDI KLEIN (Gartner Lee):** I just have one more question, Hal. Heidi Klein, Gartner Lee. I'm just wondering, in the way you structured your cumulative effects analysis, it was in many respects, a presence, an absence overlap type of approach. And I'm just wondering if at all you considered to looking at synergistic effects. You've captured additive to some extent, nibbling effects, anything like that.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Just one thing that we're clear on here, that the... we've got cumulative effects on the agenda in two places, and that is my understanding that basically issues specifically related to discipline topics would be dealt with on the individual dais -- fisheries, wildlife, geotechnical, and that Friday would essentially be the wrap-up on cumulative effects approach and the general cumulative effects monitoring.

**MR. HAL MILLS:** I think my interpretation there, Robin, if I could, is that the Friday is designed as, has been called the global cumulative effects, where we try to draw in things from the different topical discussions that have been held, but that was certainly the approach to dealing with cumulative effects could be dealt with in any of the sessions.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. In that case, Heidi, can you please repeat your question?

**MS. HEIDI KLEIN (Gartner Lee):** Heidi Klein, Gartner Lee. In the approach, your cumulative effects approach, you largely... you started off with the question of overlapping. Is there an overlap in effects, which is, in many respects, shall we say, an additive approach partially and a nibbling approach in cumulative effects language. I'm just wondering if you considered other types of effects, like synergistics, which deal with induced or indirect effects.

**MR. JOHN BERGELL (Golder Associates):** No, we didn't, just for the plain reason that we really don't have enough information to look at interactions. John Bergell, Golder Associates.

**MR. HAL MILLS:** You're running out of chances to get that right, John.

-- Laughter

Okay, I think we move on then. The next on the list is Glenda, a question about biodiversity.

**MS. GLENDA FRATTON (Gartner Lee):** I guess I first just want to say that we do realize biodiversity isn't explicitly a part of the terms of reference.

-- Interjection

Yes, this is Glenda Fratton with Gartner Lee. However, and I'm going to go back a little bit to the resilience issue, and I'm not trying to bring it into the terms of reference, but I'm going to bring the resilience issue in just because we were just talking about it, but De Beers states that the literature emphasizing the resilience of eco-system structure stresses the importance of conserving biodiversity, and therefore it was included in the impact assessment. So I don't know whether that sheds any light on some of the resilience issues, but...

Just firstly... firstly just sort of a general question, so that I have the right context in my subsequent, more specific questions. I'm just wondering if De Beers can just briefly explain the approach to me on both the coarse and fine filter approach that they took on biodiversity, and just how that measures biodiversity.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I'd like to take the opportunity to welcome a new face to the De Beers bench here, if you like, one who will hopefully be a lot faster than my colleague

on my right at learning how to use the name and organization thing. Sandy is a vegetation specialist and environmental assessment specialist with Golder Associates representing De Beers.

**MS. SANDY MARKHAM (Golder Associates):** With Golder Associates, representing De Beers, just practicing that! In terms of biodiversity, you are right, it wasn't part of the terms of reference. In our approach to assessing biodiversity we basically took a coarse filter approach, so we looked at biodiversity from a landscape and eco-system perspective; not going down to the fine filter approach which would include species and genes. At that landscape level we focused our attention on the distribution of ecological land classes across the landscape. We looked at patch size, patch distribution -- a patch being vegetation type -- and some components of fragmentation. We also looked at unique landscape features at that landscape level. That is basically the focus of our approach.

**MS. GLENDA FRATTON (Gartner Lee):** The fine filter approach was just so that we can clarify this before we go ahead -- in the EA the coarse filter approach was referred to as being the landscape approach, just a different word for it. And you used "fine filter" approach for the eco-system approach which addressed the species level. You have looked at species diversity, species richness and percent cover.

**MS. SANDY MARKHAM (Golder Associates):** You want me to elaborate on that a bit? Right. Yes, still not -- I consider that relatively coarse because it doesn't get down to the species level, but that is right, at the eco-system level we looked within the different ELC types or vegetation types. We did look at species diversity, that kind of thing, and we also measured soil parameters such as the depth of the permafrost and depth of top soil, humus type, those kinds of measurements. That is right, we took some measurements at that landscape level and at an eco-system level. Now at a species level there is information in terms of rare plants and listed wildlife in different sections of the report.

**MS. GLENDA FRATTON (Gartner Lee):** In your approach to biodiversity, again just to get a better understanding for it, was your intent to get at overall biodiversity, or just sort of within vegetation? Was the intent to look at biodiversity and your assessment represent biodiversity, or just a component of biodiversity?

**MS. SANDY MARKHAM (Golder Associates):** The intent was to look at components of biodiversity that we felt weren't addressed in other parts of the report.

**MS. GLENDA FRATTON (Gartner Lee):** Okay, that is helpful. That was something that I wasn't picking up on. I am just going to ask a couple of specific questions now that I have that a bit more clarified. In the EA it states, and I am just going to read a quote: "ELC units that are ranked as having a high potential to support biodiversity are capable of supporting a relatively large number of species and could be considered more sensitive than other ELC units."

My question there is, when you say "supporting a relatively large number of species" do you mean wildlife species, aquatic species or just plant species?

**MS. SANDY MARKHAM (Golder Associates):** We were just talking about plant species, so we really just looked at species richness in those ELC types -- plant species richness.

**MS. GLENDA FRATTON (Gartner Lee):** A follow-up question then, and I guess this goes back to what the biodiversity is supposed to be representing, so in that approach -- and I am more specifically talking about your eco-system approach (what you call the fine filter approach in the EA), are you trying to represent at all wildlife habitat or other habitats besides plants?

**MS. SANDY MARKHAM (Golder Associates):** John might want to elaborate on this, but I would say no we are not trying to represent that; that is handled in the wildlife section. If you want more information on the wildlife relationship with ELC types, whether they are rated as high, medium or low, then that would be available in the wildlife section.

**MS. GLENDA FRATTON (Gartner Lee):** Yes, just because my comment would be that your eco-system approach that you took doesn't really consider wildlife habitat specifically, and again if your biodiversity was meant to cover biodiversity in a broad sense I would have a little bit of a problem with the approach on that, but from what I am getting from you you are trying to represent almost a vegetation biodiversity rather than the large scale.

**MS. SANDY MARKHAM (Golder Associates):** Yes, that is right, and that is what we mean by that coarse filter approach.

**MS. GLENDA FRATTON (Gartner Lee):** Just one more question. Again in that eco-system approach there are high, medium and low rankings per potential of supporting biodiversity, and you do that for each ELC type. You give a ranking to each ELC type based on again species richness, diversity and I think percent cover. I am just wondering how you came up with high as opposed to low or medium. Were there different weights for percent cover? Was there a higher weighting for percent cover than, say, species diversity or richness?

**MS. SANDY MARKHAM (Golder Associates):** That is right. I need to go back and just check the specifics of that, but on the ELC type that had a higher species diversity was given a higher ranking.

**MS. GLENDA FRATTON (Gartner Lee):** So I guess what I am getting is that the species diversity, which I think was what measured the evenness, would have a higher weighting than percent cover or the species richness categories.

**MS. SANDY MARKHAM (Golder Associates):** There were a number of items included in that ranking assessment. Species richness was one of them. There

was also cover across the landscape and a percent cover of vegetation as a whole.

**MS. GLENDA FRATTON (Gartner Lee):** I guess what I am wondering is how did you add up each of those components to come up with high. Did you eye-ball it? That is fine if that is how you did it, but I am just trying to understand how you came up with high as opposed to low or opposed to medium. Whether you gave percent cover, it had a weighting of 10 percent, whereas something else had a weighting of 50 percent, it is just more important from an ecological perspective?

**MS. SANDY MARKHAM (Golder Associates):** No we didn't just eye-ball it. A matrix was set up and then high, medium and low for each criteria was established.

**MS. GLENDA FRATTON (Gartner Lee):** Okay, so in your matrix did you have numbers representing -- I still don't really understand how you came up with high.

**MS. SANDY MARKHAM (Golder Associates):** We did have numbers for each of those criteria. However, once the number was looked at it was then fitted into a category of high, medium and low. I would be happy to show the matrix to you.

**MS. GLENDA FRATTON (Gartner Lee):** Yes, that is sort of what I am looking for is that method of how you came up with that, so that would be great if you could provide that.

**MR. HAL MILLS:** Okay I take it that wraps up the questions that wanted to a Mr. Kakfwi, Glenda?

**MS. GLENDA FRATTON (Gartner Lee):** Yes.

**MR. HAL MILLS:** Thank you. Next on the list -- Alfred, you want to ask a question here? Go ahead.

**ALFRED:** (No translation available)

**MR. HAL MILLS:** Thanks, Alfred, a point well taken in terms of some of the technical banter. I think I can assure you that you are not alone in the room in terms of not understanding some of the terminology being tossed back and forth between the several experts that might be here on a particular topic. I also noted that I think you had an important point in what you were talking about there that cumulative impacts on some of the places there that are sacred or more important to people in communities are an important aspect of whatever we are looking at here in terms of cumulative impacts. Thank you for that. I have Tim next, and I think you had a couple of points that you wanted to raise. The first perhaps dealing with the inclusion of Tehera and advanced exploration camps.

**MR. TIM BYERS (Yellowknives Dene):** Before I get to Tehera perhaps I could go to my second point because Heidi Klein touched on it, and that is the inclusion



or lack thereof of exploration camps and bulk sampling camps. Before I get to my question I would like to know -- just to clarify things in my own mind from my reading of the EA report -- I am trying to differentiate what is a "claim block" from what is "the property" when I am reading the report. Are they one and the same, or is the property only the mine footprint and that peninsula, or is the property a claim block over which there is a, presumably, land use permit and lease?

**MR. JOHN MCCONNELL (De Beers):** I can understand the confusion, Tim. There is a large claim block that is referred to as the Camsell Lake claims block. I forget the exact number of hectares but it stretches probably 50 kilometers to the east from the project site. When we talk about the Snap Lake diamond project we are talking about what would be the surface lease area. I am not sure if there is appropriate map up now, but certainly in the introductions that Betty has done in the past, there is that big black line that goes around an area on the peninsula. That is what we refer to as the mine footprint or Snap Lake diamond project, which is less than 550 hectares.

**MR. TIM BYERS (Yellowknives Dene):** And you have a mineral lease land use permit for that particular area right now, that you are talking about?

**MR. JOHN MCCONNELL (De Beers):** We have a land use permit for the area that the advance exploration covers. We have applications into DIAND for the surface lease area, which would be the area that is encompassed by that black line.

**MR. TIM BYERS (Yellowknives Dene):** Okay, I guess when I look at you two fellows over there discussing that I think right now, but it shows what I would call "blocks" anyway, rectangles over a large area of the map, which presumably are mineral claim blocks.

**MR. JOHN MCCONNELL (De Beers):** I guess without knowing which map you are referring to and having it in front of me, I am not sure. If it is a big area it is the claims blocks. If it is the smaller area on the peninsula that is the surface lease area.

**MR. TIM BYERS (Yellowknives Dene):** Okay, surface lease area versus claim block, okay. Then in that case I will go to my question and that is, does De Beers have any plans in place currently for mining development at any other part of the claim block?

**MR. JOHN MCCONNELL (De Beers):** Right now we have no other plans for mining on any other claim block. However, we do continue to carry out exploration on the balance of the claims in that area, the balance of this Camsell Lake claim block.

**MR. TIM BYERS (Yellowknives Dene):** Then in that case I guess I would kind of like to see exploratory camps -- I guess the only one that springs to mind right now is, say, Kennedy Lake as an example; but any exploratory camp that you

might have I think it would be beneficial to have those included in your assessment of cumulative effects. Although I know there is no EA for such camps, but certain aspects of an environmental cumulative effect I think you must have some kind of a handle on. As an example, if there are access roads to a exploration camp or if they are air-supported, then surely truck traffic (if it is an access road) or air traffic (if it is air-supported) I would think should be able to be included in an assessment of those aspects of cumulative effects.

Another aspect of exploratory camps is drilling muds, as an example. If there is exploratory drilling in the same water shed as -- I don't know if there is or not, I am just throwing this out -- your current bulk sampling camp, then I think people would like to know what becomes of any drilling muds that are produced. Is drilling mud material and its disposal the same at every exploration camp, or are there certain specific exceptions? Those are the two aspects of exploratory camps -- access to the camp and drilling muds -- that I would think there shouldn't be an obstacle in including in the assessment, even if it is to say that we determined that these are not creating an impact. Even a statement of that nature would be helpful. That is my question on that. Perhaps more of a comment than a question, but there you go.

**MR. JOHN MCCONNELL (De Beers):** Yes, I am not sure that there was a question there, Tim, but I guess I can give a little bit of an explanation. Any exploration on the Camell Lake claim block to date has been conducted from a base camp at Snap Lake. There have been no other exploration camps on that claims block. Any drilling activities have been conducted under separate land use permits, and they have been helicopter-supported out of the Snap Lake facility -- the exploration facility that is there now.

**MR. LOUIS AZZOLINI (MVEIRB):** I know this question will come up, so just for the record. De Beers, can you categorically say that you will not be hauling ore from your Kennedy Lake project to the Snap Lake project? I know it will come up so I may as well just get it off the table.

**MR. JOHN MCCONNELL (De Beers):** I guess you are way outside the terms of reference there, Louis, which kind of surprises me, but certainly we have looked at and done sort of back of the envelope calculations to see if it makes any economic sense, and I can tell you that those back of the envelope calculations show that it is not even close to being economical. Can I categorically say that we won't apply for an application 25 years from now, no.

**MR. ROBIN JOHNSTONE (De Beers Canada):** What we can categorically say, Louis, is that any such development would have to basically follow the terms of reference issued to it, whatever they look like at that stage.

**MR. HAL MILLS:** Tim, do you will have some things to follow up on?

**MR. TIM BYERS (Yellowknives Dene):** Yes, I do. In relation to what Robin has just stated, page 17 of the terms of reference states that any areas of medium and high development potential within the claim block has to be addressed as far as explanation of the likelihood of its coming on stream. Does De Beers feel that they have met that requirement?

**MR. JOHN MCCONNELL (De Beers):** Yes I think we have met that requirement in that I have said that we are continuing exploration, but to date we have had no success in terms of finding another economic deposit on the claims block.

**MR. TIM BYERS (Yellowknives Dene):** Thank you for that. I guess I can move on to my second question which is...

**MR. HAL MILLS:** Tim, just a second if I could check on something. Anne was indicating that she wanted in. Was it on that particular topic? Okay, sorry about that, Tim, go ahead.

**MR. TIM BYERS (Yellowknives Dene):** It has come to my attention recently that Tehera's Jericho project near Contwoyto Lake -- Tehera will be submitting to the Nunavut Impact Review Board a revised EIA for that development and I have heard a couple of different things -- time line between either January or into the spring of 2003. Now as this is too late for your particular EA report, since it has already been submitted, I am wondering if De Beers has any intention of incorporating this new environmental impact assessment of Tehera's in their cumulative effects assessment as far as it applies to migratory species such as caribou, and as far as it applies to the Lupin-Yellowknife winter access road?

Comment: check

As an example, your EA report states that in year 2000 there were 4.2 trucks per hour using that road, and in the years 2001 to 2015 there will be 10.6 trucks per hour using that road. I would think now if the Jericho project report comes out that they will be using a lot more haul trucks, that that would have to be incorporated into those figures. I am wondering what your response to that question is.

**MR. LOUIS AZZOLINI (MVEIRB):** It is a good question, but it is outside the scope of the terms of reference. The reason I say that is because De Beers was instructed on the same page that you pointed out to De Beers that I have the right to ask that silly question about (if they are going to haul ore), then you would have read two paragraphs above where basically it does specifically include the Tehera project, but it also fixes the Tehera project at the time the terms of reference were issued. With respect to the Tehera project and its impacts within the Northwest Territories, or within the Mackenzie Valley, that the Review Board has jurisdiction, the Board is aware of the Tehera project. It is engaged in discussions and negotiations with the Nunavut Impact Review Board respecting the impacts of that development on the Mackenzie Valley and the environment in the Mackenzie Valley. I do appreciate where you are coming from, but the Board

did fix the terms of reference and the date that they were fixed with respect to specific projects.

**MR. HAL MILLS:** Tim, does that address your questions?

**MR. TIM BYERS (Yellowknives Dene):** I am still thinking about it. I take your point, Louis, with respect to the Tehera projects contribution to the potential cumulative effects, they have already addressed that under the terms of reference. I am wondering if I can get a sense from De Beers that they think it would be beneficial to them and to everyone else that they include the new Tehera environmental impact assessment report in their assessment, or in their future assessment of what cumulative effects of their industry will be. I was wondering if De Beers could comment on that.

**MR. JOHN MCCONNELL (De Beers):** I think we are dealing with speculation now. There is also an environmental assessment being done on a road from Bathurst Inlet down to Contwoyto Lake which totally changes things. I think what Louis said was that the Board is going to take those effects into account when they make their decision. Is that correct, Louis?

**MR. LOUIS AZZOLINI (MVEIRB):** When the Board is involved and considers the Tehera project, if and when, with the Nunavut Impact Review Board or whatever way it participates, it would consider that specific project in combination, I presume, with other projects in the Mackenzie Valley, including De Beers. The Board is not going to include a proposed Tehera project that may be different than what was affixed to the terms of reference because the record shows that it was affixed...unless the Board specifically amends its terms of reference to do so. You are partially right, John, the Board won't consider it in terms of the expanded project. The road from the port downward, I don't believe it was a specific requirement either, so that won't be specifically included in this project, but I presume it may be included in the scope of the road project.

**MR. HAL MILLS:** Okay, I think it is important to move on here, Tim, just a quick one?

**MR. TIM BYERS (Yellowknives Dene):** That being the case, I am wondering if we can bring this up during the public hearing.

**MR. LOUIS AZZOLINI (MVEIRB):** During the public hearing, because it is a public process, you can ask absolutely anything you want. Yes, you can ask anything you want and De Beers can answer whatever way it wants.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Tim, I think one thing that we can comment on is that we will certainly take a look at the information that is presented by Tehera and see if there is anything out of there that will contribute to further mitigation or monitoring. We will take a look through that information and see what contribution it can make in terms of the Snap Lake project on that basis, but which is not directly related to this environmental assessment.

**MR. HAL MILLS:** Okay, thank you. I note that it is getting towards 5:00 p.m. Chris has a question. He is the last on the list that I had. Anne and Steve have indicated that they have thought up something else, and we would like a few minutes to wrap up the session and check with you as to your feelings and things. Rachael, you have a point.

**MS. RACHAEL CRAPEAU (Yellowknives Dene):** You said that somebody else had a question. Let that person go ahead first, please.

**MR. HAL MILLS:** Chris, your question related to thresholds and limits.

**MR. CHRIS O'BRIEN:** I think Heidi answered the question through her question about thresholds and limits being developed. I don't think they have been developed. I would sure like to know from somebody at some point as to who is working n such things and when they will be developed, but it seems that they don't yet exist. I will leave it at that so we have more time for others. Thank you.

**MR. HAL MILLS:** Okay, those guys are still conferring. Anne, do you have a question to bring up?

**MS. ANNE GUNN (RWED):** I just have a quick question on uncertainty. In section 10.13 the probability per occurrence, which is one of the criteria for rating residual impacts, it reads that: "Because of the uncertainty inherent in most predictions of future conditions, conservative consumptions were used in these predictions. Therefore, it is likely that the project impact will have lower environmental consequence than predicted."

I guess my question is, why the lack of asymmetry? If you are uncertain, you could have a higher impact than predicted as much as a lower one. We wonder what the rationale was for the uncertainty to be asymmetrical about the prediction and then, as a part of that question, I wonder -- "uncertainty" was defined in the glossary as, I think, incomplete knowledge, but in fact, technically speaking, uncertainty has a number of components. There is statistical uncertainty, there is true stochastic uncertainty, there is uncertainty from knowledge gaps. Each of these contribute differently to and that will change over time as well, so the ratings might change.

Comment: best guess

I guess my question is, why the asymmetry in the use of uncertainty?

**MS. BETTY BESWICK (Golder Associates):** I will give it a start, but I think John and Robin will have to finish. It is treated asymmetrically because instead of saying -- we are trying to over-estimate the potential for impact. Let me use the grizzly bear for example. For the purposes of the impact assessment, we said there would maybe six to eight bear within the regional study area. We don't think that is true. We think there are probably fewer, but we chose to exaggerate what we think that potential impact is so we can over-report it so we don't make a mistake on the wrong way. Whenever possible, we are over-estimating that level of impact. That is why it is asymmetric.

**MS. ANNE GUNN (RWED):** Okay, then I couldn't find it is clear, going through the actual predictions, what the basis for the conservative is. You have given one example that makes it clear, but the rest of the time in the text it was difficult. The reason this is important is because it comes back to how you rate the residual impacts. That is what you have described, one way of using uncertainty, but there are other ways the uncertainty should be coming in, and also what exactly is causing your uncertainty should be clarified as well because, again, it relates to how you rate the impacts.

Don't get me wrong, this is not a criticism. It is a point of clarification because it is pretty important to identify what the components of the uncertainty are, because they also relate back through adaptive management. If your uncertainty is a knowledge gap, and an impact is rated highly, then that is something that tells you that you should go back and do something about that uncertainty. If it is stochastic uncertainty as a result of a variation in the environment, then you have a different approach to it. If it is statistical uncertainty then it is just usually a matter of fixing up your sample size or doing something like that. So the components of uncertainty relate also to your future monitoring and to the adaptive management and all that stuff.

**MR. HAL MILLS:** Is there any uncertainty as to what that question was?

-- Laughter

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think the key is that the expression of those components of uncertainty is where we target monitoring. So closing off the loop on what you have expressed then is the need for monitoring and the priorities and, if it is a sample size, then that should be reflected in the monitoring plan.

**MR. LOUIS AZZOLINI (MVEIRB):** I just heard Anne say, do you know what you are uncertain about. Is that correct, Anne?

**MS. ANNE GUNN (RWED):** Yes, that is part of it, and it is also not only what are you uncertain, but why? What is the cause of the uncertainty? Robin just answered that it relates back to the monitoring and adaptive management. That is true, but it also relates back to how you rate impacts and how that could change as a result of your adaptive management.

**MR. ROBIN JOHNSTONE (De Beers Canada):** At this stage, Anne, I don't think we have any further comment on that. We will take your thoughts and would like to have a think about them.

**MR. HAL MILLS:** Okay, thank you, I would like to get back to Rachael then for her question.

**MS. RACHAEL CRAPEAU (Yellowknives Dene):** If they don't have an answer, does that mean that it is still an issue and it is going to be on the table for the next stage?

**MR. LOUIS AZZOLINI (MVEIRB):** Before the public hearing that will held in March there is going to be a pre-hearing conference similar to the one that was held for the technical sessions. At that time all the parties to the EA can bring forward what they would like to have discussed on the agenda. Again, the Yellowknives Dene, if they have issues those issues can be brought forward then. The short answer is yes, Rachael.

**MS. RACHAEL CRAPEAU (Yellowknives Dene):** Okay. I was kind of concerned about base line data that was collected. For the Yellowknives Dene we did not feel that we were part of the collecting of data on caribou, collecting of data on small mammals or even rabbits around the area, ducks. I know that a couple of our people went in and did some work at their site, and there are mountains where he did some work with the company on collecting information on wolverine. Some time ago George Goulet was there helping to do some fish work. Mike Francioux went there to watch fish work. And Alfred's son went there to help do some work on fish work, but we did not get the impression of what is going on with caribou in that area and the impact the encroachment would have on impact.

Comment: check

Comment: check

Our concern is that caribou probably go by there to the Mackay hunting camp. When you go there in the fall we usually can book hunting camps around the first of September, but we notice that the caribou hunting that we can do is getting later and later in September. When we have to do our hunting later and later it is getting near to the rutting season and what is the sense of a hunting camp for the community.

Also the cost of doing these camps is very expensive. If we have to do our camps later and later, it's really bad weather. Planes need to be sent with our hunters. We have to have an extra plane for our gear and equipment that we need to send up. Then when we get the caribou we have to figure out where to send the planes to pick up the caribou. We notice that it is not right near our camp when they do the hunting. It might be north of Mackay Lake, so we have to send the plane to a different place entirely. It makes us think that we have to move our hunting camp somewhere else because it is the exploration, drilling and work out on the land that is causing the caribou to move differently.

The project has an impact on our ability to feed our community peoples and families. Today we don't have caribou in our community freezer. We have old meat from the spring because we didn't do the fall hunt this year. Only a few families went, but they had to contribute towards the hunt. Everybody has some sort of impact from a project. I am thinking that if we are going to do future monitoring on location at the site, we want to be part of that monitoring. We are not talking regionally. On site, we want to have our people working with the

wildlife biologists. We want people to be looking at the biodiversity of the plants that the animals feed on.

I understand that botany can answer a lot of interesting questions about changes in conditions of an environment. Monitoring and purveyor, if we see what is going on and if we see that it is really not really directly affecting our camp we would be happy and we will say to you, now we understand that you guys are not at fault at here; it is the bigger picture, and the Slave Geological Area doesn't have any huge impact on how the caribou move. That is why we are looking at other mining companies to see how they are doing their collecting of information -- what methods are they using. Is everybody using the same methods? I thought that Golder did work on BHP. Why can't they do the same things like they have done with the other companies? Use the same information so that we are all sharing the same information.

We want to know what methods are being used. Is it going to be universal or is it everybody doing their laundry differently? For goodness sake, we all have to talk the same language here.

The other concern is that I sort of get the impression that, like Chris said, De Beers doesn't want to be like everybody else. They want to be on their own doing their own thing. It is nice to be like that, but sometimes when they are talking about the same issues regarding the use of land, how much land you need, if you are going to be impacting other animals wide-ranging on the winter road, the access, that is going to have an impact also. We would like to share this kind of information. If it is going to be adaptive monitoring, we would like to be part of it.

Isadore wanted me to say that we have the Mackenzie Valley Impact Review Board members, but there are no members from Ndilo or Dettah and any Dogrib people. We don't have anybody from our community sitting on that Board looking out for our interests. This is a problem for us, and I think it makes us feel like the people sitting here are not listening to our concerns and taking those seriously. That is why we are saying that we want to look more closely at caribou issues down the road. Thank you.

**MR. HAL MILLS:** Thank you, Rachael. I wonder if we can do the quick go around the room with respect to the different issues that have been raised this afternoon, using our standard format, try to get you to give a quick response as to whether you feel the issue is still an issue or whether you are satisfied with the responses you got. I know Mike was just rushing out here to catch Peter to get that information. Perhaps I will turn it over to Mike to see what he heard from Peter.

**MR. MIKE BELL:** They both indicated that they thought the discussion was quite fruitful and interesting. They still have some issues that they will likely be raising, but they felt that they got more information than they had, and that the discussion was fruitful.

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**MR. HAL MILLS:** Next to Anne with respect to the discussion we had on resilience.

**MS. ANNE GUNN (RWED):** The discussion was interesting but I think the issue remains unresolved.

**MR. HAL MILLS:** Thank you. Heidi, with respect to the process applied, threshold through to adaptive management.

**MS. HEIDI KLEIN (Gartner Lee):** I am better informed but I am likely to have more questions on Friday.

**MR. HAL MILLS:** You are referring to the global session on cumulative effects on Friday? Okay. Ray, did you have something? No. Glenda, on biodiversity.

**MS. GLENDA FRATTON (Gartner Lee):** Yes I am pretty satisfied with the discussions and I will follow up with Sandy to get the matrix that she talked about.

**MR. HAL MILLS:** Tim, in terms of including the other advance exploration camps and so on.

**MR. TIM BYERS (Yellowknives Dene):** I'm supportive of De Beers' explanation that it is an extreme challenge to include some of these, more minor you might say, exploration developments, and that it is equally a challenge to include at a very late date the new Tehera EIA. I am still of the desire to see as this EA process goes along some addressing of new information like this. That is about all I can say at this point.

**MR. HAL MILLS:** Chris, your questions I guess get deferred to what Heidi had asked earlier. Do you have any response though at this point?

**MR. CHRIS O'BRIEN:** Just to say that I am not too pleased that we haven't really seemed to get very far along. It is nothing to do with this particular process actually. The idea of determining thresholds and limits is always good to get on the record and say that.

**MR. HAL MILLS:** Okay. Anne, with respect to the question you raised on uncertainty and the asymmetric nature of the way they are dealing with it.

**MS. ANNE GUNN (RWED):** Part of the issue was certainly resolved but I think the confusion on the different types of uncertainty and the implications of that needs further discussion.

**MR. HAL MILLS:** Okay, and lastly then in terms of the comment that Rachael made at the end. Anything you wish to state with respect to that, Rachael?

**MS. RACHAEL CRAPEAU (Yellowknives Dene):** We have got issues and we are going to talk about it together, and we are going to bring it out on Friday. I understand that we are doing the cumulative effects and global issues on Friday, but also we are going to include it in the recap of the technical sessions because we are also going to be talking about sustainable economic development.

I also want to say that some of the answers that were given to the wildlife issues today did not seem satisfactory to us. From hearing Alfred and from listening to the elders when I came in, they were not really happy with the kind of answers that they heard. They would like to get a better understanding of the answers that should have been given to Anne's questions regarding caribou. Thank you.

**MR. HAL MILLS:** Okay that is it in terms of going around the room. I just wanted to make a comment here that obviously in a session like this there are constraints by the time available, the technical -- perhaps the over-technical nature of some of the discussions and so on -- and all I can say is that I recognize that and it imposes certain difficulties in moving through things. Does anyone wish to comment? Robin is going to, but I will serve notice that any of the rest of you wish to make an overall comment on how the two days of wildlife discussions have gone and what you feel about that. Just the fact that is five o'clock doesn't mean that we have to stop talking. Rob.

**MR. ROBIN JOHNSTONE (De Beers Canada):** On Friday, De Beers stated that we would be willing to hold an evening technical session between six and eight o'clock tonight. I am not sure whether people feel that that is worthwhile. However, our doors will be open between six and eight so that if anybody has outstanding issues that they would like to discuss, then basically we will be there (along with the relevant technical experts) for that purpose to discuss whatever people would like to bring up. That is at the De Beers Canada boardroom on the third floor of the Scotia Building.

**MR. HAL MILLS:** Thank you for that offer, Robin, would you like a show of hands as to how many people would perhaps like to take you up on that offer?

**MR. ROBIN JOHNSTONE (De Beers Canada):** We will be there, but sure it would be good to get an idea. We usually arrange sandwiches.

**MR. HAL MILLS:** Anyone who intends to go do you want to indicate by raising your hand. Okay I think Robin indicated that they will be there, so if you change your mind or whatever you can do so. Louis or Ray. Ray.

**MR. RAY CASE (RWED):** Thank you for the offer for this evening. I have discussed it with our biologists and we are not comfortable right away coming in. We would like to take a look at the information and the responses that we have received over the last couple of days. Everybody has indicated that we are keen to follow up on the discussions and see what we can do to address some of our outstanding issues. We will be back on contact with De Beers and we also

actually make a commitment to the other groups there that we will certainly inform them when we intend to have discussions with De Beers and ensure that it is an open discussion when we do so.

**MR. HAL MILLS:** Thank you, Ray. Louis.

**MR. LOUIS AZZOLINI (MVEIRB):** Thank you to De Beers because our boardroom I think -- I haven't been there in about five days - is in an utter state of disrepair because of expanding the office, so I would like to offer a thank you to De Beers, otherwise I think certainly our doors would be open too to having people meet there. But also I think after these technical sessions -- and you can certainly pass it on to the people you work with -- if you want to keep these discussions going I would be quite happy to let you know when our boardroom is available and have Susan take notes or to prepare meeting note summaries of your discussions, if that would help you in your own sort of resolutions, whether you are meeting as individuals with De Beers or as individual regulators, or as First Nations, with anyone else.

**MR. HAL MILLS:** Thank you. Any other closing remarks? Okay, thank you, I would like to remind you to leave these behind. Don't walk out with them in your pockets. Apparently one of them did disappear on Friday, so if you are aware of where that is they would appreciate it if somehow it got turned in. Thank you very much. We will see most but not necessarily all of you tomorrow morning here at 9:00 a.m. Thank you.

-- ADJOURNMENT

**MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD****De Beers Snap Lake Technical Sessions****December 3, 2002****Yellowknife, Northwest Territories**

**MR. HAL MILLS:** We'll do a round of introductions, but there's something I want to do first. As you've noted, there's been somewhat changing faces sitting up here as facilitators. When the facilitators were approached -- I wonder if we could have just one conversation in the room, please? When the facilitators were approached at fairly short notice, we all had other commitments, so that in order to cover things off, we've had different people filling in when they could. I had to leave for a few days last week. Mike has got other... Mike Bell has other things he's doing today, and fortunately, we have Bill Klassen on my left-hand side there, I would like to introduce to you, who will be with you for the rest of this week.

Bill is a long-time Northerner, has worn a number of different hats over that time. Some of you will know him from wearing some of those hats. I won't go over his background, but just as an example, he's presently the chair of the Inuvialuit Environmental Impact Screening Committee, and he's a former panel member for the environmental assessment of the Diavik project.

Okay, we'll go around the room then, and Bill can add anything else that he wishes as part of that. Just in terms of introductions, my name again is Hal Mills. I'm with GeoNorth, one of the facilitators. We'll go around this way.

**MR. BILL KLASSEN:** Thank you, Hal. Just a minor correction. I helped coordinate the completion of the Diavik comprehensive study. It wasn't a panel, but there were sessions similar to this in which I was involved facilitating them. Thank you. Florence.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Florence Catholique, Lutselk'e Dene First Nation. I have one of my members will be here this morning and another this afternoon.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, Mehling Environmental Consulting to water resources division.

**MR. JOHN BRODY (DIAND):** Good morning. I'm John Brody, Brody Consulting, and I'm also consulting to the water resources division of DIAND.

**MS. SHARON SMITH (Natural Resources Canada):** I'm Sharon Smith from the Geological Survey of Canada, Natural Resources Canada.

**MR. JOHN RAMSEY (Natural Resources Canada):** I'm John Ramsey with Natural Resources Canada as well, senior environmental assessment officer.

**MR. DOUG HALLOWELL (Environment Canada):** I'm Doug Hallowell, Environment Canada, Yellowknife.

**MR. TONY KING:** Tony King, mining consultant, part of the Gartner Lee team.

**MR. MARK WATSON (EBA Engineering):** Mark Watson, geotechnical consultant for EBA Engineering, working on behalf of Gartner Lee.

**MR. GREG ORYALL (AMEC):** Greg Oryall with AMEC.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone with De Beers Canada.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers Canada.

**MR. RICK SCHRYER (Golder Associates):** Rick Schryer, Golder Associates.

**MS. BETTY BESWICK (Golder Associates):** Betty Beswick, Golder Associates for De Beers Canada.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos, Golder Associates.

**MS. LISA BEST (GeoNorth):** Lisa Best, GeoNorth.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, De Beers Canada.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini with the Mackenzie Valley Environmental Impact Review Board.

**MR. ANGUS MARTIN (Yellowknives Dene):** Angus Martin, Yellowknives Dene.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, consultant for the Yellowknives Dene land and environment committee.

**MS. GLENDA FRATTON (Gartner Lee):** Glenda Fratton, Gartner Lee.

**MR. LIONEL MARCINKOSKI (RWED):** Lionel Marcinkoski, GNWT, environmental protection.

**MR. GAVIN MORE (RWED):** Gavin More, Government of the Northwest Territories.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison with the NSMA.

**MS. TAMARA HAMILTON (DIAND):** Tamara Hamilton, DIAND.

**MR. FRASER FAIRMAN (DIAND):** Fraser Fairman, DIAND.

**MR. KEN DAHL (DIAND):** Ken Dahl, DIAND.

**UNKNOWN SPEAKER:** (translation not available)

**MS. MANORA HOBBIS (De Beers Canada):** Manora Hobbs, De Beers Canada.

**MR. ISADORE TSETTA:** Isadore Tsetta, (translation not available)

**MR. ALBERT WICHEE (Lutselk'e Dene First Nations):** Albert Wichee, wildlife from Lutselk'e.

**MR. HAL MILLS:** Okay, thank you all and welcome once again. A somewhat different cast of characters and faces sitting around the table today, but welcome.

Just a very brief recap, we've gone through the water quality sessions and the aquatic and wildlife sessions. There've been a somewhat different cast of characters as those as well. We fumbled around a little bit at the outset of things in terms of the procedures that we would follow. We've fallen into a pattern, I guess, in terms of those so far. We'll see if they are suitable for you today or not. You've got distributed to you the list of issues that have been pre-identified and so on. There are binders of information related to them that you should have all received, and if you haven't got them and need them, Louie has provided copies of the information, so for anyone who needs the background information binders, there are copies of all that information available here.

What we've been doing rather than working through the list systematically is De Beers will give a presentation covering off what they wish to with respect to the issues that will be... seem to be on the agenda for this morning. They'll have a similar presentation at the start of the afternoon, and as part of that, they'll not only be covering the issues, but giving general information about topics or about the situation on the site related to those topics, and how they have tried to respond to the different issues that have been involved. Then we can have a

discussion on their presentation, anything related to that. Then we'll go around the room and get you to put your hand up and identify the issues that you feel are important to discuss in this group this morning, and we'll develop a list related to that. And then we'll start actually discussing the issues.

After we go through the issues and before breaking for lunch, we'll do a brief recap when we go around the room, and the person who raised the issue will be asked to comment as to whether or not they feel this is still an issue, whether it's something they're satisfied with the answers and the process for dealing with them, or whether or not it has been satisfactorily resolved. So a brief sort of statement as to where you feel the issue stands at that point.

As part of that, we have Lisa Best back here whose job is not to take minutes here, but to do up short reports on outcomes. So she'll be trying to document the issues that are on the table, whether or not you feel they've been resolved or not, and any commitments that either De Beers or a regulator or whatever makes with respect to them.

So that's generally the way we've been going and the way we propose dealing with things this morning. Are there any questions related to that?

Okay, in terms of the agenda for today then, basically we're focusing on north pile issues today. You've got the agenda there. We'll follow it to the extent that we can and we'll use what I yesterday called adaptive management of the agenda where necessary throughout the day.

We have two days to deal with geotechnical issues. We don't have the freedom or ability to carry on the geotechnical issues beyond those two days, but within today and tomorrow, we should have some flexibility for dealing with things in the manner that you feel will best meet your needs.

As well, as Florence mentioned in her introduction, she's got some elders coming in who want to put on the record some of their concerns with respect to wildlife, and although that's... today's geotechnical, we have agreed that since they couldn't be here before, that we will accommodate that within the agenda at the appropriate time to let them put those things on the record and to speak to them. Any questions about today then? Okay, we'll move on then and over to De Beers for their presentation. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers Canada. Thanks, Hal. Yeah, the focus of today is geotechnical, specifically on the north pile, or where half of the process kimberlite will be placed on surface. We have three presenters today. Betty Beswick, who has been providing an introduction, will continue to do that today. Betty's an environmental assessment

specialist with Golder Associates, and has been working on our environmental assessment over the course of the past eight months. As well, she provided a lot of input into the Diavik environmental assessment.

And our second speaker will be Greg Oryall. Greg will give an overview of how the north pile will be built. And Greg is a metallurgist by education. He's presently vice-president of the metals and mining group, or operations, metals and mining group for AMEC. And he's been involved in the Snap Lake project going back to about 1999. He's been the senior AMEC person responsible for all the technical reports that are put together.

Following Greg will be Terry Eldridge. Terry is with Golder. He's a civil engineer, has vast experience in tailing systems around the world. And Terry will be giving us a number of presentations, more focused on some of the issues that were brought forward, so his presentations this morning will be focused\*and he'll be presenting his this afternoon as well. So with that, I'll turn it over to Betty.

**MS. BETTY BESWICK (Golder Associates):** Okay, I'm here to just get started and give you a bit of a tour of where we are to date in the whole process. These are the geotechnical issues that we work on today.

Now, where are we in this process? Well, in 1999, De Beers started doing a collection of base line data and the geotechnical information for the Snap Lake project. That continued through to today. Much of that information that was collected up to 2001 was consolidated in the applications that were provided for a land use permit and a water use application. And that was put together in February, 2001. And a few months later, it was referred to the environmental impact review board for an impact assessment.

A few months followed after that until, during the... doing consultation about the terms of reference and a final terms of reference was provided to De Beers in September, 2001. Since then, De Beers has worked on preparing that environmental assessment, which was submitted in February, 2002.

Since then, there has been a process of trying to provide answers and meet with people so that we can consolidate issues down, get a number of issues resolved so that, as the process continues, we're able to focus on remaining items.

There were comprehensive technical sessions held in April this year. They were held in the movie theatre downtown, and some of you I think were there as well, and they were much the same like this, where we invited people to ask us questions so we could provide responses.



During this whole time, from the time the impact assessment was submitted in February through to September, 2002, the assessment was reviewed to determine whether or not it met the terms of reference that were provided, and in September, it was determined that the impact assessment did conform to those terms of reference.

Technical sessions were held in the spring, and since then, there have been five rounds of information requests that have come to the board and to De Beers for answers, and those information requests essentially were completed just before these technical sessions began.

Right now, we're at a series of technical sessions, and as Hal said, they've been ongoing for the past week and will continue through to Friday.

The purpose of these sessions is to continue to discuss issues that people have questions about with that impact assessment.

In February, there will be an opportunity for people to have submitted technical reports to the board, and then that will be followed up at the end of March with public hearings.

Now, just a bit of a locational thing for those of you who probably... who may not have been to the site. Our laser... our laser pointer's not here today, so I'll do it on person. We'll here in Yellowknife today. The Snap Lake project is about 200 kilometres... 210 kilometres northeast of this location up here... we just point out Camsell Lake because it's on my next slide and it provides you some scale. The Snap Lake project is here. The other two major diamond projects that are ongoing now in the area are the Diavik project and the Ekati project, and they're about 100 kilometres northeast of the Snap Lake site.

This is the project site right here. Here's Camsell Lake. I said I would point it out so you know where we are. This is the project site right here. This will be the footprint of the above ground activities of the mine. This distance is about three kilometres across the mine, and this orange line shows essentially the footprint of what's going on on the surface. Most of it is located in an area that we call the northwest peninsula on Snap Lake. There are a couple of surface activities actually occurring on the north shore. These are vent raises that will provide ventilation for the underground workings. The underground workings are outlined here in these black lines right here.

Now, as John already discussed, the issues we're going to talk about for the next two days are primarily geotechnical issues. They're going to start out with an overview, and I think Greg's going to be giving that. We'll talk about the development of the north pile, thermal regimes and how permafrost affects those,

and monitoring of the activities. Day 2 is going to be impact on permafrost and the site planning, closure planning, and those sorts of things towards the end of that day.

Anyway, so now I think Greg is going to give you this really nice presentation that has moving parts to it.

**MR. GREG ORYALL (AMEC):** Is this on? The north pile will be a significant surface feature of the Snap Lake project, and will be constructed over the 24-year life of the mine. Sorry?

**MR. HAL MILLS:** Greg, I've just been handed a note that the presentations are being made too quickly and we do have translators here, so if you could keep that in mind and try to go at a reasonable pace, please. Thank you.

**MR. GREG ORYALL (AMEC):** Thank you. I have a reputation from last week. The north pile will be a significant surface feature of the Snap Lake project, and will be constructed over the 24-year life of the mine. Approximately 22 years of active mining operations and an estimated two years for reclamation and closure.

This presentation illustrates how the mine rock and the process kimberlite will be deposited to construct the north pile. These pictures have been computer generated by drawing the proposed facilities, such as buildings, roads, and the north pile itself, on top of actual aerial photographs of the Snap Lake project area.

This slide shows the main plant site and the components that are related to the north pile development. They are the portal, where the miners and equipment enter the mine, the process plant, where the kimberlite is processed to remove the diamonds, the water treatment plant, water management pond, the water outfall and diffuser, and for reference, the airstrip, which is located near the north pile.

A side view of the underground workings shows how ramps are excavated below the dyke in order to reach the kimberlite above. The kimberlite will be extracted and processed to recover diamonds, and then will either be used as backfill to refill the mined areas underground, or will be deposited in the north pile. During the first two years meta-volcanic rock, which is near the surface, in this area here, will be encountered as the ramps advance underground. Only a portion of this meta-volcanic rock is potentially acid generating, or PAG. However, to be on the safe side, all of the meta-volcanic rock will be handled as though it is PAG, and will be buried and sealed within the north pile, or used as aggregate for underground backfill.

Granitic rock, which will be encountered during the remainder of the mining operation, is not classified as potentially acid generating, or PAG. And this material can be used for general construction and for capping of the north pile.

The north pile will be located to the west of the main plant site. The process kimberlite will be deposited here in stages, in cells. The starter cell will be filled first, then the east cell and finally the west cell.

The edge of the pile will be a minimum of 50 metres from the shore of the Snap Lake, and the pile will measure about 1,700 metres from east to west, and 900 metres from north to south. The height has been designed to blend in with the nearby hills.

The clock in the top left corner of the screen will serve as a time navigation aid throughout this narration to show the progress of the north pile throughout the life of the mine.

Three quarries will be incorporated within the north pile area to minimize the size of the overall project footprint, and to provide more storage capacity for process kimberlite.

The first quarry will be mainly used to construct the airstrip extension and roads. The second quarry within the east cell will provide rock for plant site foundations. A third quarry within the west cell will be developed later in the operations to provide granite to cap the north pile and to provide aggregate for the underground concrete pillars.

First, a system of ditches, pumps and pipes will be built to collect run-off water that will come in contact with the north pile, and direct this water to the water treatment plant. Once the drainage system is in place, an embankment of mine rock will be built around the perimeter of each cell as a structure to contain the process kimberlite.

Potentially acid-generating mine rock will be used to build internal embankments and will eventually be buried beneath the process kimberlite. Non-PAG mine rock, together with the process kimberlite, will be used to construct the external embankments. These embankments will contain the process kimberlite, as well as providing an elevated platform to support the process kimberlite piping system.

Any run-off water that comes in contact with the north pile will be treated. This slide shows the starter cell drainage being collected in ditches and routed to the water treatment plant.

Processed kimberlite, or PK, is the finely ground waste rock that remains after the kimberlite has been crushed, washed and screened to remove the diamonds. Most of the water is removed to produce a material which is known as paste, because it is similar to the consistency of toothpaste. The PK paste is either pumped to the north pile or is mixed with cement and pumped underground as backfill.

This illustration shows the internal workings of the paste thickener, which removes and recycles the water from the process kimberlite. The resulting paste will be about 76 percent solids and about 24 percent water.

This illustration shows the internal workings of the paste hydraulic piston pump. The pump is piston-driven and capable of pumping 150 tons of process kimberlite per hour from the process plant to the north pile.

So the process kimberlite is pumped via pipelines from the process plant to the underground mine or to the north pile. The pipe is 12 centimetres in diameter and is heat-traced and insulated.

The pipeline will deliver the process kimberlite to a series of lateral pipes, or spigots, positioned on the embankments of the cells. The pipes will be opened sequentially to fill rectangular paddocks, which will progress around the cell.

The perimeter pipe will be monitored and repositioned until the cell is filled in. PK will continue to be deposited all year round. The larger paddocks represent deposition in the summer and the shorter paddocks represent deposition in the winter, when the PK won't flow as much.

This same process will be used in all the cells as they are built in sequence.

Surface runoff and any water which drains from the PK will be collected in a system of internal and perimeter ditches and ponds. The run-off and seepage within the starter cell will be drained within a temporary pond and connected to the drainage collection system, and then pumped to the water treatment plant. The water management pond here, the large pond, will act as a surge control for the water treatment plant.

The drainage collection system, including ditches, pumps and pipes, will be built around the perimeter of the east cell while the starter cell is still being filled in with PK. Once the drainage system is in place, the embankment for the east cell will be constructed.

Processed kimberlite deposition in the starter cell will be completed in year two. The internal drainage pond within a starter cell will be replaced by a new pond inside the east cell, and the empty pond then be filled in.

Once the starter cell is completely filled in, it will be reclaimed, beginning with contouring the surface.

While the process kimberlite is being deposited in the east cell, the starter cell will be capped with granite from the underground mine and from the quarry in the west cell. The embankment around the east cell is then raised to increase the capacity for the processed kimberlite and the east cell is contoured as it is filled in.

Granite continues to be quarried from within the west cell and is stockpiled on top of the starter cell, to provide capping material for later use. The drainage system and the embankment around the west cell is constructed.

A cross-section of the north pile progress to this point shows the internal embankment of the starter cell and the common embankment between the starter cell and the east cell are now both buried with processed kimberlite, and a protective capping of non-PAG granite is over top of the entire pile. And you can also see the relative elevation of the north pile compared to the deposit...(inaudible)...the surrounding area.

This cross-section shows the east cell now filled with processed kimberlite and the process used to increase the embankment that more PK is being deposited. The capping layer on top is added later. Now the same process repeats in the west cell.

In addition to the small internal ponds, there are also three water collection ponds outside of the west cell that are incorporated into the water collection system. Once the west cell is filled, it will be contoured and then capped with the quarried rock that was stockpiled on top of the starter cell, while the process kimberlite continues to be placed in the remaining parts of the cell.

Mining of the Snap Lake kimberlite dyke will take about 22 years, at which time the north pile will be complete. Operations, however, will continue for the next few years to decommission and reclaim the site. Thank you.

**MR. TERRY ELDRIDGE (Golder Associates):** I'm going to follow on Greg's presentation discussing north pile developments, looking at providing some information on development of the pile, some of the operating scenarios we looked at, and a brief discussion on the ...(inaudible)... of the PK material itself.

These topics have been addressed in the environmental assessment report, section 10.2 in the appendix 3.1, as well as in numerous information requests.

Just a brief discussion on tailings disposal in general, conventional tailings ...(inaudible)... typically will pump a very dilute ...(inaudible)... of ...(inaudible)...

out to a tailing facility, and will have a wide tailings ...(inaudible)..., with a ...(inaudible)... amount of water on top of the tailings. It's that water which is the greatest risk to a tailings facility. In the event of a failure, that water carries tailings long distances downstream. ...(inaudible)...examples, recently on the impacts of that water at Snap Lake, we've taken the position that we have a ...(inaudible)... plan, which removes any excess water in the process plant, and we'll only be sending the solids out, with a minimum amount of water that we can possibly handle to the north pile.

**Comments:** Really, really low on tape  
- 11.2 on slide 2

This gives us a situation where we've eliminated these large, permanent ponds of water and we only have small, temporary run-off selection ponds on the PK itself, significantly reducing the risk of this operation.

So this is an example of Elliot Lake in Ontario. You can see the size of the large water ponds, which are part of this facility.

This is a paste pile, this is from the Boolean Hula Mine in Africa. Not a cold climate project, but one of the two mines with an operating paste plant. They've thickened their tailings and pumped them to the empondment. These towers here are used to provide the elevation they need to get the tailings to the height they need. It's a very flat area with almost no topographical relief, so the pile is...(inaudible)...the elevation. You can see there's a man standing on the paste shortly after it was deposited.

Here's another example of the paste at Boolean Hula. This is the water containment berm for storing storm run-offs during the rain season. Other than that, there's no water in this facility at all. This is the paste that was deposited a few days prior to this event, so it's ...(inaudible)... trafficable, a person can walk on it with no problem. This is a much finer grind than you'll see at Snap Lake.

So again, the setting for the north pile, it's an area to the west of the mine, spanning across about 1.7 kilometres, a width of about 900 metres. We'll be developing it in three cells – a starter cell, about 250 metres from Snap Lake in a small area, very flat relief. And then the east cell and the west cell.

These are true scale sections, showing very flat relief. The key point is that was starter cells well-removed from Snap Lake, we're working in an area with very good foundation conditions.

Some of the issues that have been raised for this ...(inaudible)... were pore section development within the PK and the ...(inaudible)... characteristics of the PK. Now, the pile itself, the stability is governed by the external embankments. And the design which we're moving forward with is a starter embankment of compacted...(inaudible)... or general slough excavated during construction or

compacted coarse and grits PK. These materials will be all free-draining, non-frost susceptible materials. We selected specifically for that.

Foundation, we have the same soil cover over bedrock. We will be removing any unsuitable soil, organic materials, ice-rich materials, over a 15-metre width, potentially more, depending when we get out there and start working. So we'll be constructing a drain, embankments, rockfill or standing gravel compacted into the ...(inaudible)... equipment on prepared bedrock foundation.

**MR. HAL MILLS:** Excuse me, Terry. You're doing pretty good, but if you could take the occasional break and slow down just a little, please.

**MR. TERRY ELDRIDGE (Golder Associates):** Thank you. I get excited about the topic and get going. To raise the embankments, what we've proposed is that this piece of embankment will be constructed with the coarse and grits PK, without any fines added. They'll be taken from the process plant, mixed and trucked to the facility, dumped, spread with graders, and compacted with conventional equipment. So we have a conventional, non-water retaining drained embankment out of good, granular material on a bedrock foundation.

Removed from that area, we've got the PK. This is the full mix PK or, when we're just depositing or just constructing this embankment, it will be the fines themselves. Well-removed from the embankment, so pore pressure is generated to here, which drains into the embankment itself, and then out into the ditch.

We propose to do some test work in the starter cell to see if we can optimize this situation, and if we can use the full mix PK pump into this area, spread and compacted, but we won't revise the design until we've proven the performance of that material in the starter cell within the containment ...(inaudible)... themselves.

A number of scenarios we looked at for operations. Some of the key ones is the discharge. How can we move the PK from those external berms to locations we need within the cells? Some of the flow distances are fairly long and we have issues of winter and freezing of the PK. We've done quite a bit of planning on that situation, and we will be using a starter cell as a test to confirm what we've considered.

Other issues we're presenting as the management of the internal ponds, the perimeter ditch and its efficiency, identification of non-pad materials that we can use in external berms, and how we might remove pad material that's temporarily stored in a footprint and take it back underground for backfill.

We've done detail planning for the first year of operation, looking at how we could place the PKs into the starter cell, and what we've come up with is this scenario,

where we looked at summer and winter deposition. For summer, we assumed that we'll get a fairly flat slope for PK, 6 percent. And we assumed that in the winter, it'll freeze and it will be as steep as 15 percent.

At other paste operations that we're involved with at the moment, we're looking at slopes as steep as 10 percent for thawed deposition.

The starter cell has two pipelines ...(inaudible)... it, so it's redundant in the event that one freezes during the winter.

We've identified locations for summer discharge and winter discharge. In the winter, we'll start from a point furthest from the pipeline, discharge at that point, and then retreat back around itself. In the event that a pipeline floods, you can break it off and start discharging at the next closest point.

If we're finding that we can't get the PK to flow as far as we want, then the solution is to provide additional elevation. We don't have additional pressure, or we don't want to add additional water into it, so we will raise the internal berm or we'll use temporary towers, similar to what you saw in the Boolean Hula photo.

We will have a series of internal and external ponds for handling the water. Our internal ponds are strictly for run-off management, and the small amount of bleed water that may come from the TK. It will migrate around the cell, depending on the location that we're discharging in, and what the configuration actually is. We will either ...(inaudible)... into the large ponds, where there will be pumps to the water treatment plant, or we'll use a small floating pump to pump the water.

These ponds will be in the order of 5,000 to 10,000 cubic metres only. We'll keep them as dry as possible, pumping all the water out as the capacity of the water treatment plant allows.

So this is a slide showing what the ponds might look like for starter cell near the end of the east cell, we'll have a small pond, a low area for the pump, pumping it through the sump and then on to the water treatment plant.

And on the west cell, again we'll have a slope rise small, one ...(inaudible)... discharging into a larger external pond. Water from these larger ponds is pumped by a pipeline to the water treatment plant. We also have collection ditches around the outside of the pile, which collect the run-off from these slopes and take it either to a slump or a pond.

Very simple ditch design. We looked at the run-off that would be coming from the sides of the piles, assuming that there was no infiltration, that the maximum amount of run-off. We looked at the amount of water the could infiltrate if we had maximum infiltration. We added those together to size the ditch. And then saw



that that was not an efficient ditch size to construct, so this ditch is much larger than is needed to contain the flow. It's sized to be efficient for the construction equipment that will be on site.

The north pile will be here. We will remove any unsuitable soils, leaving only granular materials. Excavate true into the weathered rock, the bedrock, and place a liner on the down stream side, stop flow out of the ditch. It's a very broad ditch. We'll be able to go in there and remove ice and snow for spring break-up so that the ditch works as planned. We can access, going along the outside of the ditch which provides additional containment and access for maintenance.

In terms of the efficiency of the ditch, seepage modeling shows that about ten percent of the water will bypass, ten percent of the seepage will bypass this ditch and move forward to Snap Lake. This has been accounted for in the water quality model.

We're not expecting this ditch to be perfect. It will collect the run-off and 90 percent of the seepage coming from the pile.

Before I go on to this slide, we had two issues where, how would we identify the material suitable for construction, the non-PAG materials. There will be an ABA – active base accounting program on site. Materials will be routinely tested to confirm that they are non-acid generating, or potentially acid-generating. That will be an ongoing part of the operation, looking at both the rock coming from the quarries and the rock that's coming from underground.

In terms of stockpiling potentially acid generating material within the north pile footprint, for use as concrete, backfill, underground, if that's decided to be done, then there will be areas specifically set aside that won't be inundated by PK. It will not compromise the deposition plan.

Some questions raised about variability of the PK itself and how we'll handle that variation. Materials are coming off the process, there's been a significant amount of testing done on the grind to maximize diamond recovery. We're fairly confident that there will be small variations in that grind related to rock type variations. This will develop small changes in the pore water chemistry and small changes in the water content of the PK itself. However, we've looked at the north pile and it's required to handle both a full-mix PK, consisting of the porous, the grits, and the fine, as well as taking just the fines when the coarse and the grits are being trucked for embankment construction.

The facility already has the potential to accept very large variations in pore water content, looking at ...(inaudible).... There's a high density slurry of pulp densities

in the range of 60 to 68 percent, as well as the full mix PK, which has a pulp density in the range of 75 percent.

There will be questions raised on the experience of paste in a permafrost environment. And there are no pump paste disposal systems in an arctic environment at the moment. Cruck Lake in northern Saskatchewan is a cold climate where they just started using a paste system. The systems that use ...(inaudible)..., de-watered tailings, Greens Creek, MacVie Island, Ragland, Pogo in Alaska is looking at using a pump de-watered tail, truck de-watered system, but there is no direct experience on pumping paste in an arctic environment.

However, there's considerable experience on tailings management in arctic environments. The mechanisms of freezing are well understood. The mechanism of pumping materials are well understood, pipelines will be fairly ...(inaudible)... and insulated. There's provision to blow those out in the event that the paste has to sit in the pipeline. The pipelines won't be used for long periods.

In terms of similar technology, Kid Creek is probably the best example of picken tailings ...(inaudible)... paste that's been operated for a significant period of time in a cold climate. Kid Creek's been operated since mid-70s. It's got another 20 years mine life on their picken tailings disposal system. It works well. They see seasonal variations between the... on how the material flows. But aside from that, they're managing the system very well.

Paste itself is not a new technology. There's something like 90 paste plants in the world right now, being used mostly for underground backfill. So producing paste, new watering is evolving, but it's a well-understood science at the moment.

So we're taking what we consider the best technologies around right now and applying them to the Snap Lake situation so that we have minimum risks from the PK disposal.

So just a few concluding remarks, paste technology allows us to eliminate the largest risk in our tailings facility, which is that large, permanent tailings pond. The embankments we've constructed granular materials using conventional construction techniques, and the north pile is founded on an ice-free granite bedrock foundation.

All these things work towards producing a very safe and stable containment facility.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. Hal, that concludes our presentation for this morning.

**MR. HAL MILLS:** Okay, John, thanks to you and to Betty, Greg, and Terry. I think that those presentations are most helpful for us to, for an understanding of the issues that we'll be discussing.

I'd like to differentiate for just a short period of time between questions that you might have on the presentations and the issues that you wish to discuss. I'd like you to hold off just for a minute or two on the issues and see if anyone has questions on the presentations, or their understanding as to how the north pile will function. Tim.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives Dene. A question on the presentation. I'd like to know more about the PK paste beaches. I'm wondering, will they still stay the consistency of toothpaste, as you described, when it hits the PK and is exposed to the air and differences in temperature? Or will it solidify in some way?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates for De Beers. The PK will solidify. We expect it to freeze. It's a permafrost environment, so everything tends to frozen conditions, so at Snap Lake, most of the PK will be solidified by freezing. During the summertime, there will be a small amount of water that drains out of the paste itself, which then stiffens the material -- I wouldn't call it solidified, but it is more competent material. It won't be paste at that point, and it will not flow.

We saw the pictures of Boulton Houliou. That was a paste material which was pumped onto the ground, flowed with a small amount of sunlight, removed a very small amount of water. It turned into that thick material which you could walk on.

Comment: spelling

**MR. TIM BYERS (Yellowknives Dene):** Further to that then, how long would it take, would the process take from changing from the toothpaste consistency into that solidified consistency?

**MR. TERRY ELDRIDGE (Golder Associates):** We haven't done full-scale... Terry Eldridge, Golder Associates. We haven't done full-scale testing on the materials, but the lab scale, we're showing that in order of several hours, the material had stiffened when it was dumped and you could walk on it. So it would be a short period of time. In terms of freezing, that would take a longer period of time.

**MR. HAL MILLS:** Okay, Hal Mills speaking. Other questions to the presentation?

**MS. PERRY MEHLING (Mehling Environmental Consulting):** Perry Mehling, consultant to Indian and Northern Affairs. Terry, I wasn't quite following. Did you mention a PAG stockpile as part of this north pile? I wasn't clear on that.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. There's been discussion on having a stockpile of PAG materials, which would then be reclaimed and taken underground as concrete backfill. That would eliminate the need to quarry other materials for the concrete backfill. There will be PAG materials placed in the bottom of the cells and covered. That's not a stockpile. That's just a disposal method.

**MS. PERRY MEHLING (Mehling Environmental Consulting):** Perry Mehling. Do you have a location outlined? You've got lots of space there, but do you have a specific location outlined for that material?

**MR. TERRY ELDRIDGE (Golder Associates):** We don't. It's just been done schematically at the moment, Perry. That will be identified in the detail design.

**MR. HAL MILLS:** John.

**MR. JOHN BRODY (DIAND):** John Brody for DIAND. Terry, you showed a cross-section of the embankment with the constructed earth section composed of rock or sand and gravel, and then the coarse and grits over top of that. And to the right of that section, you showed the full mix PK. And in that section, you showed a vertical barrier for demarcation between the two materials, the full mix and the grits. Could you bring up that slide again and just describe some of the construction sequence around that detail for me?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. I'll just wait until the screen comes up. We have a starter embankment, constructed of material on site, most likely rock fill itself, since we have very little sand and gravel, and that's at the eskers. We don't want to move that material that distance. The vertical line is more schematic than anything. It's just providing a definition of where we would not want to put full mix PK closer to the toe than that line. So this will be a jagged edge on this side, where we'd have... if you remember in the video, there was a sequence showing construction of small berms on the PK and raising them sequentially. So instead of putting it on the pump PK, we'll be putting it on waste and compacted materials.

**MR. JOHN BRODY (DIAND):** John Brody again. Would it be correct to interpret then that you would envision discharging full mix PK not from that berm, but from some other location?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. We would discharge it from the edge of this berm, so when we're working on a level here, we put a small... push up a small amount of material there, put our pipes on it, and discharge into the cell.

**MR. JOHN BRODY (DIAND):** John Brody. Thank you, Terry. I have one other question for you. You showed a cross-section of the perimeter ditch, and in that you referred to a liner on the downstream side of the ditch. Could you describe for me some details about that liner?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. This is work that's been done for the feasibility level work. We haven't done a detailed design on that yet, but we're proposing using a GCL -- Geosynthetic Clay Liner -- say two layers of fabric with bentonite in between, a fairly robust material that can accept punctures. You don't have to seam it so you can place it in the cold if you want to just by rolling it out and lapping it like shingles.

**MR. JOHN BRODY (DIAND):** John Brody. Thank you. That's all my questions for now.

**MR. HAL MILLS:** Florence.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Florence Catholique, Lutselk'e Dene First Nations. I'm sitting way back in the back here, and I had a really hard time hearing you. If you would speak louder. I have to strain my ear over there. It's all right, you know, if you speak a little bit louder.

My question is in regard to the liner. Is that the same type of liner that the Cuff Lake tailings is using, or was using? Because they had a lining there that sounds similar to this lining that you're mentioning.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. I'm not sure what liner Cuff Lake has used. There might be somebody else here who's got experience on that one.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Did I not hear you mentioned Cuff Lake in your presentation?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. Yes, Cuff Lake is using a paste tailings disposal system, but I've not been involved in the design or operation of that one, so I have no direct experience on the details.

**MR. HAL MILLS:** Hal Mills speaking. Does anyone have that information on Cuff Lake? Okay.

**MR. LIONEL MARCINKOSKI (RWED):** Lionel Marcinkoski, RWED. Terry, I have a question in regard to the starter cell. You had indicated that the starter cell was being built and the intention of the... to assess the performance of the PKC, the

paste, and the whole system. What happens in the event that we have excessive water, excessive volumes of water or ice occurring in that starter cell during the first five years? Is there a planned contingency plan, other options for alternate designs, in the event that excessive water occurs in the starter cell in construction and operation?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. The starter cell will be used for two years, at which point it's full and we've moved into the east cell. Excess water would have to be from climatic events, since the PK is de-watered in a process plant, which is carefully controlled. Climatic events where producing water would be snowfall and then melts, so we'd be in thawing times as opposed to freezing times where we're getting the excess water. And that we'll be immediately pumping from our small ponds to larger storage ponds or the water treatment plant. I don't know if that's addressed your concern. That's the philosophy we've taken for that area.

**MR. LIONEL MARCINKOSKI (RWED):** Will there be ongoing monitoring the first two years on the paste, the volumes and the percent water or solids?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. Yes, there will be, and there will be a presentation I believe it's this afternoon discussing the plans we have for monitoring and the details of tests we want to do in the starter cell.

**MR. LIONEL MARCINKOSKI (RWED):** Lionel Marcinkoski. Thank you. That's all. We'll be here this afternoon.

**MR. HAL MILLS:** Okay, Hal Mills again. I would like to move on fairly quickly so that we can get actually... into an actual discussion of the issues, but John Brody has one more question.

**MR. JOHN BRODY (DIAND):** John Brody again. Terry, you mentioned the plan for winter discharge involving retreating from the furthest spigot point back towards the process plant in order to address freezing issues. As you retreat backwards, would you be flushing out the wine in any way to prevent the freezing of whatever materials in the wine, as you retreat backwards? And if so, how will that wine be flushed out?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. Our expectation is that line will be flushed, John, but we haven't gone through the details of that. That'll be something that's handled in detail engineering.

**MR. JOHN BRODY (DIAND):** No further questions, thank you.

**MR. HAL MILLS:** Okay. Thanks to all of you. I'd like to... we'll take a short coffee break now, return and identify the issues and get at it in terms of discussion of the issues. Thank you.

-- Break

**MR. HAL MILLS:** ... to the identification of the issues that you want to discuss this morning. We'll be preparing a list. You've all been very good so far, but I will remind you once again to... to clearly identify yourself. There are no minutes being prepared of what's happening here. There's a record of outcomes, but there also is a transcript that's being prepared. So please, each time you speak, identify yourself so that the people preparing the transcript will be able to do their job.

So, we want to prepare a list then of issues to be discussed related to this morning's topics, this morning's part of the agenda. There will be a separate presentation this afternoon and we'll go through this exercise again for this afternoon. So over to you. Which issues, which priority issues do you want to have discussed here this morning?

**MR. ALBERT WICHEE (Lutselk'e Dene First Nations):** I want to talk in Chipewyan, so my language.

**MR. HAL MILLS:** Better get your headsets out here.

**MR. ALBERT WICHEE (Lutselk'e Dene First Nations):** (translation not available)

**MR. HAL MILLS:** Okay, thank you, Albert. Hal Mills speaking. We'll put those issues on the record. Other issues for identification, for our list? John.

**MR. JOHN BRODY (DIAND):** John Brody for DIAND. An issue that I would like to have discussed is the issue relating to the potential for elevated moisture content in the paste and/or potentially larger ponds in the north pile, both of which could result from either operation or practical considerations. So the issue really is an increase in the amount of water being delivered to the north pile.

**MR. HAL MILLS:** Okay, thank you, John. Hal Mills. Next.

**MR. DOUG HALLOWELL (Environment Canada):** Doug Hallowell, Environment Canada. I noticed that the plan involves having the PK containment area at least 50 metres, 160 feet away from the Snap Lake water body. I'm just wondering how strong controls you have on the seasonal and long-term variability of water levels in Snap Lake. I think in previous sessions, you referred to the elevation being four, four, four metres, plus or minus five metres. Do you

have a lot more detail data on seasonal and long-term variability of water levels, so that you can look at the worst case scenario of the high water level of the Snap Lake in proximity to the PK containment?

**MR. HAL MILLS:** Okay, thank you. Over here next, and then John.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. My question is really one of clarification of the issue, is whether the management, water management of the PK pile depends upon whether the pile is frozen or unfrozen, whether the water management techniques, whether the water management methods and the structures to be constructed are associated with an assumption that the pile will be frozen or whether they're associated with operation under un-frozen conditions. Thank you.

**MR. HAL MILLS:** Thank you, Chris. John.

**MR. JOHN RAMSEY:** Just for the record, Hal, John Ramsey, we're minus one expert that would be useful in tabling this particular issue, but we want to put it on the record so that it is out there for discussion at some time throughout the proceedings. And it has to do with paste backfill. And if I may read it, it's easier if I do so, to put it on the record. The issue is insufficient information on chemical reactivity and stability and structural stability of the paste backfill under low temperature conditions. And why this is considered an issue is that the long-term stability of this material in regard to metal release and structural stability, should be assessed for impact on underground water quality. Our minerals and metal sciences laboratories does not possess expertise in paste backfill, but recommends that this area be examined. That's part one of this paste backfill issue.

Part two is that there seems to be some confusion about the proposed use of PAG rock and we have in brackets here, 250,000 tons, for underground concrete paste backfill. And this was in brackets, 3-17. Chemical reactivity/or stability of the PAG for use in underground concrete paste backfill under low temperature conditions is not provided. Is there a rationale for not disposing of the PAG rock in the base of the north pile. And why this was considered an issue is that the use of acid generating material in paste backfill may increase the possibility of metal release.

Now, I'm not sure if that's appropriate in this section right now, but I thought we'd read that one onto the record for starters.

**MR. HAL MILLS:** Okay, John, Hal Mills speaking. My understanding from the discussion we had is that you want that on the record but not necessarily to be discussed here?



**MR. JOHN RAMSEY:** Parties are at liberty to discuss that if they wish to. It's obviously not the best medium when you're caught off-guard to have to have scientists react to something immediately without being able to digest it and look at some written material in the process.

But experts, other experts are at liberty to discuss that. We just are not in the position to discuss it ourselves today because our expert is not here.

**MR. HAL MILLS:** Okay, if I could ask you to leave a copy of what you have with Lisa, so that she can put that on the record and have the right words. John, you wish to speak?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I think the first issue that John raised was actually dealt with last Tuesday, and it's unfortunate you weren't here to be involved in those discussions, but certainly a lot of the same people from the De Beers side are here this week, so perhaps rather than going through it all again with the entire group, we could handle it as a bit of a side bar discussion.

**MR. HAL MILLS:** Okay, thank you. Other issues? Chris.

**MR. CHRIS BURN (DIAND):** Chris Burn from DIAND. This may be a procedural issue. The company has indicated in its presentation that the freezing characteristics of the PK paste were covered in the responses to the IRs. We have some further discussion that we would like to engage upon this topic, but it would, might also be suitable to discuss this topic in the section this afternoon, when we consider the geo-thermal regime. So I really request advice as to whether you wish this to be placed on the table now, or whether we should postpone the issue until later today.

**MR. HAL MILLS:** It seems to me that it is more appropriate to this afternoon's agenda. Does De Beers have any counter opinion on that?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. We actually have a presentation on that for this afternoon, so I think it probably is better covered then.

**MR. HAL MILLS:** Okay, quickly, other things for this morning. John.

**MR. JOHN BRODY (DIAND):** John Brody, DIAND. One other issue I'd like to discuss is the efficiency or performance of the ditches with respect to their capture rate and the potential for bypass to Snap Lake.

**MR. HAL MILLS:** Okay, let's get at it. Hal Mills speaking. With respect to the various concerns raised by Albert, I'll turn to Florence and Albert to know whether

you wanted discussion on those now or whether you were putting them on the record. Okay, on to John Brody then with respect to the potential for the elevated moisture content in paste. Do you want to explain the issue a bit more?

**MR. JOHN BRODY (DIAND):** Thank you, Hal. John Brody. The issue with respect to the potential for additional water, there's a number of factors that all relate to the paste operation. For example, it's been acknowledged by the company that the kimberlite paste will be very abrasive and will be, you know, cause wear and tear on the pipes and pumps. And additionally, there will be a requirement to de-water the tailings, and this will take effort and reducing the moisture content will obviously require additional effort. And finally, the pumping pressure, or the energy required to relocate the paste from the paste plant out to north pile will also depend on the slump of the material, or its moisture content. And so I see all of these factors leading to the temptation from an operational perspective to increase the amount of water in the paste. In other words, to reduce wear and tear on pumps, to reduce the effort to produce the paste, and the effort to relocate or pump the paste. All of these would be aided by putting more water in the paste, which will result in more water in the north pile. Perhaps we could have some discussion on that point.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I guess it's kind of hard to answer without a specific question. I mean, we can have a discussion about it, but it would certainly be easier if you had a specific question about the operations.

**MR. JOHN BRODY (DIAND):** John Brody. I'll convert that discussion into a specific question then. What is the anticipated moisture content should all of these factors lead to more water being discharged with the paste? How much more bleed water would there be in the pond? How much larger would the internal ponds be, et cetera?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates, for De Beers. There's two parts to that questions, or two parts to the answer, John. One would be dealing with the specifics of pumping additional water to the north pile and how that is viewed as simpler from the process point of view, reducing pumping costs and wear.

The drawback of that is putting more water out to the north pile and then the operator has to manage that, so there's a tradeoff on which is easier to do, pump out a little dry material and handle more water, less water in the pile or visa versa? And you know, the process is set to be run a specific way, designed with the pumps to handle that material. They're looking at where and who placement, so they understand the nature of the materials. There's been lots of testing done to prove that it can be done.

Then really you're asking how do you handle more water in the north pile than we've anticipated, you know, whether it's from bleed water or from run-off. We brought temporary ponds out there and systems to pump that water to the treatment plant. There's excess capacity in the treatment plant most times of the year so that water will be transmitted directly to the treatment plant, handled and discharged at Snap Lake, so we're not, we can't ...(inaudible)... our qualities of water on the pile itself for most periods of the year. It's only during the spring run-off that we would be impounding water, and the ponds can be sized to handle additional waters at that time.

**MR. HAL MILLS:** Thank you, Terry. Do you have a follow-up to that, John?

**MR. JOHN BRODY (DIAND):** Yes, I do, if I can just take a moment, please? I guess at this stage then, recognizing that you're anticipating an experimental type start up, your response could be summarized as there won't be so much more water than you can handle in the system. Is that correct then?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. Could you repeat the question, John? I didn't understand that.

**MR. JOHN BRODY (DIAND):** John Brody. You've acknowledged with the starter cell concept that the start up will be somewhat experimental, that you'll be trying various methods to discharge the paste. And so I guess I'm understanding from your previous response on the water issue that you expect to be able to handle, in terms of volumes, the amount of water that may be discharged, even if all of those factors were to lead to more water than the current design?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. You say there will be an experimental startup. We have a fairly good understanding of how this material will handle and what we want to do is try to optimize the system to make it more efficient for De Beers. There is sufficient capacity in the system to handle water that reports to the north pile, whether it's in the... as bleed water or as run-off. The water treatment plant has excess capacity to handle any amount of water that we'd be taking off the north pile.

**MR. JOHN BRODY (DIAND):** John Brody. All right, just moving on from that then, there's an internal pond anticipated in each of the three main cells of the north pile, and I'm wondering what have you looked at in terms of the geometry of those ponds, the winter operation of those ponds with respect to pond depth and ice formation on the ponds, and finally, whether or not those ponds will be static in terms of their location through the operation of each cell, or will those ponds be moving around? And finally, when those... when each pond is initiated, will it be on the frozen ground or will there be other measures taken to prevent thawing of the ground during the initial internal pond development?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. John, I wonder if you just might be able to keep... you've got a list of questions there, and they follow on from each other. In terms of being able to just provide you with the easiest answer rather than a separate... writing every single one of them down and then go back to them, perhaps you could just present them one at a time? I think it might work a bit easier.

**MR. JOHN BRODY (DIAND):** Okay, yeah, I'm happy to do that. John Brody. I'll start again then. Could you describe for us the variations or the anticipated geometry of the internal ponds within the north pile?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. In terms of size in those internal ponds, we've looked at containing the run-off from spring events, both in that pond and in the external pond. The internal ponds will be the order of magnitude is 10,000 cubic metres maximum. The intent is to keep those as small as possible so we don't have water perched on the PK itself, but to pass it through the system as rapidly as possible. They are more a surge pond than anything.

**MR. JOHN BRODY (DIAND):** John Brody again. A 10,000 cubic metre pond would require some surface area and some understanding of the geometry, or its basin shape. Have you ever worked with the details of that basin and how deep that pond might be at its deepest point, and the surface area of those ponds?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. The specifics of those ponds will be something that's addressed in the detail design. In the starter cell, we're looking at pond depths of about 3 metres in the northeast corner.

**MR. HAL MILLS:** If I could just throw in a comment here, Hal Mills. I've obviously been letting this go, so far at least, but there's quite a long list of questions coming here that don't necessarily focus on a particular issue. They seem to be more information that... I'm just wondering whether this is the best way to tie everybody's time up. I'm also wondering if other people in the room have questions that related to this topic or not.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I guess I'd again like to extend the offer that if it's felt that, you know, this forum is... kind of stifles the exchange of technical information, then it might better be done in a session later. We're quite happy to do that, and make Terry and the technical experts available.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini here with the review board. This is addressed to Mr. John Brody of Indian and Northern Affairs. I see sort

off... I see what you're doing, I think, in terms of asking questions. Could I synthesize what I think where you're going to basically say this -- De Beers, how sure are you that you know what you're doing with respect to the water management of the PKC areas? Is that sort of ultimately where you're going with it?

**MR. JOHN BRODY (DIAND):** John Brody. Yes, that's where I'm going, and I think it's important to have some understanding of a number of these points, because as we move on to the other issues of the freezing at the pile, I think it's important to have a good understanding of how the pile has been constructed and how the water has been managed during its construction and operation.

**MR. HAL MILLS:** Okay, proceed please.

**MR. JOHN BRODY (DIAND):** John Brody. This is also my last question on this. Can you describe for us please, will the internal ponds be essentially static in their location in plan view through the operation of the cells, or will they be moving around as the cells are constructed?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. They will be relatively static in plan location, but rising in the pile as the PK is deposited.

**MR. HAL MILLS:** Okay, any other questions or comments on this topic?

**MR. JOHN RAMSEY (Natural Resources Canada):** John Ramsey of NRCAN, Hal. It's just an observation as an EA process person on my part, and this is my first introduction to this particular set of proceedings. It appears to me that the oral technical sessions that we're currently involved in may not be the optimal medium for the tabling and discussion and dealing with the various issues. It's very difficult, I think, for a lot of people to assimilate this information on the spot and thus deal with it on the spot, but that's just an observation that we may be experiencing a situation where it's difficult. This may be a difficult medium to actually deal with a lot of the issues, whereas the written format might in fact be the optimal one, but carry on.

**MR. HAL MILLS:** Okay, thanks, John. It's Hal Mills. If I could comment on that, these are the technical sessions, and this is the, you know, two days on geotechnical issues, so we're obviously involved in technical things. I think it is the right place to get your issues on the record. It's not the only place, but I think it is quite appropriate to get your issues on the record here.

I think there's a range of variability as to how appropriate it is to try and resolve the issues here, to the extent that we can, we should. If some of them are of a

highly technical nature that come down to discussions between one or two people with De Beers, then as John has indicated, you know, we do have alternatives for people to take them up on their offer. We do have a room downstairs if people want to have sort of a sidebar discussion as well. But let's see how well we can deal with it.

Okay, Doug Halliwell then I believe had the next issue in terms of the PK containment area.

**MR. DOUG HALLOWELL (Environment Canada):** Yes, I'm quite curious to know how many benchmarks exist around Snap Lake, especially around the northwest peninsula, but anywhere around Snap Lake, which allow you to measure precisely the water levels of the lake and how they might vary with time. If you have a major rain event, you might have, in the case of this summer, I understand 300 percent of the normal rainfall than you previously expected in early models. Climate variability and related to climate change is going to give you a wider range in the future, so I'm just wondering if you dealt with the most worst-case scenario here as far as the highest water levels of Snap Lake and you still have 50 metres between the highest possible water level and the edge of your PKC area.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Doug, thanks for your question. The information and certainly the people to explain that further aren't here today. That was unfortunately last week. We had a hydrologist here, Brent Topp, who would have been appropriate to provide you with the detailed answer to you on that. So I think that we could... I would suggest... I know that he presented a draft which basically explained what we see as the high and low water level in the lake, and it is my understanding that was based on data, field measurements from Snap Lake and extrapolations from regional data, but I can't provide you with any further information at this stage beyond that.

**MR. DOUG HALLOWELL (Environment Canada):** Okay. I think there would be a lot of benefits to having, making sure that data does exist, even from the hydro-geological and hydro-geochemical standpoint as far as constructing flow lines and whether... to discern where the groundwater might be moving if indeed it's moving to northeast or north lake. I was there for part of that session, so I do recall describing some of it, but unfortunately, I must have missed the part where you were talking about benchmarks and flow or levels that would be re-calculated back to those benchmarks.

**MR. HAL MILLS:** And for the transcript, that was Doug Halliwell speaking. Anyone else have a comment related to this topic? Tim.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, Yellowknives Dene. Further to the questioning from Doug, I think I'm very curious as to if in fact the Snap Lake water level has changed at any point in mine life, either caused by natural occurrence, global warming, or mine development, and I think there was a figure of 14 centimetres attached to a possibility of Snap Lake level being changed by that degree, 14 centimetres by that mine. At any rate, I would like to know that that 50-metre buffer zone will in fact still be 50 metres if the Snap Lake level rises to any substantial degree. And if you don't have that information now, I think at some point, we would be...well, we would desire to know the answer to that question for sure.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. Yeah, I think your recollection of the 14 centimetres variation is correct, and it's a good question, and we'll endeavour to try and get an answer before the end of this geotechnical session by the end of the day tomorrow.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. And my recollection was that 14 centimetres was a maximum, that it coincided with the natural low in water elevations, so that annual fluctuations in water levels, that would occur when water levels within Snap Lake were at its lowest. We can get that information.

**MR. HAL MILLS:** Okay, Hal Mills speaking. Thank you. Any other comments on that topic? Okay, next then we have Chris Burn with questions about water management of PK, or PK pile.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. I just would like to reiterate the question that I raised initially, whether the water management practice for the pile, the practice is the design and so forth, are predicated upon the pile being frozen, or whether the identical proposed design is satisfactory for the un-frozen case.

**MR. HAL MILLS:** Thank you.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. We recognize that there's going to be frozen parts to that pile and unfrozen parts to the pile, so we try to come up with a system that will accommodate both, be flexible enough that if we're operating in frozen conditions, it works, and if it's unfrozen pile beneath, it also works.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. I wonder then if the design of the pile is to be satisfactory in the unfrozen case, why there is a permeable boundary to the pile and there is no proposal for an impermeable liner to be placed around the pile?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. We did seepage modelling for the completely thawed condition, and with high infiltration, we estimated the amount of seepage that will be coming out of the toe and bypassing the ditch. That was included in the water quality model, and it was determined that a liner was not needed for this situation where we have a relatively benign water coming off the pile.

**MR. CHRIS BURN (DIAND):** So I'd just like to clarify that then, the thermal modeling, which you have done, has taken some pains to demonstrate that the ground is frozen in the pile, but that is actually of no material difference to the design of the north pile.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. In terms of the performance of the seepage and how we collect it, that's correct. I mean, we've tried to be conservative in looking at the conditions that would produce the most seepage from the pile, reporting at and below the toe, and that's a thawed condition, so if the pile freezes, it would be less seepage coming out at the toe.

**MR. CHRIS BURN (DIAND):** During any seasonal freezing, I assume that there is to be some seasonal freezing at least, of the pile. There may be concentration of the solutes during the freezing process, as you've discussed in some of your IRs. Do you anticipate then that your pile will be leaking throughout the year and will be producing seepage water even during the wintertime, or do you propose that the boundaries of the north pile will be frozen during the winter and the pile will be contained on a seasonal basis?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. We feel that the pile will be tending to the frozen condition. There will be unfrozen layers within it. The external berms, they are fairly well-drained materials. They will breeze through and there will be some seasonal thaw and freezing in the toe area, and especially around the ditches, but we tried to design a system which will accommodate the maximum amount of seepage that will be coming out, and hence, doing the thawed calculations, maybe a small amount of water coming out during periods of winter, but the ditches are still there to collect that water.

**MR. CHRIS BURN (DIAND):** Could I just ask how, if the material at the edge of the pile is well-drained and hence dry, it can be considered frozen?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. It's cold. The material will be cold. It has some small water content in it, and that water will be frozen in the external berms.



**MR. CHRIS BURNS (DIAND):** I guess my question is that any material from the pile which seeps out into the coarse and permeable boundary there of the pile will effectively be stored there in the wintertime, because this area has got very little water in it, but water has been generated from the pile. And then, earlier in the spring and over the summer, the material that has been expelled from the pile in the wintertime will be ejected, and I presume the company hopes collected by the ditches. I guess the point is that the concentration of dissolved materials in that water may be very different from the concentration of dissolved materials in the spring run-off.

If you wish a question, I can ask whether the company could respond to that.

**MR. HAL MILLS:** Thank you, Chris.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. There's a presentation this afternoon which discusses cryo-concentration. We can answer your question then.

**MR. JOHN MCCONNELL (De Beers Canada):** Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** I have the blessing of being totally untechnical, but I've seen the BHP PKC area. How does the... how would the performance of or the deposition of the process kimberlite in the containment area that you're proposing differ from that of BHP in terms of water content and in terms of some of the issues that they've had to handle in terms of deposition -- the process kimberlite, the paste, essentially.

-- Interjection

Totally different material. No, I'm saying it for two reasons: 1, not everyone has that context, and it's important to I think at the table recognize that we're not dealing with a BHP type of material, and people from the communities and including myself may not be necessarily familiar with that.

**MR. HAL MILLS:** So Louie, are you asking for sort of an explanation of how the situation here is similar to and/or differs from that at Ekati?

**MR. LOUIE AZZOLINI (MVEIRB):** I would be for some of the lay-people in the audience that may have experience with one type of project but not necessarily another. And I'm not trying to take away from DIAND presentations at all. It's just that some people are familiar with one context, and they may be extrapolating from that context in their minds, and it's important to put it into context.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. You know, I think that we've probably got technical experts here that

know more about the Ekati project than we do, but I think from a, again, from a non-paced technical person, I think we need to go back to the reason why De Beers selected this idea of using paste, that Terry described, a conventional slurry, and some of you that have visited BHP may have seen that slurry that comes out, very liquid, that comes out into a large, process kimberlite containment area, tailings pond. De Beers didn't want to do that, because one of the disadvantages of that system is that you have a large amount of water to deal with, and that there, as Terry described, that there is a level of risk to the environment associated with basically storing all that water and that slurry behind a dam.

John Brody expressed concerns of operational issues that are associated with pump and paste, something with a lot less water in it, so pushing rather than being able to pump it out really fast, pushing it in more of a toothpaste like consistency. De Beers is very aware of the operational issues associate with pumping something that's much more consistent around the wear and tear, the amount of force that it's going to have to take to get that paste to the... to the north pile. But it's the advantages of the paste. The disadvantages in terms of those operational issues, are offset with the environmental advantages of lowering, lowering that risk associated with storing all that water behind it, behind a dam. So that's... I don't know if that's helped people in the room that aren't aware of the difference between the two systems. If Terry would like to comment further, he can. I think other people in the room are better equipped to be able to describe in detail what's happening at BHP.

**MR. BILL KLASSEN:** Bill Klassen here. Terry, did you want to comment further? I see Chris Burn is indicating he may have a comment.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. I've not been involved at BHP, so I don't know the specifics of their tailings disposal system. I've been involved in other tailings facilities in permafrost environments, where we've used conventional slurry, and on those, we're pumping the tailings at pulp densities of 35 percent, so that means for each ton of tailings, there's two tons of water going out. If you look at Snap Lake, where we're talking about pulp densities of 70 percent, that means for every ton of PK going out, there is a third of a ton of water going out, so the quantities of water being transported with the material are much lower. Material in the paste system will look more like wet concrete than a mud coming out of the end of a pipe, so it's a lot less water in the system, and then it's the mechanics of how the material flows from the end of the pipe to where it stops. And the pastes are more viscous and they don't flow as far as a wet slurry. So I think those are the big differences in the two.

**MR. BILL KLASSEN:** Thank you, Terry. That comparison may help people who have seen the BHP picture, what might be involved at Snap Lake. Chris Burn, did you want to comment?

**MR. CHRIS BURN (DIAND):** Yes, I'm interested in the numbers that Terry just pointed out. I have in front of me the table 10.2-7, which are the material properties used in the thermal analysis of the north pile. In that table, the volumetric water content of the full mix paste is given as 48 percent, so half... almost half of the volume that is coming out of the pipe is water. I don't think that that's... I think that's a little higher. It may be that the mechanical operation is different from the thermal modeling. That's characteristically a feature of design that the thermal design is not necessarily specified in exactly the same way as the mechanical design, but nevertheless, I guess the point that DIAND would like to make is that there is a lot of water going into this north pile -- half of the volume initially, nearly half, 48 percent of the paste is water. That's the pore spaces. And for some of the other mix, it goes down to 40 percent.

So I guess the point is to the board that from DIAND's water management perspective, there's a large amount of water to be managed in this pile. I don't know, the company may have some variation in these numbers, but I'd just like to make that point. Thank you.

**MR. HAL MILL:** Would De Beers care to comment on that point?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. Just trying to make a comparison for people on the quantities of water and doing a quick calculation in my head, I didn't have the table right in front of me. I think, you know, the best way to look at it is coming out of the end of the paste pipe will be something that looks like a wet concrete. And we did tests where we discharged it onto the floor and very little water ran out of it, you know, it was just a few percent of water that came off.

If you discharge tailing slurry onto the floor, the water just runs off completely. I mean, there's a very big distinction between the performance of those two materials.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND again. I think there are two issues here regarding water management. One is the super saturation of the fluid. That would be the supernatant water. That's the water which will directly report to the ponds on the top of the north pile. And the second issue is that even though the remaining water is saturating the pore spaces, under any normal condition where we have gravity, which is the case, I believe, in most of the conditions that we deal with, the water will drain downwards. And only a portion of the pore water will remain within the findings. In sand, a free draining sand in

this case, there is some fine materials, some silt and some clay in the material. There will be more held, but one of the issues that DIAND will request resolution of is the natural water content of this material once it's free-draining. In other words, a water budget, effectively, of how much of the paste will, how much of the water in the paste will remain in the paste after it has drained, because if not much water remains in the paste, then the issue is where is it?

**MR. HAL MILL:** Okay, Chris, I think you've fairly clearly stated what you feel is the residual issue from this. Is there any response from De Beers at this point?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Certainly De Beers recognizes that DIAND needs resolution on the issue of the amount of water, and at this venue, we cannot provide the answer at this time.

**MR. HAL MILL:** Would it be appropriate, Robin, -- Hal Mills speaking -- to ask you what process or time frame you would see for that?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. We can get back to you, Hal. I don't know if we can provide it this afternoon, this evening, or this week, so I...

**MR. HAL MILL:** Okay, thank you, Robin. The next on the list was the issue that John Ramsey tabled, and I guess it's still an open question as to whether you want to have that issue discussed further at this moment or not.

**MR. JOHN RAMSEY (Natural Resources Canada):** Well, seeing that we don't have an expert here to actually assimilate the kind of information that would be presented by some of the parties, it's probably... it's probably not in the interest of all at this table that have other issues that they wish to discuss to move on, but at least it's on the record and obviously we will be in touch with De Beers on that particular point.

**MR. HAL MILL:** Okay. Thank you. The last on the list that I have is John Brody with respect to the ditches.

**MR. JOHN BRODY (DIAND):** Thank you, Hal. John Brody. I guess to start this off, how did you go about determining a 90 percent efficiency for the ditches and a 10 percent bypass to Snap Lake of water emanating from the north pile.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. The seepage model that we used, we looked at flow lines and what was reporting at various depths in the stratigraphy and looked at a ditch depth cutting into the top of the bedrock, and anything that would be flowing below that depth would be bypassing the ditch system.

**MR. JOHN BRODY (DIAND):** John Brody. It's my understanding that the north pile foundation area consists of fractured bedrock, presumably there will be some vertical fractures or ice wedges in the bedrock, which would be not only points for water to bypass under the ditch, but also any water that was in the ditch to escape and be released from the ditch. How are these being considered in the ditch efficiency?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. The first point on that question is the existence of ice wedges in the rock. The drilling program did not encounter significant mass of ice in any of the holes that we drilled, except the ones in the area of bogs where we had ice rich organic soils. We didn't see ice in the bedrock itself. The ...(inaudible)... show that we've got an active layer development of approximately 8 metres along the north side, so in that active layer, we wouldn't expect to have permanent ice. We're not designing a ditch, we'll extend through the active layer.

We did some packer testing in the shallow materials and we used that permeability to... in the seepage model. In terms of how we'll handle the specifics of ice wedges, when we get in there and open the ditches, we've identified that that's a possibility and during detail design, we'll come out with a mechanism we'll use to handle those ice wedges, if they do exist.

As I pointed out, the investigations to date have not shown that type of ice on the site.

**MR. JOHN BRODY (DIAND):** John Brody. I'm not surprised that you didn't find vertical ice wedges in a drilling program. That's not a very effective way of finding such features. Did you excavate any test pits in these areas to try and find either ice wedges or open vertical fractures in the bedrock?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. We didn't excavate test pits in the area of the north pile, John. We did do some GPR, ground penetrating radar, work in the area of the proposed plant site and we saw very little ice. We could identify very little ice, if any, in that area.

**MR. BILL KLASSEN:** John, I wonder -- I may be out of order here, but what the heck. I wonder if you could explain what would be the implications of this if there were to be such ice wedges?

**MR. JOHN BRODY:** John Brody. Basically, should these features be present, there'll be considerable potential for seepage to bypass the ditches, much greater than the amount allowed for in their modeling. And in fact, that was my next question, was have you in your modeling looked at the effects on Snap Lake,

should the seepage be, say 50 percent of the escape, the 50 percent of the seepage that reports to the ditches?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. At this stage in the engineering, we're proposing that the external berm footprint be completely stripped. We'll have equipment in there. We'll have a trench that extends around the full perimeter of the north pile. At that time, we'll be able to very clearly identify where and whether ice wedges exist, and be able to treat those specifically. I mean, we aren't relying on a few test pits or drill holes to determine if there is or is not. We have in place the mechanism to very clearly identify the location of ice wedges, and then procedures we put in place to deal with them.

**MR. JOHN BRODY (DIAND):** John Brody. I agree with the concept of studying the terrain in detail and stripping it and these types of measures when you're constructing the ditch, but my question was has De Beers considered what the effects on Snap Lake might be if instead of having 10 percent bypass in the ditch at say a much higher percentage, say 50 percent was to bypass the ditch.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Yeah, it's a two-stage process. One is that we apply mitigation and then the follow-through is basically identifying what residual impacts may occur after mitigation has been applied. I'll just get Ken DeVos to briefly outline that.

**MR. KEN DEVOS (GOLDER ASSOCIATES):** Ken DeVos with Golder Associates, for De Beers. I believe your comment related to if we look at this in terms of a mass loading perspective. The mass load that's applied currently runs through the treatment plant, where the only thing we remove is the suspended solids. If you have a seepage pathway, the suspended solids will not in all likelihood migrate along that pathway, so we're really looking at a dissolved load. And whether that dissolved load enters Snap Lake via a seepage pathway, or via the treatment plant, it's just a matter of where that mass load enters Snap Lake. We've already accounted for that mass load entering Snap Lake.

**MR. CHRIS BURN (DIAND):** Chris Burn from DIAND. You mentioned a few minutes ago that you would be putting a big perimeter ditch around to intercept more of the seepage if there was, as a result of your investigations. I wonder if you could indicate the depth of that ditch below surface.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. This is another question that relates to the level of engineering and where we are in the process. And we're looking at ditch samples at this point in time of order of two-metre depth, so it's extending through the soils and just into the top of the weathered bedrock.

**MR. CHRIS BURN (DIAND):** I'd just like to point out that if the active layer at the site is 8 metres, as you have indicated, then the top of any ice wedge will be eight metres below the ground surface, because the ice wedge cannot exist within the active layer, and therefore the issue, the ditch at two metres will still have another six metres to go before encountering permafrost.

**MR. TIM BYERS (Yellowknives Dene):** Sorry, Tim Byers here. Excuse me for interrupting. I'm just wondering if we're going to continue the conversation with the ditches, if you could put up that graphic about... that ditch graphic that you had in your presentation? Thanks.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. I'll begin the answer while it's being put up. I agree that if the active layer is eight metres, the top of the ice wedges would be eight metres. That would mean that the material characteristics between the bottom of the ditch and the top of the ice layer will govern the flow during more of the year than when the active layer gets to the bottom, so we have to be concerned about the permeability of that material itself, and we have done packer testing in it to determine it and put that into the model. We had in there ice wedge at eight metres. We may change the depth of the actual layer from the ditch, either increasing it or decreasing it, depending on the exact conditions, so there's potential impact that. It's a point source and we get some melting of the ice and loss of support in the ditch bottom. We'll see that as depression in the ditch bottom, and it'll be something that De Beers needs to go in on their ongoing care and maintenance of the ditches and address.

**MR. CHRIS BURN (DIAND):** I guess my point is not associated with the maintenance of the ditch but rather as an unanticipated conduit for the seepage. And this goes back to the comment from John Brody, or the question from John Brody at the beginning about the location of the ice wedges. I guess the summary comment, and this is... there's no really... no, it's a comment for the record rather than eliciting a response, is that if ice wedges are indeed eight metres below the ground surface, then they're actually quite difficult to locate.

**MR. HAL MILLS:** Okay. Thank you. Anyone else in the room care to comment on this topic? Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** Not a comment. The board wanted to have the technical sessions so that there would be an opportunity for De Beers and the technical experts to exchange information and to discuss if necessary, debates on the finer points. At the end of the day, I'm hoping that you will have sufficient technical information to provide technical reports to the review board. They're relying on the environmental assessment from De Beers and your technical review of it and your final conclusions that you'll provide DIAND in your

technical reports. So it's certainly incumbent on you to get the information that you believe you need to provide those technical reports. And if you are getting it, great, and if you're not, this is the place to make that explicit -- not later on. Is that understood?

**MR. CHRIS BURN (DIAND):** This is Chris Burn for DIAND. I would say that I've listened to the answers that the company has posed to certainly my questions... has offered to my questions, and I think I've understood those answers. When I felt that there was an area that required further information, I followed up with a subsequent question, and at the end of one round of questioning, the company has stated that it can't answer the question right now and it will need to get back at some point and the company has indicated that it doesn't know precisely when that will be. I think that the board, if the board takes our questioning in seriousness, then the board will also wait for the response from the company for that question. There are other questions that we have asked that I have received answers to, and which I have not felt it necessary to ask a second question, and certainly in that case, I feel that the company has responded to the question that was posed.

**MR. HAL MILLS:** Okay, and shortly, we'll go around the room and get people to recap as to how they are feeling about how well their issues have been responded to. I think I'll go back to Albert one more time, and see if there's anything else that you wish to say with respect to the issues that you tabled. Albert. You don't have to say anything. I just wanted to give you the opportunity if you wish.

**MR. ALBERT WICHEE (Lutselk'e Dene First Nations):** I'll just listen right here to what you guys are talking about and I'll ask questions after.

**MR. HAL MILL:** Okay, thank you. Then I would like to go around the room with respect to the people who asked or raised issues, and I'll ask you to briefly respond as to whether you feel that your issue is still an issue, or whether you're satisfied with the answers or the issue has been resolved. So first on the list then was John Brody with respect to the potential for elevated moisture content in the paste.

**MR. JOHN BRODY (DIAND):** John Brody. I don't think I have any further questions on that now.

**MR. HAL MILLS:** John, the process we're trying to follow is to get more or less for the record and for the outcomes that Lisa is trying to document for this, we're looking for a statement from people as to whether or not they feel this is still an issue, whether it's been resolved, whether they're happy with the answers they've gotten, and so on.



**MR. JOHN BRODY (DIAND):** Can I think about that for a minute before I respond?

**MR. HAL MILLS:** Sure thing. Next was Doug Hallowell with respect to the PK containment area.

**MR. DOUG HALLOWELL (Environment Canada):** Okay, I have a closure on that issue.

**MR. JOHN RAMSEY (Natural Resources Canada):** John Ramsey, NRCAN. Hal, I was just wondering if the true purpose of these sessions is to actually have a resolution of issues between De Beers and other interested parties, so that at the end of the day, as few issues as possible are actually brought forward in the technical reporting phase, or are the various parties still at liberty to, regardless of these sessions that are taking place here today and over the last week and so. Is still that opening for us to bring these issues forward at the technical reporting phase, or through some sort of verbal consensus today, are they supposed to be eliminated in the process?

**MR. HAL MILLS:** I'm glad you asked that question. Obviously, one of the things that probably everybody would like to have done here, certainly the board and De Beers, would be a documentation as to whether or not the participants at these technical sessions feel that there are outstanding issues or whether they feel that the answers have been provided, the issue has been resolved. We don't necessarily expect that a whole bunch of issues are going to be resolved through that, but if they are, well, fine and that'll be documented here. However, in particular with the point you're raising, that doesn't tie anybody to what this room decides. If you or the Yellowknives or whatever, after thinking about this over the next little while say "Well, okay, that might've been what those guys or even while I was participating, that might've been the consensus at the end of the discussion, but that doesn't tie me to that. I can still, through the other processes available, through your technical reports, through appearing at the public hearings, perhaps through legal mechanisms, if necessary, you've got all of those avenues still available to you. Florence.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Florence Catholique, Lutselk'e Dene First Nations. Yesterday, I heard Louie telling us that if there was a discrepancy between what information that De Beers was giving us and questions that were raised by technical people, that it was -- and this is how I understood it -- that it was then up to you to convince the board who is, in this case, to make the decision on the information's adequacy on questions that were being raised. We have a bit of a concern in that, being from the Akaitcho people and not really acknowledging the Mackenzie Valley Lands and Water Board Act, but that part was kind of different in other kinds of assessment process that we've

been in. And so maybe in light of that procedure and process, Mr. Ramsey's question, I think, is very good.

**MR. HAL MILLS:** Care to comment on that, Louie?

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini. No.

**MR. HAL MILLS:** Rachel, do I see your hand?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** My concern is that the issues regarding pore pressures, the ice wedges under the ground in the granite, how the extra water is going to be looked after. How is the company going to mitigate? I've concerns in those areas. And the... the climate changing, like say, for example, right now, if it was really warm, what is it like over there? The air temperature, the modeling. I know that when you introduce air into the ground, there's a lot of water, and that extra water going onto the north slope and there's going to be drainage. We're interested in how it's all going to work, but I understood that the companies hydro people aren't here today, and I'm wondering how come they weren't here today. It's kind of interesting that they were for the first two days last week and we're going to get into geotechnical items again for tomorrow. For tomorrow, I thought that maybe somebody could've answered some of the questions regarding the permafrost, how the water from permafrost is going to drain for the ditches. When there's no liner, water will melt the permafrost, so it would've been good to have those experts here for them, so that they could've answered some of the questions today so that we could walk away from this week thinking that we understand fully what's going to be happening and how they're going to be handling the water that's going to be coming out of the whole scenario.

I don't... today I understood that it's not the same operation as what BHP is doing or Diavik is doing. This paste puts a different picture on things, but from what I'm hearing, it sounds like there's still going to be quite a bit of water that we're going to be dealing with, so I think issues are not resolved, so they should be resolved sometime soon, not next year, January. Thank you.

**MR. HAL MILLS:** Thank you, Rachel. Could I ask the company if some of the things that Rachel mentioned will be covered by your presentation this afternoon?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I think the issue of the hydrologist not being here was related specifically to lake levels and a presentation that was given last week. People to deal with permafrost and water in the north pile and in the paste are definitely here, those experts. I think there was one question referred to us this morning that we didn't

have an answer to, and we said we would get the answer. The question of the water levels, we said that we would review that presentation and answer the gentleman's question from NRCAN as to whether or not the 50-metre buffer between Snap Lake and the north pile would be maintained at high lake levels.

But otherwise, I think, Rachel, the experts that are necessary to answer the questions related to the north pile and geotechnical issues are here.

**MR. HAL MILLS:** Okay, thank you. We were going around the room... oh, sorry. Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** I'm looking for a layperson's perspective on the issues being raised by DIAND's consultants. The board consists of laypeople like myself. They bring their own areas of expertise. You've raised a number of questions. You've got resolution to some of them. Should I be telling the board that this is a little problem, a little problem that's fixable with good engineering, a big problem? If you could put some perspective on it from your professional view.

**MR. HAL MILLS:** That probably would tie in with what I was trying to do. We haven't heard yet from Chris Burn or John Ramsey on their last two sets of issues, and maybe they could cover both things at once there. So Chris, with respect to the water management.

**MR. CHRIS BURN (DIAND):** Chris Burn. I think the issue for the board is essentially as follows; the company has presented a proposal for a frozen pile. The geothermal modeling, which we will discuss this afternoon, as presented in the information requests, indicates that the pile is almost entirely below zero. Initially, our assumption was that this meant that the water that was coming out of the paste would be locked up in the pile.

I established this morning that the company considers the water management capacity of the pile to be adequate in either a frozen or an un-frozen case. However, the issue of exactly how much water would need to be handled in the totally un-frozen case, is a matter which is to be resolved. This afternoon, we'll discuss the geothermal issues, particularly modeling of the north pile. That is the prediction as to whether the north pile is a frozen entity or whether it's a partially frozen entity as the company has indicated that may be the case, or whether it's in fact not to be frozen in large measure at all.

So from my perspective, the issue at this point in large measure hinges on discussions that will take place this afternoon, because it seems to me to be... if we consider the north pile to be a frozen entity, or we consider the north pile to be unfrozen, we may be dealing with two completely different beasts. And what I've tried to do this morning is to indicate that the quantities of water that are to be

dealt with are quite different in those two scenarios. This afternoon, we may have some progress in determining whether in fact this is to be a frozen pile or whether it is likely to be partially frozen or unfrozen, but we need to wait. And I just want clarification as to whether that is insufficient laymen's terms.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini. Yes, that helps. I think the board will have these tapes and I'm making copies of some of them, so that I can pass them on right away, so it is important I think when you do summarize, that pretend you're speaking to the board, because they might literally be hearing it at some point.

**MR. HAL MILLS:** Okay, back to John Brody then. Anything that you want to add in summation regarding the ditches?

**MR. JOHN BRODY (DIAND):** John Brody. Yeah, this morning I raised a number of related issues dealing with water and the potential for additional water within the pond. And in so far as those relate to the operation of the pond and its construction, discharge of paste and the management of water within the pond, I'm satisfied those issues have been addressed.

However, I would like to stress that there is still some uncertainty with those issues. I mean... I should back up a bit. The issues that have been addressed, I believe they can be managed within the detail design when that's presented. However, there is still some uncertainty as to the... how the design will manage those issues, and there is implications for the freezing and thermal condition of the pile at closure that stem from these uncertainties.

**MR. HAL MILLS:** Okay. Thank you. I believe that brings us to the end of the agenda for this morning. We'll resume here at 1:30. Please try to be here on time for a start at 1:30, and we'll have the presentation from De Beers related to that. Thank you.

-- Break

**MR. HAL MILLS:** ...late for lunch or not, but if you take your seats, I believe we should get started. Okay, thank you then. This afternoon, we'll follow a similar process as this morning. We'll have a presentation, I guess it's several presentations wrapped into one again, and so we'll be focusing on more of the geothermal things related to the north pile. Then following that, we'll have a brief discussion on questions that you have related to the presentation, then we'll go around the room and draw up a list on the issues that you want to have discussed through the balance of the afternoon, and then proceed through that. As well, as Florence noted this morning, we'll likely have an additional elder or two in and we'll make time for them to make their statements. Florence.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Florence Catholique, Lutselk'e Dene First Nation. Mahsi, Hal. I just wanted to inform the group here that due to the weather, the members from Lutselk'e won't be able to be here today. So they'll probably do their presentation on Friday.

**MR. HAL MILLS:** Okay, thank you for that information. So with that then, we'll get started and turn it over to De Beers for their presentation.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers Canada. We have a couple of presentations this afternoon, and I guess, you know, there was talk about talking to the translators and explaining what cryoconcentration was, and I suggested maybe it would be nice if they explained it to the whole group, never mind the translators. So our first speaker is Ken DeVos. Ken is a hydro-geochemist with Golder. I won't give all his credentials, as we did that earlier last week. But also, there were a number of... I think three or four questions last Thursday that Ken wasn't here to answer, and as long as he's here, I thought we'd just get him to repeat the questions and then give the answer, so that they're on the record, so over to you, Ken.

**MR. KEN DEVOS (Golder Associates):** Yeah, it's on now. Ken DeVos with Golder Associates for De Beers. Some of the... there were three questions last Thursday that my name is beside here. The first of those questions related to selenium with respect to mine operations, and a follow-up question was asked, it appears here. With processing of the rock, is there potential for greater release of selenium or other metals? In response to that particular question, we have accounted for differences in potential selenium values based on the kinetic test work that was done, so that has been accounted for in the water quality estimates.

The second question corresponds to what kind of other metals could come out of the paste? The values with respect to, we're going to talk about that a little bit more today, in terms of cryoconcentration, but the answer to that question is provided in appendix 3.2 and appendix 9.1 of the environmental assessment.

**MR. HAL MILLS:** Ken, I couldn't hear that. I'm not sure about the other people. Could you repeat that information please?

**MR. KEN DEVOS (Golder Associates):** Yes, I'll use this microphone. The question related to what kind of other metals could come out of the paste, was the question as I have it. Those values were assessed and are provided in appendix 3.2 and also in appendix 9.1 of the environmental assessment report, and they were accounted for in the water assessment.

The third question revolved around the level of confidence around the TDS number used in the mine, in the mine water, I believe. And that was discussed earlier in the week. I gave a presentation on Tuesday morning, I believe, to that number, and it's shown in that presentation. And also, with respect to the TDS, the average TDS value that was used for the mine water was 900 milligrams per litre. And the confidence interval, the average plus one standard deviation number on that TDS value, is 1350. And in the assessment, when we looked at chloride, we assessed the chloride component of that TDS number at the average plus one standard deviation for the mine water in-flow.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Just to clarify that those were questions from day 4 of the technical sessions.

**MR. KEN DEVOS (Golder Associates):** Okay, the purpose of this presentation this afternoon is we've been talking about physical stability and will continue to talk about physical stability aspects of the north pile, but I'm going to take this opportunity to discuss some of the chemical stability aspects of the north pile, and the purpose of this particular presentation will be to provide some background on chemical concentration that results from expulsion of the chemicals into the liquid phase as ice forms in the pile. This is also called cryoconcentration. And this, just to give you an analogy, if you look at your carton of milk in the fridge when it starts to freeze, you'll find that you get some relatively pure ice forming in that carton, and that pushes out the other chemicals. It's not a direct analogy, but just to give you some idea of the process that we're talking about.

And this topic has been addressed and discussed in appendix 9.1 of the environmental assessment report, and in the response to information requests, notably request 3.4.18. There are external references that also relate to this particular topic. Most of them deal with sea ice and the formation of brine solutions in a sea ice, but there's also, you know, the handbook of chemistry and physics also has a discussion on chemical concentration and changes in freezing point as a result of freezing of solutions.

Once again, we're talking about the north pile. This is the north pile in plan view, a little bit more schematic than the earlier representations. And in particular, we're talking about the fine grain material in the north pile, the process kimberlite or the paste kimberlite, PK.

So I'll start out with our initial conditions. We start out with a saturated process kimberlite, with a chemical concentration, and in this case, I'm going to be talking about salinity, which is essentially the mass or the weight of chemical in grams over the mass of water in kilograms. So in this case, we're looking at the initial

conditions of salinity of 0.8 grams of chemical per kilogram of water. When we're looking at sea ice, this is per kilogram of sea ice, and we're using an analogous system with respect to the north pile. The freezing point of this particular solution at this particular chemistry is about 0 degrees Celsius. And the other thing that happens is when freezing occurs and the chemical concentration's increased, you get a decrease in the expected freezing point.

So now we're freezing the pile for initial... or for this initial slide, we've looked at a ten times reduction in the volume of the core water. And what happens then is as the ice forms, it essentially pushes out the ions, concentrates the ions in the liquid fraction, so the ice is more pure, the water increases in chemical concentration. A small fraction of the chemicals or the ions that are retained in the ice structure, when we increase or decrease the water volume by ten times, we increase the salinity by about... to about six grams per kilogram. We had a slight reduction in the total chemical mass retained in the liquid phase, but overall, in terms of chemical mass in the dissolved phase for the pile, we're dealing, even though we have a smaller volume of water, we have a higher concentration, we have the same total chemical mass in that water phase, or a slightly lower total chemical mass in that water phase. And in this case, we end up with a freezing point of about -0.3 degrees Celsius.

So let's continue to freeze the pile and look at a further decrease in water volume and liquid water volume by about 100 times. So when we decrease the water volume, we increase the amount of ice. As the chemicals in the water phase get more concentrated, a larger fraction of those are retained in the ice mass. Further, as the chemicals get more concentrated, we reach saturation with respect to several of the chemical phases, and we start to precipitate solids into the ice. If you ever lived on the prairies and made ice cubes out of prairie, hard water from the prairies, you'll notice when you put them back into a glass, you get solids coming off of those ice cubes. That's what's happening. You're getting precipitation of solids as the ice forms. The salinity in this case, due to the... is about 35 grams per kilogram, and part of that is because we're losing mass from the chemical phase into the ice mass.

So we have a reduction in the total mass, chemical mass in the liquid phase due to these processes, and we further then reduce the freezing point to about -1.9 degrees Celsius. So given the conditions on site, we're continue to freeze the pile.

Let's continue to freeze it to about -12. We end up with a much further decrease in the water volume of 500 times. We very much increase the chemical concentrations now, because we're getting into a very small amount of water, and by the way, this diagram is not to scale, so it's just for illustrative purposes.

The salinity then increases to about 150 grams per kilogram water, so we have a very high salinity or concentration in the water, but we have a very low volume of water. So if, you know, if we started out with a one-litre bottle of water now, we're down to about, you know, 500 times reduction. We're looking at about 2 millimetres of water, so we have a very small amount of water that's actually able to move in flow. And we have a reduction in freezing point of about -12. We may not get this far with respect to freezing at Snap Lake, but in the surface materials, we could.

So this process that I've gone through with concentrating the solution, this is taken from one of the books on sea ice, and increasing in brine concentration with decrease in, or sorry, with decrease in temperature. The lower values that I've used in the previous slides are based on the handbook of chemistry and physics, so they plot lower on the curve, and this is empirical data that was taken from the other reference that I've presented up front. So you can see, you know, as the temperature decreases, the brine solution increases and you get a reduction in volume of water.

So then what are the key factors that will affect the chemical availability, just to recap. During the initial freezing of the water, some of the water may be released. So you may get some release as you're freezing down to that ten times reduction in volume, so you may even get some slightly elevated concentrations coming out in that water, but the total mass that's released is no greater than the initial chemical mass in that distribution of water.

As the freezing occurs, the ions are pushed out of the ice structure, and you do incorporate some amount of this into the ice structure, these ions, into the ice structure as well.

As the volume of liquid decreases, the chemical concentration increases, and as this concentration increases, the chemical solubility or the amount of the chemical that can remain in the liquid phase, you reach an equilibrium, or you reach a solubility limit, and you get solids precipitating out of solution, which decreases, tends to decrease the overall mass in the liquid phase.

And as the amount of liquid gets smaller and smaller, this liquid becomes bound up in a mass of ice and kimberlite. When you're dealing with sea ice, the only thing you have is ice and a very small amount of precipitative solids. And you can have brine land migration. When we're dealing with kimberlite, we also have solids in this mix, and we tend to bind up that any residual water within the solids and the ice, and the rate of migration of any of that brine is very, very small. It's very small in sea ice and it's much smaller, it's expected to be much smaller when you're dealing with a kimberlite mass, where you have solids and liquids mixed together.



So in conclusion then, qualitatively, the potential rate of release of this chemical mass as the liquid concentrate, is expected to be very, very low, and it's important to note that the total mass available for release does not increase. The volume decreases, the mass in that liquid phase may increase, but the total mass in the pile does not increase. The current mass released from the pile is considered conservative. We've released about 14 percent of the pore water we release as a function of operations, as a function of bleed water. We expect that that's a high number, relative to what we actually expect to come off as bleed water, so we're being conservative in that respect. And we consider the data that's used in the assessment is appropriate and conservative. Thank you.

One further point with respect to the north pile and the seepage from the north pile, whether it be from cryoconcentration or surface water runoff is that we have to keep things in perspective with respect to, especially during operations with respect to the amount of water that's coming from the mine. Surface runoff is from the north pile and site, is less than 10 percent of the overall water coming from the mine, so we have a very small amount of water, and that includes all of surface runoff.

When we start to look at the seepage volumes coming off the pile, we're looking at maybe ten percent of that, so less than one percent of the total flow from the site might come out of seepage, so it's important to keep that in perspective when we're thinking about the north pile.

I'm going to move on now. I'm going to talk about the acid-rock drainage. And the purpose of this particular small talk will be to provide background and rationale for acid-rock drainage related topics.

And when I talk about acid-rock drainage here, there are several different words people use to describe acid-rock drainage. Some call it acid-mine drainage. What we're really speaking to here is the potential for metal release as a function of reactions in the pile.

This topic has been addressed in the environmental assessment report, notably in appendices 3.2. It's been discussed in detail in those appendices and all the data is available in appendix 3.2. And also, it's been pulled together with respect to the overall site in appendix 9.1. There's also been several responses to information requests and also several external references that have been reviewed.

I guess the main question that I get with respect to seepage from the north pile with respect to ARD issues is what happened at Ekati. I don't claim to be an expert on Ekati. I have reviewed the seepage reports from Ekati, and this is essentially summarizing my interpretation of those reports. They found low PH

seepage in a few different areas from their site. One was the coarse kimberlite reject storage area. The second location being the panda koala waste rock storage area. These are at Ekati.

Now, why did they see the low PH seepage? There's a number of possible explanations provided in the report. As, you know, essentially the values originated in relatively inhomogeneous piles of kimberlite with respect to the waste rock storage areas, where the piles had been placed in organic materials, or placed on top of organic materials, so there was speculation that the organic acids, the acids that, you know, potential acidity associated with these organic materials depleted the neutralization potential of the kimberlite. There was also some speculation in the report, or one of the potential conclusions in the report was that iron released from the pile, possibly as a result of ferro silicon used in the processing, were as a result of flow through the pile and reactions in the pile, that the combination of acidity from this iron or from the reaction with this iron, and the organic subscape depleted the PH and resulted in the low PH conditions observed.

Just to follow on, what they did at Ekati as part of adaptive management, I guess, or as part of remediation of this potentially low PH seepage, they placed a toe berm at the edge of the Koala waste rock storage area, and that in terms of the report, and I actually, I have to point out, I have this reference incorrect. I put BHP 2001. This is the 2002, the March, 2002 waste rock report. But the... to carry on then, the placement of the toe berm at the Koala waste rock pile in their opinion appeared to be effective in mitigating the low PH values, so they had more neutral PH values from this pile.

So that leads us to the question, well, why is Snap Lake different than Ekati? Why do we feel that we're not going to have low PH seepage at this particular facility? We're dealing in a much different, well, a different host rock in geology, different in placement of the kimberlite, different inclusions in the kimberlite. We're also dealing with a very different mine design. We have an underground mine. We don't have the open pit that Ekati has. We don't have, you know, the large amounts of waste rock. And we're also going to be preparing our north pile site, so we're not going to be... any material that... around the edges of the pile will not be in contact with organic matter and the potential possibility of acids associated with that organic material.

We're going to minimize the waste rock produced at this site. Any potentially acid-generating waste rock will be encapsulated, or will be sealed in the north pile. We're going to have a thickness of process kimberlite, fine-grained, saturated process kimberlite over top of the potentially acid-generating rock, so it can't react with the oxygen in the atmosphere, or those reactions are minimized.

Or we will be depositing the waste rock back into the mine, and we're have a homogenous blend of the kimberlite and the dilution rock at the Snap Lake site.

So this diagram was presented very early last week, but I'll talk about it again with respect to the differences in these two sites. When you look at Ekati, this would be the idealized model of a kimberlite intrusive, and it's a very... how the kimberlite gets placed is very violent. There's a blow out at depth, blows up to surface, you get incorporation of post-rock, large chunks and blocks of rock within the kimberlite, and this lends itself then to open-pit mining, and it's usually found under lakes because it's more weatherable. So what we see then is a large amount of waste rock. In the case of Ekati, they're talking about, for the life of mine, 800 million tons of waste rock at Ekati. There was a point this morning somebody stressed that we had 220,000 tons of waste rock. At Ekati, they will have 800 million tons.

We're looking at an underground mine here. The best way to mine this deposit is underground. It's a sheet. This did not undergo, you know, if you can call an intrusion non-violent, this is about as non-violent as you can get. Lifted apart, we have much smaller amounts of country rock in with the granite, or sorry, in with the kimberlite. And most of this is un-reactive granite. When we mine this, we won't be producing a significant amount of waste rock. There will be some waste rock produced, and that waste rock, as we said, will be encapsulated in the north pile, or will be placed underground to minimize reactions.

So if we go on and we look at the acid-based accounting characteristics of the Snap Lake kimberlite, we're going to move on to the Snap Lake kimberlite. But I would like to point out, if we can just back up a step, this type of intrusion is more characteristic of deeper root zone kimberlite. And what that means in terms of the chemical composition is that it has a little bit more calcite and carbonites than your typical upper level kimberlites that you would find at Ekati or Diavik.

In the case of Ekati, I believe I've read they have about 2 percent carbonite materials, going up to possibly 4 percent. With Snap Lake, we're looking at between 4 and 6 percent kimberlite, so we have almost double, in some cases triple the amount of buffering minerals, reactive buffering minerals that they would have at Ekati or Diavik.

So then if we look at acid-based accounting characteristics... what acid-based accounting is it's a balance of the possible acid-generating materials as defined by reaction of sulfide minerals. So we look at the sulfide content and we determine how much possible acid that sulfide can produce if it reacts completely. When we look at that balance, we also look at the neutralizing minerals, and acid-based accounting is a balance of the acid producing minerals versus the neutralizing minerals, and when we talk about neutralizing minerals,

not all neutralizing minerals are created equal. There are carbonites and more highly reactive neutralizing minerals, such as calcite, and then there's neutralizing potential, more long-term neutralizing potential or slower reactive neutralizing potential provided by other minerals, such as silicates.

So if we look at the kimberlite from Snap Lake, the maximum possible... this diagram shows proportionally the amount of acid production that could occur with the sulfide minerals versus the amount of neutralizing minerals. And you could see quite clearly in this diagram that we have a lot more neutralizing minerals available than we do have possibility for acid production. And a lot of these neutralizing minerals, more than a third of them, are in the form of the more reactive carbonites, so the calcites, the dolomites. And in fact, when we look at a blend of the dilution rock, so we have 20 percent of meta-volcanic rock at a very high sulfide content in the meta-volcanic rock, we blend that with 80 percent kimberlite, which is what our expected dilution ratio is in the mine, at the very low percentage of... actually, I shouldn't call this MP. This is not carbonite content. A very low percentage, 50 percentile of the neutralizing potential available, we still get a neutralizing material. We still have more than two times. This is at the 95<sup>th</sup> percentile sulfur content in the dilution rock and the 5<sup>th</sup> percentile content, so a very low amount, in the kimberlite. We still have a neutralizing blend. We still have more than two times the neutralizing potential as we have acid production potential.

So we then carried this one step beyond just looking at snap shots of acid production potential versus neutralizing potential, and we did that laboratory test work on the kimberlite. And what we found was, we should point out that this initial line here shows a change in PH that results from setting up the cells. The cells, the materials, the screening material in the cell was acid wash, so we had a very low initial PH in that one particular cell, but very quickly, all of the cells had a slightly alkaline to neutral PH. We looked at, we continued on with the four or five cells that we had of kimberlite material, and they all followed this trend of slightly alkaline to neutral PH. And one of these cells has now been going on for more than 100 weeks. And these tests, what we do with these tests is every week, we apply water to the test material, drain the solution, analyze for the chemistry for that solution, and that's how... what we base our water quality estimates on.

So then again, again what we see is consistently alkaline or near neutral PHs with low-metal concentrations. And we have these plots for all the different metal concentrations, and they all plot as low-metal concentrations. And that's contained in the appendix 3.2 if anyone wants to go digging for it.

So the other potential concern or question that came up in the information request was "Well, okay, that's fine, but what happens if iron can sometimes move or migrate at the neutral, near-neutral PH conditions." And then once it

reaches the air, it can oxidize, or react to form acidity, so what's to stop that iron from migrating and forming acidity once the, you know, as the pile operations continue.

So what we did in response to that was look at the balance between the possible acidity that could be produced with the iron and the available alkalinity, or the available neutralizing potential of the water itself. So we looked at now only looking at the water. We're looking at how much iron is in the water and how much neutralizing potential was in the water as it comes out of the pile. And we base this on the kinetic test work, and some of the short-term bleach test work.

Now, in most instances, we looked at the waters that came from the pilot plant operations, where they used a particular chemical, ferrosilicon, in the processing. In all the cases where they used the ferrosilicon in the processing, the iron concentrations were very low. Iron concentrations were typically less than .08 milligrams per litre, with, in one single case where we took the kinetic test cell results and we acidified the sample to start with, so we tried to deplete as much neutralizing potential as we could from the sample. So we acidified the sample and then we repetitively bleached or added, continued to add acidic water to the sample, and the maximum alkalinity we got from that sample of kimberlite was 11 milligrams per litre. And when we look at the available alkalinity to buffer the potential acidity, we have about 57 milligrams per litre and 34 milligrams per litre, and this is as calcium carbonate, expressed as calcium carbonate.

So then these figures show the typical balance of acidity that could be produced by iron, and the amount of alkalinity in the water itself that can buffer the acidity. So as you can see, both in this typical balance, and in the worst case, this is the worst case iron situation. It's the average alkalinity. We still have substantially more neutralizing capacity in the water than we have potential for acid generation.

So in conclusion, we feel very confident that the ARD data used in the assessment is both conservative and appropriate. The possibility of alkalinity depletion due to organic materials or acids is minimized at this site by stripping or preparing the ground around the edges of the pile. We fully expect that the pile will be non-acid generating, and that there will be substantial excess neutralization capacity in the pile. And we have more than ample, more than sufficient neutralization potential in the water phase to neutralize any acidity released from iron in the pile, even under worst-case conditions that we've modeled, or that we've looked at. That's about it.

**MR. HAL MILLS:** There's one more component to the presentation, is there? I'm not sure what to do here. We've not been through all the presentations and the other hand, it's getting quite long and there are a lot of details, and now there are

some questions, so would it be appropriate to entertain a couple of questions related to the presentations we've had so far before proceeding?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada. We have no problems with that.

**MR. HAL MILLS:** Chris.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. My questions relate to the cryoconcentration. I wonder if the company can indicate if it has conducted any laboratory tests on the PK paste to determine the freezing point depression in this material.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos, Golder Associates for De Beers. No, we have not.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. I wonder if the company could indicate how the expulsion of dissolved material from the freezing plane varies with the rate of freezing, the rate of frost penetration.

**MR. HAL MILLS:** I wonder if I could jump in here, Chris. We're simply entertaining questions and clarification on the presentation. We'll be preparing a list of issues to discuss later.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. Yeah, and this bears on the issue of the model that was presented in the presentation, the amount of concentration of material in the unfrozen... in the... if you looked at the picture on the diagram you would see there was a smaller and smaller area that was more and more densely concentrated in solutes.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. The issue that you're referring to, cryoconcentration, is not a novel issue. It's been looked at in detail, especially with sea ice. The numbers that were put up are theoretical numbers based on a review, a literature review of that data. We feel that at this stage in the environmental assessment process, that it's reasonable.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. May I ask for clarification then whether you do or do not believe that the rate of freezing influences the rate of cryoconcentration?

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. Yes, I believe that is indeed the case.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. May I ask one more clarification? In the model that you presented, the concentrated area became smaller and smaller in the picture. Does this depend on the rate of solute migration away from the frost front?

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. My understanding of this issue is that under quickly freezing conditions, where it rapidly freezes, you're going to get more solutes, more disconnects in the frozen terrain. The graphs that were put up were strictly for informational purposes for this audience, and they're schematic in their representation. So we've looked at one scenario where we have a reduction from a large volume of water to a very small volume of water. What I would expect would happen in something like the north pile is that you would have many small components where you have this sort of process occurring.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. I would like to point out to the board that the migration of solutes in a fluid behaves differently when the fluid is in the bulk, that is, in a tank of liquid as opposed to in a porous medium, that the movement of material away from the frost front is impeded when the pore spaces restrict the movement of the fluid. And maybe I could return to this line of questioning later on.

**MR. HAL MILLS:** Okay, please do. Any other questions or clarifications on Ken's presentations? Okay, back to you then, Terry, for yours.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. Could you tell me if that's working? Okay. I've got two presentations to do this afternoon. First is a brief introduction to the thermal work that we've done on the north pile. The purpose is to describe briefly the thermal properties, thermal gradient that was used, and factors, issues of climate change. There were some questions raised around the adequacy of the temperature modeling that was used within the thermal model. All of these combined come down to the main question, which is are we confident in the rate of freeze back to the north pile?

These topics have been addressed in the environmental assessment report, sections 10.2 and appendix 3, and again in numerous information requests.

Just to briefly set the thermal setting, we're in an arctic permafrost environment. We've got a mean annual temperature of about -8 degrees C. Mean annual precipitation of about 370 millimetres. In an area of the north pile, we have a very thin soil cover over granite bedrock. And our work shows that the bedrock is essentially ice free.

The reason we carried out the thermal modeling was that it was part of our engineering work to allow us to design the north pile. We did it in what we consider enough detail to be able to understand the critical issues, and the general performance of the north pile. This allowed us to come up with design concepts and to have them agreed upon by the team participants.

This allowed us to demonstrate that there would be sufficient storage capacity within the north pile footprint to take the PK that was not going underground. It allowed us to come up with a deposition strategy that we think has the flexibility needed to accommodate changing conditions. And that detailed engineering, where we provide specific response to some of the issues addressed at this stage would be done in the future.

We used a commercially available piece of software called Temp W, produced by Geoscope in Calgary for this work. This is a piece of software that we have used on numerous projects. The process we used was to take the natural ground, which is this line here, run the climatic conditions over it until we established a stable thermal regime throughout the course of a year, from one year to the next.

And then sequentially placed horizontal layers of material, raising the ground surface for each layer. Depending on the time of year that that layer was placed, it was either under freezing conditions or warm conditions. This was one of the scenarios we looked at. We looked at two. One was placing material fairly slowly, at three metres a year. And the other was placing material very quickly into the pile at nine metres a year, to give us an idea of the impact of the rate of placement.

Again, random models for a short period after the pile was complete to see if they were tending towards the frozen condition or the thawed condition.

So for this particular example, you can see that these areas outlined in blue are thawed layers of PK within the pile, so we have frozen PK and thawed PK within the pile during the operating period.

So in terms of the thermal model results that we thought were important, we see that the north pile during operations will have frozen and thawed layers, and unfrozen layers. The exact patterns of these will depend on the specifics of the deposition pattern scheme.

The model does show that the north pile tends to the frozen condition with time, excluding an active layer, which will be developed seasonally. Coupled with this thermal model, or in addition to the thermal model, we did some seepage modeling and infiltration modeling, and we see that most of the precipitation runs



off the pile. The pile is shaped not to retain water but to direct water off of it, so most of the water runs off.

We did some modeling to see what would happen if the pile thaws. If the pile thaws the materials coarse enough that it drains, and the preatic surface develops near the base of the pile.

Even for cases where we had maximum infiltration possible, a preatic surface does not develop in the pile.

Again, to point out that for stability for the foundation, we're an ice-free bedrock. Changes in the thermal conditions of the bedrock do not change the stability of the pile itself. And frozen or thawed, that pile is stable, given its construction with the external berms.

Modeling was done as part of the design process. We started off by taking the strategy that we didn't want the tailings impoundment. We didn't want to be storing that large volume of water on top of the tails, so we've eliminated that. From there, we'll be going into the detail design, where we take the information from the EA work and the optimization engineering work that's been done and carry that forward. The intent is that we'll start up in the starter cell, build the cell itself with some conventional techniques, placement of the granular aggregates will be well away from the lake. We'll have redundant seepage collection systems between the starter cell and the Snap Lake.

Within the starter cell, we'll be doing a variety of test work, both to optimize the operation of the cell itself, as well as to confirm the parameters we've used in design. And we will not be changing the design of the pile until the work we've done in the starter cell confirms a safe system.

So this piece of the presentation will then roll into the next one.

Conclusions, we're going to see, during operations, frozen and unfrozen layers in the pile. We'll completely freeze in some time periods, and we'll be stable whether frozen or thawed.

So a second brief presentation will deal with management issues of the north pile. We proposed to do some field work, some field tests within the starter cell, looking at how we can construct containment burns using the pump PK. Nobody I'm aware of is pumping this type of material to an area and then immediately using it for construction. We think there could be some real efficiencies in the system by doing this, and we want to investigate it within the starter cell.

There are some issues related to how we will physically move the pipes on the berms and on to the PK, and issues on how the cover itself will perform. So those are test programs.

And then there's monitoring issues. How will we monitor the performance of the north pile? The process kimberlite in place there as well as the cover on top of the pile.

Again, we presented this information in section 10.2 of the environmental assessment report, appendix 3.1, and some information requests.

Just to recap where we are in the north pile, we're to the west of the process plant, an area adjacent to Snap Lake, 1.7 kilometres by 900 metres. We talked about a setback of minimum 50 metres from the edge of Snap Lake and how we will develop this in a series of cells going from a starter cell to the east cell to the west cell.

Again, the sections, this is the starter cell area. Snap Lake sits here. This will be the east cell. So when we start the operations, you've got some very low berms around an area of flat topography that we'll use to discharge PK for two years.

Just review the overall process, you know, it's an adaptive management process. The perimeter design, that's been completed. That provided input to the EA. The EA is being reviewed at the moment and there will be feedback from the EA that goes back into the engineering of the detail design. That will be carried through, reviewed, and then from that will be developed the construction drawings and specifications for the north pile. The north pile will be constructed, starting in the starter cell. It will be operated for a period of two years before the east cell is commissioned. The monitoring, instrumentation installed in the north pile, specifically in the starter cell at the beginning, information that we acquire from that monitoring and those field tests allow us to do a final design and change the operations so it becomes a more efficient system.

Having cells allows us to do progressive closure. This means that we can provide, start doing closure of the north pile in the third year, the third summer, which provides us at least 15 years for monitoring the performance of that cover - how does it respond to freeze/thaw conditions, how does it respond to erosion, wind, and adjust that closure to the remaining sections of the facility well before the end of the mine life.

In the starter cell itself, we need to better understand the deposition, the slopes that the PK will achieve when it's pumped up out the end of a pipe. There will be variations between winter and summer.

We've done testing, flow tests, lube tests and pumped the material onto the ground, and we saw the slopes that we achieve. They were about six percent. That's what we used for our summer numbers, but for the winter, we think the detail of these closer to the discharge points and we'll achieve steepest slopes, so we'll use 15 percent for the winter. Work within the starter cell over two years will allow us to have a better understanding of the seasonal variation of those slopes.

We also want to understand how those slopes perform during the spring melt. There will be movements. As the PK thaws, water runs off, so we'll monitor that so we can better develop the deposition plans for the larger cells.

We know there will be frozen and unfrozen layers within the PK. We will install thermistors so that we can monitor the temperatures and understand the rate of freezeback, and how those frozen and unfrozen layers perform at the time.

Pore pressures, we need to understand during the freezeback process, if we had layers fully encapsulated, thawed areas fully encapsulated by frozen areas, what the pore pressure will be, how do those increase and how will they dissipate. We'll be looking at how much bleedwater is coming from the PK under various scenarios, and will be evaluating performance of the ditch around the starter cell, and we'll be doing some field construction programs. We'll be running a variety of test fills, looking at different compaction equipment to see which is the optimum to use to construct the external berms.

So in terms of the starter cell, what we'll be monitoring, temperature is one thing we can measure. We'll be installing thermistors horizontally and within the vertically within the PK. With each of those, we'll put ...(inaudible)... to see if we can monitor pore pressures. Doing periodic surveys on the deposition slopes, that will give us both the configuration as discharged, and then with periodic surveys, we'll be able to look at the movements of the slopes.

Pore measurements, both inside, looking at the quantity of water reporting into the run-off collection ponds, and the quantity of water reporting to seepage collection ditches.

And as I mentioned previously, we'll be doing some test fills, just looking at different construction techniques for building with these materials.

Starting in year three, we'll be able to start putting cover on the PK materials. This is when the starter cell will be complete. This will allow us to start looking at how quickly we can move across the complete surface of the PK, with construction equipment suited to place the rockfill. It will give us a 15-year or

more period to monitor performance of the cover, looking at how it responds to seasonal runoff, how it responds to freeze/thaw activity.

The programs in terms of monitoring that will be the same as what you saw in the starter cell. We'll be looking at continuing monitoring, the temperatures, pore pressures in the cell itself, and doing flow measurements and surface surveys.

So the management plan, as it sits today, includes both monitoring and field test to confirm the construction methods and design perimeters. It includes progressive closure of the north pile so that there is an extended period of monitoring the closure scenario prior to actual mine closure.

**MR. HAL MILLS:** Okay, thank you, Terry. Once again now, before we brainstorm the list of issues that you want to discuss, are there any questions or clarification on Terry's presentation? Chris.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. A question of clarification. In the second slide of your presentation, you listed a whole range of items, geothermal gradient and factors, thermal properties and so forth, but you did not address them in your presentation. Do I interpret from that that you feel they have been addressed satisfactorily in the information requests?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. What we've done has been provided in information requests. I've put them on the slide so that when we're in the forum and responding to questions, we flagged them as issues we understood would be raised, and then we can discuss.

**MS. PERRY MEHLING (DIAND):** This is sort of a combination for Terry's and Ken DeVos'... Perry Mehling, consultant for Indian and Northern Affairs. You're talking about having frozen and unfrozen layers within the north pile. But my understanding of the water quality assessment that's been conducted on two metres, the surface two metres or active layer. Was there consideration for the additional unfrozen layers providing some additional mass loading in your analyses?

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates for De Beers. Can I just get you to actually rephrase the question so I'm sure I understand?

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. I understand from the acid rock drainage mass loading from the north pile that it took a look at mass loading created from the top two metres of PK material, that being the active layer, the unfrozen mass. However, I heard Terry say that we've

got frozen and unfrozen layers for a period of time until the mass is frozen. Did your analysis of mass loads consider that period of time that you might have more than two metres active?

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. We considered that once freezing conditions occur, well, essentially, we considered the full mass to be available for... until it froze up for the first two years in different areas of the pile, I believe. I have to go back and check the actual documentation of what was modeled. But after that time, once the pile was considered frozen, it was considered that those layers would be isolated for a number of reasons, not just because of the freezing. The freezing is the main mechanism that we've used to discuss the pile, but there are other... there's more rationale, more on the qualitative basis that we can discuss in more detail at a later time, if you wish.

**MR. HAL MILLS:** Okay, anything else regarding the presentation? Okay, I'd like to suggest then that we try to develop our list of issues before we take a coffee break, and I'll turn things over to Bill to lead you through that.

**MR. BILL KLASSEN:** If I understand the process correctly -- thank you, Hal -- we'll go around and see who has issues that we need to address and, as Hal is suggesting, we'll do that after we take the coffee break and that'll serve as a bit of an incentive to get through the issues quickly. Does anyone have issues that remain unresolved that you want to discuss? Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. We'd like to provide an answer to Doug Hallowell's question of the morning in relation to minimum distance between the lake and the north pile.

**MR. BILL KLASSEN:** Do you want to do that while people are considering what their issues are?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Sure. De Beers has checked with Brent Topp, the hydrologist who has confirmed that a minimum of 50 metres separation will be maintained, that it's actually over 50 metres, but that the details will be provided in a memo submitted to the public record for basically you to see that description with the background.

**MR. DOUG HALLOWELL (Environment Canada):** Robin, just one final question. What is the variation in the water levels of Snap Lake? Was the hydrologist able to give that information?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I do not know the answer to your response, but I will ask for him to include that in his memo.

**MR. DOUG HALLOWELL (Environment Canada):** Thank you. That was Doug Hollowell talking.

**MR. BILL KLASSEN:** Thank you, Doug. Okay, back to issues then. Are there issues that people want to address after the coffee break? Chris Burn, and then I think it's Mark.

**MR. CHRIS BURN (DIAND):** Chris Burn for Indian and Northern Affairs. I would like to address the thermal modeling of the north pile and its association with the cryoconcentration effects, which have been described earlier today.

**MR. BILL KLASSEN:** Thank you, Chris. And at the far end, if you could give me your name, I'm sorry.

**MR. MARK WATSON (EBA):** Mark Watson, EBA for Gartner Lee. I just wish to comment later on about issues of the geothermal model and the relationship to our comments made with respect to rates of freezeback and seepage pressures.

**MR. BILL KLASSEN:** Okay, thank you, Mark. Sharon, and then Perry.

**MS. SHARON SMITH (Natural Resources Canada):** Sharon Smith for NRCAN. I also have an issue with the thermal modeling. In particular, the climate data that's used to force the model, and then a second issue that perhaps is better left until tomorrow but is related to the north pile a bit is whether or not you considered the removal of the organic material in these ponds and the effect that that also has on the thermal regime.

**MR. BILL KLASSEN:** Okay. I think Hal's got that. I can't write that fast. Perry.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, Indian and Northern Affairs. A few issues sort of related to some of the details on acid rock drainage. Ken's covered off a few of the issues related to comparison to Ekati, but I'd like to ask a few questions about potential contingencies should the kimberlite not react as predicted. Secondly, a description of low iron in the water quality coming off the north pile and I want to put that together with some of your freak modeling, where you have arsenic absorption, which often requires some iron. So I just want to sort of resolve that issue.

As part of the model, the mass load from the top two metres of material was reduced by an order of magnitude to get realistic loading values within your model. Although temperature reductions had all been applied to reaction rates,

and I'd like to hear a little bit more about the rationale for that order of magnitude reduction.

And also, a little more description of how a cut-off criteria of 0.3 percent was reached for the granite, particularly with respect to kinetic test results.

And a final one that may or may not be significant on the cryoconcentration. Can one of the issues that's come up is not so much mass loading to the lake but concentration impacts on the north arm of the lake, and I was wondering if you could address or we could maybe approach the impact assessment from a concentration point of view in that portion of the lake.

**MR. BILL KLASSEN:** Are there other issues? Ann, I think it is.

**MS. ANN WILSON (Environment Canada):** Ann Wilson, Environment Canada. I have a question or two about the ARD with respect to the iron and the comparisons to Ekati. I think Perry's probably going to ask them all, but just in case there's any outstanding, I'll put my name on the list.

**MR. BILL KLASSEN:** Okay, thank you. You might get her to share. Perhaps during the break, just in the interest of not doubling up on points. Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I just wanted to let everybody know that one of the elders said that the presentations, and then with discussion and questions and answers being provided to the questions, has been a really good learning experience. I think the procedure and the... Monday, when we discussed about how we wanted to do the meeting and what we decided on is actually working. I think that's why one of the elders mentioned it to me and said that this has been a pretty good learning process. But also, we're going to be leaving in about five minutes. We'll be back as soon as we can, later on, if we could. But we'll be here for the rest of the week still. Thank you, and Lawrence is going to be sitting here taking my place.

**MR. BILL KLASSEN:** Okay, thank you for sharing that with us, Rachel. If there aren't any other issues that need discussion, we'll take I think a fifteen-minute break now. Thank you.

-- Break

**MR. BILL KLASSEN:** If everyone would take their seats, then we'll get underway. The first issue that we had was one that Chris Burn raised on thermal modeling. And I think you may want to use the overhead as well as part of your discussion. I think there's a lapel mike up there if you want to work from the overhead location. And I see that Louie has turned on the Christmas lights to put us in a festive mood. Do we get some carol background music, or...

-- Interjection

Thank you, that's enough.

-- Laughter

Go ahead, Chris.

**MR. CHRIS BURN (DIAND):** Chris Burn for Indian and Northern Affairs. I have some concerns regarding the thermal modeling of the north pile. The reason that they are concerns is that the rate of freezing of the north pile influences the quality of the pore water in the north pile. The destination of that pore water is also at issue. Whether that pore water remains in the north pile or whether the pore water is transported to the lake, De Beers has pointed out that the total loading to the lake from the north pile is one percent of the total loading to the lake from the mine. I guess...

-- Interjection

Is that correct? Is that what you said?

-- Interjection

**MR. KEN DEVOS (Golder Associates):** Ken DeVos, Golder Associates. I believe what I had indicated is that when you include the run-off component, it's ten percent of the overall flows. When you look at seepage volumes, you are looking at about one percent ...(inaudible)....

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. So that's the seepage volume, that is not the chemical loading? Correct? There is a chemical loading proceeding to the lake from the pile? The model that we've been presented with in the documentation up until now indicates that the pile will be frozen, and the indication is provided in the information requests responses, and on those responses, the diagrams that indicate the thermal regime in the north pile are in red if the ground is frozen, or black if the ground is unfrozen. Most of the pile in the diagrams is red. That is, it's below zero degrees. So the implication of the modeling is that most of the material is frozen. I have some comments which are designed to indicate that the security of that judgment is an issue which I require resolution of.

In geothermal modeling, as was presented in the previous remarks from Terry, there is a model called Temp W. And that essentially deals with the flow of heat within this pile. The flow of heat within the pile is by conduction. So any movement of pore water within the pile and the heat that that pore water carries with it is not included in the model. The model has a series of what we call



boundary conditions. Boundary conditions are the external conditions that govern the behaviour of the freezing. In the model, there are two prime boundary conditions. The first is the flow of heat from the ground into the pile. We call this the geothermal flux. The second is the exchange of heat at the ground surface, or the pile surface. This is governed in large measure by the air temperature. In the model, the surface temperature, which is the critical value that determines where the heat is flowing out of the ground or into the ground, the surface temperature is determined from the air temperature by applying what we call an end factor. An end factor is simply a transfer function. It takes the air temperature, multiplies by a certain amount, and gives us a surface temperature. I have some concerns regarding the application of end factors.

And the third is that the flow of heat within the pile is governed by what we described as the thermal properties. The thermal properties are the heat capacity -- that's the amount of heat that is required to warm or cool a volume of material. Then, the thermal conductivity. The ability of the soil to move heat and finally, the latent heat component -- that is, how much energy must be extracted from the pile in order to freeze the water. Now, you already have assumed that the latent heat is associated with the salt concentration. As the salt concentration varies, then that influences the freezing point of the material and so the amount of heat that is removed due to freezing is altered by the amount of salt in the ground.

The first comment concerns the geothermal flux. We have requested and we have received a response in the information requests that De Beers has used a geothermal flux of .004 watts per square metre. In the information request, it was made clear that this value is not based on field measurement. It's based on a number that is used to make the model fit field conditions. So the model was used to try and mimic conditions in the field, and the best fit of that model was obtained when a value of .004 watts per square metre was used for the geothermal flux. Gartner Lee, in their letter to the board, in dealing with geothermal issues, pointed out that the fit of the model to the field is different by about three degrees Celsius, so the best fit is actually... the model is cooler, cooler or warmer than... it's out by three degrees. It doesn't actually matter whether it's cooler or warmer.

In our requests for information concerning the thermal conductivity of the materials, De Beers has pointed out that the thermal conductivity of granite is 3 watts per metre per Celsius. We have received from the company three sets of temperature measurements which enable us to determine the temperature gradient in permafrost. The first is from the work conducted this summer, reported in bore hole TH0201, and that temperature profile I will place here for you. That's the first temperature profile at a depth of about 30 metres. The temperature is -3, the bottom of permafrost is at a depth of about 225 metres. The temperature gradient in this portion of the profile is .015 degrees celsius per

metre. The second hole gives us a very similar temperature gradient, and we have another temperature gradient from the bottom of the bore hole 30. That's .02.

The geothermal heat flux is the temperature gradient times the thermal conductivity. If we use these temperature gradients and this thermal conductivity, the geothermal flux at the field site is .04 watts per square metre -- ten times more than the material that is used in the modeling. Which implies that in the field, we can expect ten times as much heat to come to the bottom of the pile as is accommodated in the modeling. This would tend to reduce the amount of freezing that takes place in the pile.

The second comment concerns the N factors in the model. As I indicated before, the N factors are simply a transfer function which takes the surface temperature as a fraction of the air temperature. We know that at the ground surface, N factors are very sensitive to local conditions. On the north side of a pile, the ground temperature will be cooler than it will be on the south side of a pile, where the pile receives direct solar radiation.

So there are local effects. De Beers has used one N factor for the whole pile and I think that, at an environmental assessment stage, that is probably a reasonable position to take. However, in the wintertime, and the wintertime is the most important in terms of the freezing of the pile, the N factors vary during the season. The N factor is quoted from a paper written by a man, Virgil Lunadini, published in 1978, in which a value for the winter of .5 is given as representative of many values. I have a copy of the paper, and anybody can look at it, but you will be hard-pressed to find a value of .5 for a pile such as this, because there is, of course, no assumption in 1978 that a pile like this would ever be built, so there is no actual number .5 available. Instead, we have to obtain that value from other conditions.

The N factor, the critical point here is that in the wintertime, the N factor varies with the snow depth. As the snow becomes thicker, the air temperature is more different from the surface temperature than it is when the snow is thinner, so over the winter, the N factor varies.

If, in addition, the N factor that Lunadini proposed is one for the whole of the winter. So he assumed and he proposed that this was an index that could be used for the whole of the winter, rather than applied month-by-month-by-month, because in winter, a single value does not describe the conditions between the air temperature and the ground temperature, because of the development of the snow cover, and also, during the freezeback of the active layer, because the latent heat released by freezing of near-surface water is trapped at the bottom of the snow cover. As a result, the ground surface temperature is much warmer

than would be the case in a frozen material. So all natural surfaces, which are represented in the referred literature, the value for NF is always less than .5.

This is the table, table 1028, which indicates the values of the N factor that I used. As you can see, throughout the freezing season, the value is .5. And in the view of the published literature, .5 may be a very... the actual value that is more realistic for the conditions may be smaller than .5 and therefore the freezing may be retarded.

The final comment that we have concerns the thermal properties. And the most important of these is the distribution of latent heat, the rate of freezing of the material.

Now, this is critical because the distribution of latent heat with temperature governs the speed with which the frost line, the speed with which the zero degree isotherm may penetrate the material, and also governs the proportion of the soil water, which has turned to ice. We requested from De Beers a characterization of the latent heat, a characteristic, or the freezing characteristic of the soil. And De Beers in the IR, figure 3.4.17-4, provided this diagram. This diagram remains on the record and remains an unresolved issue for the simple reason that there is no scale on the X axis and there is no scale on the Y axis. We do not know at what temperature the ice will form in the soil. I asked earlier today as to whether this, whether there had been testing, lab testing on the materials that are to be included in the pile with regard to cryoconcentration, and the answer was there has been no lab testing. It is almost impossible to produce a relation between the freezing characteristics of a material -- that is, the amount this is frozen and the temperature as it freezes without conducting a laboratory experiment on that material. Otherwise, we can draw diagrams like this, but this curve ultimately is entirely arbitrary. It might look rather like that, or it might be even steeper. It's a question of some judgment as to which curve to adopt, but if we have no scale for temperature on the X axis, it's impossible to determine from a reviewer's perspective, whether this represents, in a realistic fashion, the potential conditions for freezing in the field.

Those summarize the principal concerns I have. We have detailed concerns regarding the thermal properties that were provided in the... here we are... that were provided in the original environmental assessment. And we have requested clarification of those properties. We have yet to receive much clarification. This table was in the original environmental assessment materials. We can have a discussion about this table, but it's probably unproductive. It's probably better dealt with one-on-one. But there are a number of places in this table where there are either typographical errors, or what must be typographical errors, or there were inconsistencies in this arrangement.

Finally, I would point out that some of the data that has been presented are referenced in the information requests to original sources, and some of those points don't always match up exactly, but that's not an issue at this level.

So the three points I would like to summarize are that the... that the increase in field condition, the field determination of the geothermal flux indicates there is more heat coming to the bottom of the pile. The uncertainty regarding the assignment of N factors reduces the freezing rate. The uncertainty regarding the nature of the thermal properties in the pile means that from a reviewer's perspective, it's impossible for me to determine whether the projection of the model that the pile will be completely frozen, particularly when those values are on a 0.1 degrees celsius, 0.2, or maybe 0.0 degrees celsius, but negative when those are the documented numbers. And therefore, the nature as to whether this pile is a frozen pile or an unfrozen pile and therefore the implications that has for management of pore water, is unresolved, but I'm sure that it's\* possible to resolve these issues with the right information. Thank you.

**MR. BILL KLASSEN:** Thank you, Chris. Does anyone from De Beers wish to respond to the points that have been raised?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I guess I'm similar to Louie, a bit of a layman when it comes to this stuff, and I think Chris gave a good explanation, but I still can't begin to say I understand what he's talking about. I guess I always come back to how does this affect the environmental assessment? And so maybe Chris could make some comments on how, whether we agree on the model and the numbers that go in the model, how it ultimately affects the assessment of, you know... because the north pile as we've said, we designed it so that it's stable, whether it's frozen or unfrozen. So I would assume his concern is the water that would migrate out of the pile if it's thawed. So I guess that is really the question, not whether there's an incorrect number or not. So I guess I'd like to hear his comments on how that affects that.

**MR. BILL KLASSEN:** Chris, go ahead.

**MR. CHRIS BURN (DIAND):** Chris Burn for Indian and Northern Affairs. I have no concern at this point with the stability of the pile. The issue concerns the management of the pore water. If the pore water is released from the pile to the lake after there has been freezing in the pile, the pore water will have an elevated concentration of dissolved materials. Just how elevated that concentration is, just how much water is to be released from the pile is something that we have insufficient information at this point to determine. Initially, I thought that this would not be an issue, because initially, I assumed that the pile would be frozen and therefore, there would be a small amount of drainage each year through the active layer and after closure, there would be drainage from the active layer that

would become progressively more and more diluted. But when I examined the thermal model and found that I was not convinced that the modeling indicated that the pile would be frozen, but that there would be some freezing associated with particularly winter conditions, then I began to wonder about the release of fluids which have been cryoconcentrated to some degree into the local area close to the pile in the lake. I agree with the company that the... if we take the total volume of the lake and add the material from the pile to the total volume of the lake, then the impact may... an argument could be made that the impact would be small.

But if the discharge from the pile is to be repeatedly located in a small area of the lake, then the influence on that portion of the lake is different from the gross influence to the lake as a whole. And that is the reason why I raise it at the environmental impact stage. I don't think that the details of the modeling are appropriate for discussion.

I don't think, for example, that Temp W is an inappropriate tool to use at this point. It's just that the boundary conditions for the model, that is, the characterization of the freezing conditions in the model, the characterization of the heat being supplied by the earth to the bottom of the model, and the characterization of the freezing within the pile that the model has, which is specified somehow, but I don't know how it's specified at the moment. Those lead me to believe that the pile will not be completely frozen. In fact, it may not be frozen very much at all.

I don't know the answer to that question because I don't have the information on some of these plots that would enable me to answer that to my satisfaction, and for that reason, I consider that this is an issue which remains unresolved at this stage.

**MR. BILL KLASSEN:** Thank you, Chris. Again, does anyone from De Beers want to provide a further comment?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I think... I guess we'd like to think about that and perhaps come back and address the forum tomorrow morning.

**MR. BILL KLASSEN:** Okay, is that acceptable then? Thank you very much. We'll move on then to the second issue that also had to do with the geothermal model, Mark Watson.

**MR. MARK WATSON (EBA):** Mark Watson, EBA for Gartner Lee. Basically, I want to kind of comment on the fact that I thought that through the presentations today by De Beers that I've found a certain amount of clarification of the few of

the aspects that were raised in an issue that I had documented for this technical session.

In EBA's experience, albeit the tailings are wetter than probably what we're seeing here. We have seen departures even that... on the rates of freezing, and generally, they are slower than would be expected from modeling.

I must concur with Chris Burn's presentation to some degree. We did feel that the calibration in the top ten metres was off on... in comparison to the ground temperatures that had been measured. In all four seasons, the temperatures were typically up to three degrees cooler, so depending on the unfrozen water content curves and so on of your material types, it can lead to faster rates of freezing, and so the initial documentation, there's lots of discussion about the pile freezing back in the first two years, and those were the kinds of things that caught my eye.

Because in our experience, both in the field and from what I would expect from modeling, the freezeback time would be much longer than two and three year time frame.

From a geotechnical perspective, how does that influence things? I think you've somewhat addressed that this morning as well. You've modeled the stability or you've proposed in your starter cell the most robust containment shell construction, which again, I think, is a prudent thing to start out with. In all the information that I had reviewed, it was an exchange of information from the Golder reports on the north pile and there was information in the EA assessment and somehow, it escaped me that that was the section that you were proposing to start out with and that...

So I'm pleased to see that you're starting out with a very strong containment shell section, and I think that's a positive thing. I think that, based on the monitoring and instrumentation, there's much to learn about not only the rate of freezeback, but the seepage pressures and pore pressure distribution that will accompany that and again, I think that's extremely valuable information to have in hand, before we progress to the maximum heights of embankment that develop in the latter parts of the north pile construction.

So in summary, I guess there's not so much an issue as I do share Chris Burn's concerns about the accuracy of the thermal model and the time frame, not whether or not it will freeze back as much as the rate at which it will freezeback. And if that affects seepage and groundwater flow, and pore water chemistry, those are hydrogeological and geochemical that are outside my areas of expertise. Thank you.

**MR. BILL KLASSEN:** Thank you, Mark. Any response from De Beers on that observation?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. No, I think it was all positive, so we'll take that.

**MR. BILL KLASSEN:** I just thought I'd give you the opportunity to respond to a positive comment. Not that the others aren't positive, constructive criticisms as well. That will take us then to Sharon Smith's point on thermal modeling and the removal of organic material.

**MS. SHARON SMITH (Natural Resources Canada):** Sharon Smith from NRCAN. I must say when I looked at the thermal modeling and when I looked at your results and the comparison of them to the actual ground temperatures, I noticed this 3 degree difference and the fact that you were predicting much shallower active layers than are actually there, and I must say, I do agree with what Chris has said, that there are a number of places where perhaps those errors have arisen, and I would like to add one more area or one more cause of those errors, perhaps, and that would be in the upper boundary conditions in the climate data, or the air temperature data that you're using to drive the model. Because if that's not right, then you're taking that, applying an N factor, and then getting a ground surface temperature, and you're just compounding the errors as you go along. And reading through all the reports, I must say I was a bit confused as to how you arrived at your air temperature data. And you had presented your data from Snap Lake itself, some air temperature data, and then you have done some modeling, I guess, or combined Lupin and Yellowknife temperatures and come up with some kind of modeled air temperatures for the Snap Lake area, and when I compare those two sets of numbers, it looks like this simulated air temperature data is much colder than what you have been measuring at Snap Lake. And it's up to, on an annual basis, about 3 degrees difference there. If you go month by month, especially in the wintertime, you find maybe 5 or 6 degree differences in your monthly temperatures in the winter.

So I guess my question or my concern is are you using data, air temperature data that are relevant, that reflect the current conditions, and also are you taking into account that you may have increases in temperature over the lifetime of that pile, and you may in fact have warmer temperatures, and that may affect the freezeback of the pile itself. So that's the first part of what I have to say, so...

**MR. BILL KLASSEN:** Okay, thank you, Sharon. We'll give De Beers the opportunity to respond to that, and then continue with your second point.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I won't comment on how we arrived at the numbers we did, in terms of

temperatures. I know we... you know, there's a long history of air temperature measurements in both Yellowknife and at Lupin, and only a couple of years of data at Snap Lake.

I guess our main concern in the design and in looking at the thermodynamics of the north pile was to ensure the stability of that structure should temperatures continue to rise and it not freeze solidly, so I think that's where our primary focus was on. Do you want to add something, Terry?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. As I pointed out in the earlier presentation, the thermal modeling was done to provide us some information on how that pile would... how we could operate the pile. And we weren't looking for specifics of will it freeze back in ten years or five years. We wanted to understand what the issues the mine would have to be dealing with in terms of operating the pile. Will there be frozen and unfrozen layers? Which direction would be tending to frozen or to unfrozen? So it was a fairly coarse model that was done on it to provide us with that type of information, so that we could start to look at what mitigative measures we'd have to build into the system to handle those types of things. You know, how do we handle a water collection pond when sometimes it's sitting on unfrozen PK, sometimes it's sitting on frozen PK. How do we configure a seepage collection ditch when we've got these big swings in temperatures? So we weren't trying to specifically say that the north pile will function this way, but generally, this is the type of performance we'd expect from the north pile, and then how do we engineer around that.

**MR. BILL KLASSEN:** Sharon, go ahead.

**MS. SHARON SMITH (Natural Resources Canada):** Sharon Smith, again from NRCAN. Yeah, I guess you just mentioned something which was my second point. Have you considered with these ponds that you have in the north pile, and also the removal of the organic matter that is going to take place, that that will also have some affect on the thermal regime, so that you will probably end up in some places warming up the ground beneath what will be the north pile and how that might affect seepage and these other things?

**MR. BILL KLASSEN:** De Beers.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. We did consider that. We will be removing those organic deposits. That removes insulation from the ground, generally increases the depth of the active layer. Our concern in that situation would be that there is massive ground ice below and we start to thaw that, we have stability issues for the pile itself. We have a bedrock foundation. We have a fairly deep packed layer, development



along the toe, so removal of those materials, some increased depth of active layer during the time that before you put the PK on there should have small impact on the pile itself. We're already looking at a thawed layer being the conduit for bypassing water underneath the ditches. So whether it's eight metres or eight-and-a-half metres, I think we've addressed that in the impacts, like, by allowing this seepage, or the seepage model to pass that water past the ditch.

**MR. BILL KLASSEN:** Did you have a follow-up question or comment on that, Sharon?

**MS. SHARON SMITH (Natural Resources Canada):** No, I think that's it for this one today.

**MR. BILL KLASSEN:** Okay, thank you. I've been remiss in not identifying myself when I speak. I'm Bill Klassen, for the benefit of the transcribers. Maybe the mikes numbered and they know that this one belongs to the facilitator. Perry, and before you start, I don't know whether you and Ann had a chance to chat during the break, or whether we've still got separate questions? Anyway, proceed and then we'll see if Ann's issue is addressed in the discussion.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. I'll try to remember all those questions that I had myself.

**MR. BILL KLASSEN:** Okay, well, the first one, according to my notes was acid rock drainage and contingencies if the process kimberlite does not react as predicted. I hope you can decipher from that what you meant.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. I think one of the issues that's come up occasionally, and Ken addressed very well, was there were predictions for Ekati, and those have proven to be somewhat inaccurate, and I don't think that any, I certainly haven't and I don't think even Ekati have really nailed down the why's and wherefore's, so there's sort of this issue out there that we haven't really got a handle on our predictions from kimberlite. And you've done an excellent job of trying to address the hypothesis that have been put forward by Ekati as to why those kimberlite materials have gone, or produced acidic drainage, in terms of proposing to excavate the organic material at the toe, which is one of their recommendations.

And you also have an excellent opportunity in the way you've designed your mine to do some monitoring and determine whether things are acting as predicted. What I think would be prudent at this point would be to identify what contingency measures you have available if the kimberlite should prove not to be predictable, meaning that same hiccup that we don't understand happens here, because you've done the proper steps that I would have done for kimberlite. We've got

this little twist in the background that we don't understand, and I think providing... I think you've got the capability of it, but providing contingencies or outlining the contingencies that are available to address that, should it potentially happen here, would be beneficial. I wondered if you could maybe either comment as to whether that could be undertaken or what.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. I guess for the first part, in terms of contingency measures, I think, you know, a good situation is what develops at De Beers. They found they had a problem, and they put a berm in, so it's adaptive management in some respects. Now they're out there... sorry, at Ekati, not at De Beers.

Now, I guess to be more specific on other contingency measures that were put into place, I'd like to get a little bit of information on what you're proposing the potential problems could be.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. I guess I'm not proposing. I just think that should kimberlite produce poor quality water, low PH water, as has happened at Ekati. You know, I don't know why it's happened there, and there's this little bit of a question out there, but I wondered whether there would be the potential for De Beers to identify contingency measures that could be undertaken should this happen at that site.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. I think as indicated in the environmental assessment, De Beers has already committed to operate the treatment plant until the water meets acceptable discharge criteria. For the most part, this water will be directed to the treatment plant, and that situation will continue.

**MR. BILL KLASSEN:** Yeah, Louie wants to get into this.

**MR. LOUIE AZZOLINI (MVEIRB):** Having the benefit, or... Louie/Azzolini here speaking. Having the benefit or experience the pain of all the first week and part of the second week, during the first week during the aquatics discussion, there was a discussion on the volume of water in the containment pond, and the volume of water to be treated everyday, and sort of the level of the capacity of the system to address waters issues. I'm curious if your analysis or your initial planning for the containment pond or the water treatment plant took into account the possibility of treating this water.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. Yes, this water was included in that design of the treatment plant.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini. Thank you very much.

**MR. BILL KLASSEN:** Okay. Perry.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. I guess I'm not necessarily requiring a comment on the water treatment plant. It is any seepage from, or water runoff, from the north pile, it is a small fraction of what's going to the water treatment plant. I don't know that that's necessarily a significant issue. And you certainly, like I say, have time, should it be that crazy, you know, to... I'm thinking more long-term, and I don't know that this is a... I don't think that I'm necessarily thinking of major things, but the way to address the issue may be to say, if it should happen, we've got all this in hand. We've got these kinds of steps there. And I only say that because there's something out there we don't understand, and it's not a bad time now to think about it and have ideas in hand. I think you've got the time, you've got the ability to monitor, you've got long-term management things that are there in place. I just want from a... there's something out there we don't understand. And that now's the time to address it, and maybe it's simple to address.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Two things I want to clarify. One was when Ken was discussing acid rock drainage or treatment, we need to be clear that the treatment plan isn't specifically... it's for the expected conditions, so you know, that... you know, I want to make that clear. In comparison with... that it's a primary method for a contingency of acid rock drainage, but your point is very well-taken, Perry, that we need to ensure that we have thought through contingencies for it. At this stage, we do not. We have not worked through that process, but as you pointed out, through the monitoring phase and through a process of adaptive management, we have the opportunity to implement the contingencies that are available to us.

**MR. BILL KLASSEN:** Thank you, Robin. Anymore on that one, Perry, or do you want to move on to the question you had about iron? What I have is iron and arsenic. I'm not sure whether that's enough shorthand.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. Just on the previous comment, it's just... it's an uncertainty I have and I don't think I would have done anything different in the analysis than what has been done. I just think that my recommendation would be that some sense of contingency should be thought through, even if there... just in foresight. I mean, it may never, ever be required, and I don't... that's where I'm coming from on that one.

The next issue, Ken was talking again about the iron levels in the process or the water coming off the north pile. Again, putting in context, when it gets to the water treatment plant, it's a small portion of the flow, but iron is usually the

mechanism for allowing arsenic to precipitate, and I noted that the thermodynamic equilibrium coming off that was conducted on the water to limit the water quality off the north pile assumes that arsenic will precipitate. It says by absorption. I'm wondering the mechanism assumed for arsenic precipitation in the absence of iron.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. The assignment of mass to the north pile, when we assign that mass, that mass for arsenic, I believe and for several other chemicals, the measured values in the kinetic test work were measured at, you know, about half... well, the mass assigned was about half the detection limit, so there is a large amount of conservatism built into using those mass loading numbers. And we don't... essentially, we looked at the particular values and the particular chemicals where there were mechanisms to... that could be used to reduce those numbers. If, for instance, we don't see the amount of iron that we've calculated with respect to the north pile, then we would also expect concurrently that there would be a reduction in the amount of arsenic that we would see. So when we calculate the values from the kinetic test results, if we see iron and we calculate the iron values from the kinetic test results and use those as a mechanism, in effect we're to some extent artificially increasing the values that we're using. If we don't see the iron, we don't expect to see the arsenic in solution either. I don't know if that answers your question, but...

**MR. BILL KLASSEN:** Before, well, Perry, respond to that if you want to, and then I see Louie has his hand up.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini here. I'd like to take advantage of the number of people with the expertise in the subject area that's being discussed here. And I don't mean to draw undue attention to the whole ARD issue and ask that potential acid coming through from the kimberlite, but you've mentioned the need for or has De Beers thought of contingencies. In your professional opinion, what would be a reasonable contingency? A technical response to a potential acid issue? Because contingency is very vague. I'd like to hear your perspective on that.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. The kinds of things that I would be looking at were I to stand in someone else's shoes might be looking at what kind of volume might come off and looking at some poor quality water, similar to Ekati just to get a scale of what kind of impacts might happen to that north arm. Real ballpark numbers, just because I'm not sure that it may or may not be a significant issue, even if this stuff does potentially produce poor quality water, and it's not expected to at this point. For contingencies, a possibility might be to increase the cover, such that that kimberlite is more thoroughly frozen. At this point, they're talking about a .5 metre

cover, so decreasing the amount of material that might be available to produce poor quality water over the long term. I hadn't actually really considered the treatment possibilities because it is a small flow coming from the north pile, but possibly again, some sort of assessment of using those numbers and looking at what kind of impact you might possibly have on treatment plants.

I mean, what's coming out of Ekati was unexpected, and I can't see, if that does happen, that would be worst case, so just getting kind of a scoping of what might be there, but I think from a contingency plan, long term, it might be increasing the cover.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini. Thank you.

**MR. BILL KLASSEN:** Tim, you want to get into this?

**MR. TIM BYERS (Yellowknives Dene):** Yeah, Tim Byers would also like to say thank you for that answer, because one of our questions that we forwarded to the board in one of our IRs was this very thing of contingency planning. From a technical response to a very non-technical response, what Yellowknives Dene are most interested in seeing in any contingency plan when it relates to poor quality water is containment and treatment, and it sounds like that is what you're telling us you're going to be doing, so I thank you.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for DIAND. I'm sure everybody recognizes, I'll state again, what Ken's done for prediction on the kimberlite is absolutely standard, and the predictions for it being alkaline are what I would have come up with as well. We just got this little twinge out there with Ekati that we don't understand, and therefore just covering that off in a general sense beforehand is what I'm suggesting here. It's a real big what if.

**MR. BILL KLASSEN:** Perry, do you have enough information or enough of a response on the iron and arsenic issue, or can we move on to the next one?

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for DIAND. I think I'd like a more specific response of the actual mechanism in the freak model that's being used for absorption, whether it is actually absorption or whether it is iron, co-precipitation, and that would be as detailed as I want. And other than that, I think I'm fine.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. The modeling was done by Sharon Ross in our Golder Seattle office, and I've spoken with her about it. And I can check my answer with her, but my understanding is that it was absorption onto the ferric iron, or whatever ferric iron would occur in that situation, so once it has become oxidized outside of the pile.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. That's sufficient information to... I don't know about address the concern, but clarify how they reached the numbers they did. I think I may take another look at the numbers that have come out of that model.

**MR. BILL KLASSEN:** Okay, thank you. I have a few more on my list for you, Perry. Something to do with mass loading on top two metres, and an order of magnitude reduction of... I'm not sure. You wanted a rationale for that particular aspect of it. Temperature and then my notes dwindle off.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. Thank you for those notes. They're keeping me right on track. The water quality modeling that was done on the north pile, as I understand it, simply takes a two-metre active layer and breaks it into several layers, and then takes the reactions from the kinetic tests and applies a temperature factor, so as it gets deeper in the two metres, it's colder, therefore the action rates reduced.

Having used those production assumptions, each of these layers in the two-metre active layer produces a mass load. And when the volume of material in that two metres was multiplied by that mass load, milligrams per kilogram per week, which comes out of the kinetic test, a significant load was produced. And as described in the documents, that load was reduced by an order of magnitude to get what were considered more realistic values. Now, this is often an issue in trying to take laboratory kinetic tests and apply them to a large field site. And it was explained in the documents that that was what this was addressing. From my point of view, the critical issues in scaling are often temperature, scaling from laboratory to field are often temperature and drain size. And temperature corrections had already been applied, and drain size doesn't necessarily apply significantly to paste, meaning the lab material is very similar to the material in the field. So I was wanting a slightly more detailed rationale for the factor of ten in the scaling, which reduced the load that was coming off the pile.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. There's two points that I can bring forward now and we can discuss the other ones, well, the other issues in more detail later, but the two points that come to mind with respect to scaling, from the field scale, the laboratory scale to the field scale, the rationale for that reduction was based on the experience of myself and other geochemists at Golder Associates. In addition, we have measured data for the run-off from the meta-volcanic rock from... in 1999, some bulk sample pits were installed, or were placed on a... to the west of the site... or, sorry, to the east of the site. And the meta-volcanic rock in that area is on surface. And that collection of the run-off and water from that location arrives at a single point. We looked at that water – there's kind of a seepage run-off point there – and the water that we find in that location is much, much lower than we would have

expected, given the mass loading rates observed in the kinetic tests in the laboratory. So in part, based on site data and in part based on our experiences at this and other sites that we applied that reduction factor.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for DIAND. That was a waste rock pile, so coarser material than used in your laboratory tests?

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. There was quite a range of grain size in that particular pile. It essentially was a lay down pad area, and there was quite a large amount of fines as well as coarse in that pile.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for DIAND. This may be an unfair question – if you had not reduced that by an order of magnitude, do you have a feeling for what solubility constraints would have been applied? Like, how close you were to upper levels on some of those, some of the parameters?

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. The solubility constraints that were applied were only for minerals that we could justify the mechanism for. If we would have increased the mass loadings for... by an order of magnitude, we would have only had those similar solubility constraints as were applied in the EA.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for DIAND. Do you think they would have come into play is what I'm asking?

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. I think I would be starting to stretch my speculation to get into a detailed discussion of that here.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. That's a fair answer. There's a number of layers that can take all these mass loadings up a bit, so I think one of the... one of my suggestions would be an opportunity to look at some of the assumptions in that model and maybe play a little bit with them with Golder. That would be one way of addressing some of the questions I have. I don't want to layer increased assumption on increased assumption on increased assumption to try to create something that's not realistic, but there are some assumptions it would be nice to play with to see what their impacts are.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. Just to follow up on some of those assumptions, and possibly address some of Chris' comments. The mass release, you know, we feel that although we're using freezing as our mechanism to reduce mass release, if freezing did not come into

play, if the pile was thawed, there would be other mechanisms that would limit the release of mass from the pile. With respect to reactions, that could be oxygen diffusion into the pile. It could be solubility constraints from the parameters that we have. It could be secondary mineral precipitation, so there's several mechanisms that we didn't look at in terms of the mass loading to the pile, because when we looked at the freezing mechanism, we didn't want to, as Perry said, pile assumption on assumption on assumption, so we went with the expected conditions.

Now, if we have mass release in the pile and we have freezing, which we've assumed now, we have a higher concentration and a lower volume migrating to the pile, so that's what was assessed in the current assessment.

To address Chris' concern, if the pile is unfrozen, we have a greater volume of seepage but the concentration in that seepage will be lower, so the mass that we have being released is essentially the same. And we can get into a more detailed discussion on what the exact mechanisms that we want to use in the model are, but we feel that the loading and the assessment that was used for seepage is appropriate whether we go into a discussion of chemical mechanisms or freezing mechanisms.

**MR. BILL KLASSEN:** Thank you. Are we on to the next one now? Go ahead.

**MS. PERRY MEHLING (DIAND):** Perry Mehling from DIAND. I believe my next question was on the selection of .3 percent sulfide for a cut-off for granite as being non-PAG. Could you clarify your selection of that value?

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates for De Beers again. I don't know and I have to check in the EA that we've stated that the value of 0.3 weight percent is hard and fast. You know, granite is a common construction material. If we look at common guidelines such as price or the DIAND guidelines, they suggest a cut-off of 0.3 weight percent. With the caveat that in low MP environments or where there's little neutralizing minerals, you have to look at that and where you expect to be in mineralized terrain, you have to look at those values in a little bit more detail. And we feel with respect to metal mining, where you're dealing with mineralized terrain, that it's appropriate to look at those values in significantly more detail. We're not looking at mineralized terrain here. We're looking at massive granite intrusions typical of what would be expected for construction rock in several other types of environments. The value of 0.3 was based partly on price, the price guidelines. But also, because we don't expect there to be a whole lot of sulfide here, we'll continue to monitor the amount of sulfide. De Beers will be monitoring the amount of sulfide in their construction rock. And should... well, they'll continue to monitor that value and I'm sure it will be looked at again if it is deemed to be problematic.



**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. I noted in the IR that you quoted the Price 1997, and I concur that Price raises that value, but very specifically says only where there are areas where there's carbonites, and granite doesn't contain an awful lot of carbonites.

I concur that you have a lot of granite that you can use for construction that has very low sulfur contents, but I do question the selection, or what I saw as the selection of 0.3 percent sulfide as a cut-off. I think it may possibly be lower than that. I haven't done calculations to address that, but the kinetic test results have been conducted on lower values than that. There's only two kinetic tests specifically on granite, and we're looking at similar material, I believe, at other diamond mines. What I would have considered in my past to be clean granite, but the cut-offs are lower than 0.3 percent sulfide. Diavik selected 0.04 percent sulfide. And I think that might be... I think that should be looked at, and I will look at that closer as well, but I don't believe that as a sufficiently conservative or well-considered cut-off. I don't believe it will affect your mine plans because you have numerous samples in the quarries that are very low in sulfur, but I don't believe – I'll make a comment. I don't believe that that cut-off has been sufficiently justified.

**MR. BILL KLASSEN:** Okay, did you want to respond to that, Ken, or if not, then we'll move on to your final concern, Perry. I think concentration impacts.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. I think this has been raised numerous times. I guess I don't particularly expect a response, but one of the as I understand it, one of the impacts that needs to be addressed is concentration impacts in that north arm on the near shore. And I believe that there's been a significant assessment on mass loading, but not necessarily concentrations in that area. And I don't know where to take that at this point. It's been raised a few times and possibly I guess I'll put it back to De Beers to see if they have an interest in addressing that.

**MR. BILL KLASSEN:** Okay, thank you, Perry. Did De Beers want to take that point up again?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. I think we'll just leave that for... add to the list for tomorrow.

**MR. BILL KLASSEN:** Thank you, Robin. Louie, before I go to Ann.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini with the review board. Just a bit of... this question is for clarification purposes. Perry, you mentioned about the east arm of Snap Lake and the effects of the cryoconcentration. Are you implying

or are you stating that you believe that water with the higher concentration or whatever it's got could move into the east arm of Snap Lake and affect it?

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. Not having been to the water quality session, going back on what has been discussed internally in our group, yes, I believe there's a potential for water to escape past those perimeter ditches and possibly have, and also higher concentrations and possibly have a more significant effect than has been considered to date, whether it is significant or not, I don't at this point have an opinion. But it has been raised as a potential consideration for impact assessment, that arm, specifically that portion of it, and I had sort of assumed that it would be raised last week. Then I think it's... it's a combination of the two issues, the cryoconcentration and some concern that those perimeter ditches may not be as effective in limiting run-off or capturing run-off and seepage as has been proposed.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Ken is going to make a point, but just one thing I wanted to clarify, Louie, that you referred to the east arm. It is actually the north arm of Snap Lake. Ken.

**MR. LOUIE AZZOLINI (MVEIRB):** I was thinking Great Slave Lake.

-- Laughter

**MR. BILL KLASSEN:** It's important to keep the geography where it is. Ann Wilson. Oh, sorry, Ken.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos with Golder Associates. I think with respect to...I can't comment on the aquatic effects to the north arm of Snap Lake. That's not my area. We did, however, provide Mark Digel, our aquatics guy, with values for seepage based on freezing up of the pile and mass loads that were predicted in that model. And as I pointed out earlier, if there's more unthawed portion of the pile, then the, you know, the concentrations may not be as high as we've given to Mark, so I think there's a balance and a trade-off there that can't be ignored.

**MR. BILL KLASSEN:** Chris Burn, you look like you want to say something.

**MR. CHRIS BURN (DIAND):** Chris Burn for Indian and Northern Affairs. I think the issue of cryoconcentration is one that is not completely resolved. The reason is that the rate of salt rejection from the ice phase depends on the freezing rate, so the increase in concentration depends in part upon how quickly the material freezes. Once the soil has frozen, or the PK has frozen, then the frozen portion is

relatively clean. The unfrozen portion close to the frozen portion is enriched in the expelled materials. The unfrozen portion some distance from the frozen portion is at its original concentration. So the part of the... the cryoconcentration and water quality of the effluent, if you like, from the north pile, is connected to the issue of how quickly this pile is going to freeze, if it is in fact going to freeze. The two things are also linked, because the salt concentration in the pore water influences the rate of freezing of that pore water. So it's actually quite difficult to say if they freeze so much, this is what's going to come out of the pile, because the two, that they're not linearly related. They're related in a non-linear fashion. So I think it's the first order estimate may be the kind of estimates that we've been providing, and that the board may consider is satisfactory at the environmental assessment level.

But when it comes down to a detailed assessment of what the nature of the seepage from the pile will be, then there will be requirement for some testing of this material itself. And in addition, there must be some linkage between the chemistry of the pile and the freezing rates of the pile. At the moment, the freezing rates of the pile, in my view, are not understood sufficiently to be able to add that second layer of analysis. Thank you.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. From a layman's point of view, when you make the comment, Chris, that there has to be a testing of this material, what do you mean? Do you mean that we have to wait until the starter cell is developed? So are you talking that volume, or are you talking much lower volumes? And... well, basically, what volume are you discussing?

**MR. CHRIS BURN (DIAND):** Chris Burn for Indian and Northern Affairs. The overhead that I've presented that provides the temperature on the X axis and the amount of freezing on the Y axis at present is an arbitrary assignment. A relatively straightforward laboratory test that is commonly conducted in many engineering labs will indicate the rate of freezing for the rate of temperature depression. That in turn will tell you something about the cryoconcentration. So the kind of information that I was hoping to receive from that IR is the result of one laboratory test that can be conducted in probably something like six days, or five days in the lab, maybe a week, but it's not... I'm not requesting at this point, nor would I wish to suggest to the board, that they defer their assessment of the environmental impact until the construction of the mine has begun.

If I may just try to reduce the puzzlement on Robin's face, what I'm saying is that a laboratory test conducted – a standard laboratory test to determine the unfrozen water content of this material could go a long way to resolving this issue, and in addition, a freezing test that determines the rejection of salt from dissolved materials from a sample, maybe of a cubic metre, something like that,

as the freezing progresses. This will tell us something about the cryoconcentration of that specific material. It will also tell us about the rates at which the dissolved materials migrate away from the frostbite.

**MR. BILL KLASSEN:** De Beers.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I guess... Chris, a couple of questions, and I guess I'm trying to determine the magnitude of this issue. And I think we're talking about some very complex processes here. And probably that, you know, you say it's going to go a long way, but it's not... doing some lab tests is going to go a long way, but it's not going to solve the issue. Probably, I mean, it appears to me that this is something like Perry was saying. You want to have some contingencies built into the operating plan, so it would appear to me that maybe the way that you deal with this is in the test cell, and you know, the first couple of years of operations gives you a good idea of what actually happens to this material, because I don't think we're going to resolve it in a lab doing that kind of test work. Is that a fair statement or...?

**MR. JOHN BRODY (DIAND):** John Brody. Something like that in principle would be reasonable, but I think from our perspective, what we would like to see is the hypothetical argument that says if it did happen, or you found these problems in the starter cell, what would you do about them? Is there a contingency that you could propose that if those problems were realized, that you could implement and satisfy us that there would not be adverse impacts?

**MR. JOHN MCCONNELL (De Beers Canada):** I'm sure there are, I just can't think of them right now. I think there are. I think there's some... and I'm loathe to even raise the idea, but things like liners so that you have 100 percent collection of anything that comes off the pile is a solution. Probably a fairly expensive solution, but it's a solution, and I'm sure there's other contingencies that are less costly that could be put in place before you reach that.

**MR. BILL KLASSEN:** Thank you, John McConnell from De Beers. Is there anything further on that point before we go on to the next concern or issue? Yes, John.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. Again, I guess I... you know, we want to make sure we understand all of these issues and the magnitude of the issue. And so I would suggest that these gentlemen, if they can fit it in, get together over the next couple of days for a little bit of one-on-one discussion, so that both sides fully understand the concerns, and that — you know, I don't know if we'll resolve them, but at least if we understand each other. Because I'm not getting from my side that we fully

understand Chris' concern, and I want to make sure we fully understand it so that we can deal with it as an issue.

**MR. BILL KLASSEN:** Hal's just reminding me that there is a room downstairs where these one-on-one discussions could take place, so Chris, I don't know whether... it depends, of course, on people's time availability outside of these discussions. Chris Burn.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. I think the...clearly this issue would benefit from further discussion. Clearly it seems that the modeling of the north pile was originally geothermal modeling of the north pile was originally intended for the purpose of determining what operational conditions would be in the north pile. We have a concern regarding whether the north pile is a frozen creature or an unfrozen creature, and the only information we had to examine that was the geothermal modeling. That's where our concern comes from. I'm sure that further discussion of this matter will be of assistance to both parties.

**MR. BILL KLASSEN:** In an effort to bring some resolution to this issue before we decide whether or not it has to be handed off to the board, is it likely that this further discussion can take place before these technical sessions wrap up on Friday? Chris is suggesting tonight. Is that... okay, thank you. John.

**MR. JOHN MCCONNELL (De Beers Canada):** Yeah, I guess, you know, we're open to people using our boardroom. I guess the only thing, commitment we've made in the past is that the groups that meet bring a report back to the greater group, so that the greater group understands what the discussions were and if any resolutions were reached.

**MR. BILL KLASSEN:** I agree that that's essential. Okay, I think that, then takes us... yes, John Ramsey.

**MR. JOHN RAMSEY (Natural Resources Canada):** John Ramsey from NRCAN. Bill, just an observation on my part with the process that we have here in the technical sessions, and the fact that there have been one-on-one – well, there are being proposed to have one-on-one discussion, breakout groups or breakout discussion, however you wish to term them. We've already experienced that with NRCAN's representatives here last week. And I'm just wondering in the total scheme of things, is there a possibility that there might be a compromise of the actual technical sessions themselves in the sense that these are really not on the public record, such as the system that we have in place right in this facility, and I'm wondering what – perhaps what your thoughts or what other people's thoughts are on the whole idea of one-on-ones or breakout discussions, when in fact there may be a compromise of the actual technical review when one thinks that they may not be on the public record per se, or only small elements of them

are on the public record at the end of the day with brief summaries that are brought back to the large group. I'd just like to get some views from people on how they feel about that matter.

**MR. BILL KLASSEN:** Thank you, John. Maybe I'll turn it over to Hal, since he's been instrumental in setting up this process.

**MR. HAL MILLS:** Well, I think a main comment – Hal Mills here – a main comment with respect to that is when we say one-on-one, I think that's just a loose description of getting down to a small group, but it's not exclusive. If you or other people want to join in that discussion, nobody's being barred from it, and as was mentioned, we are requiring or asking the groups to report back to the main session so that the results will be put on the record. Now, that doesn't completely meet what I hear you saying, but I'm not quite sure what the option would be.

**MR. LOUIE AZZOLINI (MVEIRB):** Louie Azzolini for the review board. Basically, there's been some concern about the flexibility of the process, and the board wants to ensure that there's flexibility. There's no problems. If one of the parties doesn't want to go, they don't go. If they both go, they both agree to what's put on the record.

**MR. BILL KLASSEN:** My impression, John, was that – it's Bill Klassen – my impression was that in part, those discussions were taking place because of the time line, the overall time line imposed on these discussions and there wasn't time to deal with certain issues in detail here, so this was just a more efficient use of everyone's time to have these smaller groups go and talk and then report back. Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. These one-on-ones have more likely been fifteen-on-seven, so they've been pretty wide-ranging groups, and they've been open to anybody who wants to come. Obviously, we haven't been advertising them three weeks in advance, but the De Beers boardroom, third floor of the Scotia Centre, will be open between six and eight p.m. tonight for anybody that wants to attend to pursue any of the discussions further. And like John said, the proviso to that is that notes are taken, people sign off on what was agreed on, what wasn't agreed on, that they agree upon the record of basically the meeting notes that go on the public registry. So De Beers thinks it's a valuable process that, given that there is a constant balancing between the detail that technical experts want and the ability to get through all the questions that people would like to address, I think it's a good adaptive management to the process.

**MR. BILL KLASSEN:** Okay, thank you. According to my list, we've got at least one, and possibly two items left. Ann Wilson on acid rock drainage, iron and so on.

**MS. ANN WILSON (Environment Canada):** Ann Wilson, Environment Canada. I think my concerns have largely been addressed. Thanks, Perry, for your questions and the clarifications from De Beers. I do agree and expect that we will get surprises from the kimberlite seepage. I do feel also that the configuration of your starter pond is going to allow testing of that early enough to manage it, and I was trying to think ahead of the consequences of what we might see, and the main parameters that are going to be coming out are collectible and treatable, as you have the perimeter ditch in place, at least we expect 90 percent of it.

One thing I'm wondering is in the case of the closure configuration. I know that kimberlite is going to be used for construction of the outside berms. Is any of it going to be on the downstream side of it or is all of it going to be on the inside and non-PAG rock on the outside as well? And if so, how far will that impinge on the... will the collection ditches still be in place at that point?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. For some sections of the external berms, the TK will be used for constructing a large segment of that, so there will only be the half-metre of granite over top of that. And you had a question on the ditch. Could you clarify that for me, please?

**MS. ANN WILSON (Environment Canada):** Ann Wilson, Environment Canada. I'm just envisioning that if you have the outside berm of PK and then you subsequently have to cover it with a certain amount of granite, then the ditch which is right below that will be filled in to some degree, or will that be done very late in the stage? I mean, at a certain point, you're going to have weathering of the external surface of the kimberlite and other materials in the berm. And is that going to wait until you have acceptable water quality coming off of that before you finish your cover?

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates. The ditches in the water collection system and the water treatment plant stays in place until the water quality is confirmed. So if there's modifications required to the cover and we've got this long period of about 15 years where we're monitoring the starter cell cover, and then... so we can adjust the design as we go, I believe there will be sufficient room between the toe of the embankment and the ditch that we could have some minor amount of cover material put on that. We're not looking at re-sloping those. They're already at a three-to-one slope, which is fairly flat.

**MS. ANN WILSON (Environment Canada):** Ann Wilson, Environment Canada. Okay, with that, I'll just say thank you. I don't have any issues to leave on the table at this time.

**MR. BILL KLASSEN:** Thank you, Ann. It's been suggested to me, Janet, that you may have a question on adaptive management?

**MS. JANET HUTCHISON (NSMA):** Janet, NSMA. No, I don't have any specific questions. I was just looking forward to the discussion.

**MR. BILL KLASSEN:** Okay, thank you very much. Go ahead.

**MR. HAL MILLS:** Okay, I think the only thing left for the afternoon is to go around the room quickly and get people's responses. In a couple of cases, I think it's pretty clear what they are going to be, but we'll have them say it anyway for the record. So this is where we get you to respond to the issue that you raised, the answers that you received, and to tell us whether you feel it's still an issue, or whether you're satisfied with the answers and it's been resolved or not. Ann.

**MS. ANN WILSON (Environment Canada):** Ann Wilson, Environment Canada. I noticed that on the afternoon's agenda, climate change was to be talked about and we haven't touched on that explicitly. Is that going to be carried over until tomorrow?

**MR. HAL MILLS:** It was only raised with respect to the thermal model, and all of those things were open for you to list issues that you wanted to raise. If you want to carry it over, just let us know and we'll make sure something is included tomorrow. Sharon.

**MS. SHARON SMITH (Natural Resources Canada):** Yeah, Sharon Smith here from NRCAN. I had brought that up when we discussed the thermal modeling and whether the climate factors they were using to drive the model were appropriate, so that's I guess where that came from today, just to clarify that.

**MR. HAL MILLS:** Yeah, Ann is looking at the items listed on the agenda, and we don't necessarily follow those. It's just dependent on whether or not people identify the fact that I've got an issue related to that, that I want to have it discussed.

**MS. ANN WILSON (Environment Canada):** Ann Wilson, Environment Canada. Just my only comment would be that it's come out very clearly this afternoon that it doesn't matter whether the pile is in a frozen or an unfrozen state as far as stability goes, and I think the other aspects of ...(inaudible)... are continuing to be addressed, so I'll just leave it at that.



**MR. HAL MILLS:** Okay. Thank you. Then once again, we'll have a quick go around the room in terms of the issues that were raised, as your response or comments on them. Chris on the thermal modeling.

**MR. CHRIS BURN (DIAND):** Chris Burn for DIAND. On the thermal modeling, I would say that I'm looking forward to a discussion in the next few hours. On the issue of climate change, I would state that, given the crudeness of the thermal model as it is constructed at the moment, the climate change predictions, any climate change predictions for the evolution of the north pile must be regarded with some skepticism.

**MR. HAL MILLS:** Okay, thank you. Mark, you also had comments or concerns on the thermal model?

**MR. MARK WATSON (EBA):** Mark Watson, EBA for Gartner Lee. I still believe that the thermal model is fairly coarse, but from a geotechnical and stability of the north pile perspective, most of my issues were clarified. Thanks.

**MR. HAL MILLS:** Thank you. Sharon, with respect to the climate data on the model and the removal of organic materials.

**MS. SHARON SMITH (Natural Resources Canada):** Sharon Smith here from NRCAN. Yeah, I still do have some concerns about the thermal modeling as a whole, and it's not just the climate drivers but the, you know, there's been three or four issues raised with the thermal model, so I think that's still quite an unresolved issue.

Yeah, this may be something that we can just bring up more tomorrow, the overall impact on the permafrost regime, I think we need that as well.

**MR. HAL MILLS:** Okay, thank you, Sharon. Hal Mills speaking. Then over to Perry in terms of the, I guess it was five different issues that you raised with respect to acid rock drainage. Cover them individually if you wish, or collectively if you wish.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. Regarding contingencies for the unlikely occurrence of the kimberlite acting inappropriately, I guess I made my recommendations. I would hope to see a response from De Beers to, in terms of proposing, or discussing contingencies, potential contingencies to address those. Regarding the arsenic and iron issue, I think that's been resolved. I'm going to go away, not right away, but and re-look at some of the arsenic values. I don't think it's a significant issue but I do want to think about that one.

In regard to the rationale for reducing the mass load by an order of magnitude, I want to consider that response in connection of with a number of other assumptions that have been made, and ideally would have an opportunity to work through some of those with the model and Ken himself.

Regarding the sulfide cut-off of 0.3 for granite, I don't think that that's been resolved.

And the issue of potential concentration impacts on the north arm of Snap Lake, I think that falls out of the thermal model, so it's sort of still on the table. I certainly have a much better idea of what, things I was uncertain about before. Excellent presentations. And I also think that there is a lot of latitude for what we're calling adaptive management, an excellent ability in the mine design that's been presented in dealing with the north pile and resolving issues as they go along, as long as we have an idea of what might come along and be thinking about how they might be addressed before they actually occur.

**MR. HAL MILLS:** Okay, thank you. Ann, did you want to say anything?

**MS. ANN WILSON (Environment Canada):** Ann Wilson, Environment Canada. No, I think it's just all been said, thanks.

**MR. HAL MILLS:** Okay, thank you. And Chris, you also made the statement that the issue of cryoconcentration is not completely resolved. You've already put that on the record, I guess.

**MR. CHRIS BURN (DIAND):** Yes, I am looking forward to discussing that this evening.

**MR. HAL MILLS:** Robin, a comment.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. An outstanding issue is it would be helpful if we could have an understanding of how many people are likely to show up tonight, recognizing that it's non-binding. If you get a hot date in the meantime...

**MR. HAL MILLS:** I take it this has to do with the number of pizzas that you're going to order?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Essentially.

**MR. HAL MILLS:** Could we have a show of hands for the people who are... that may attend this evening? Nobody from NRCAN? We're trying to get an indication as to who's coming to the session this evening.

**MR. JOHN RAMSEY (Natural Resources Canada):** It's under consideration.

**MR. HAL MILLS:** Okay. Tim, a comment.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers. One housekeeping detail. I'm wondering if it's at all possible for De Beers if they could have some handouts prepared for the rest of the presentations. I know you're kind of constructing the presentations as you go each evening, and I guess Robin and I discussed this very early on in the sessions last week, but if it's at all possible for you fellas to prepare handouts of your presentations beforehand, so we can have something to look at as we're listening to you. I'm not sure if the translators are here, if that would even help the translators if they have something in hand beforehand, but something that, if it's possible, we wouldn't mind seeing. Thanks.

**MR. HAL MILLS:** I think that Robin has that I'll-take-that-under-advisement-look in his face.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Let's make it clear. I think at this stage, Tim, we can't commit to that. I'm sorry, as much as we'd like to.

**MR. HAL MILLS:** Robin, Hal Mills speaking. I believe you have earlier made a commitment that copies of those would eventually be made available as handouts that will be given back to people. Is that correct?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. The electronic files, the presentations, are emailed on a daily basis to the MVEIRB for submission to the public record.

**MR. HAL MILLS:** Okay, thank you. I have one reminder with respect to the agenda for tomorrow. On day one, one of the topics on the agenda was production rates, and because some of the experts on that, Tony King being at least one of them, not being available on day one, it was agreed to put those on the agenda for immediately after the lunch break tomorrow. So just a reminder that we will be including production rates in the discussion for tomorrow afternoon.

And if nobody else has any particular comments or concerns at this point, thank you for your cooperation today and we'll see you here at nine o'clock in the morning.

-- ADJOURNMENT

**MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD****De Beers Snap Lake Technical Sessions****December 4, 2002****Yellowknife, Northwest Territories**

**MR. HAL MILLS:** Okay, welcome back. We probably essentially have the same cast of characters or faces in the room as yesterday, but we have been following the process of starting each morning with a round of introductions. I think we will continue just in case some people have problems with short-term memory loss or whatever. My name is Hal Mills, I am with GeoNorth, and one of the facilitators.

**MR. BILL KLASSEN:** Bill Klassen, one of the facilitators as well.

**MR. PAUL BOUCHER (Lutselk'e):** Paul Boucher, from Lutselk'e Wildlife.

**MR. CHRIS BURN (DIAND):** Chris Burn, representing Indian and Northern Affairs.

**MS. PERRY MEHLING (Mehling Environmental Management):** Perry Mehling, Mailon Environmental Management, representing Indian and Northern Affairs.

Comment:

**MR. JOHN BRODY (DIAND):** John Brodie, Brodie Consulting, on behalf of DIAND.

**MS. SHARON SMITH (Natural Resources Canada):** Sharon Smith from Natural Resources Canada.

**MR. JOHN RAMSEY (Natural Resources Canada):** John Ramsey from Natural Resources Canada.

**MR. DAVE BALINT (Fisheries & Oceans):** Dave Balint, Fisheries & Oceans.

**MR. TONY KING (Gartner Lee):** Tony Keane, mining consultant with Gartner Lee, for the Board.

**MR. MARK WATSON (EBA):** Mark Watson with EBA for Gartner Lee.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone.

**MR. TERRY ELDRIDGE (Golder Associates):** Terry Eldridge, Golder Associates, for De Beers Canada.

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**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, De Beers Canada.

**MR. GREG ORYALL (AMEC):** Grey Oryall, AMEC.

**MR. MARK HEALY (Golder Associates):** Mark Healey, Golder Associates, representing De Beers.

**MR. RICK SCHRYER (Golder Associates):** Rick Schryer, Golder Associates, representing De Beers.

**MS. SANDY MARKHAM (Golder Associates):** Sandra Markham, Golder Associates, representing De Beers.

**MR. MARTIN RAWLINGS (Golder Associates):** Martin Rawlings, Golder Associates, representing De Beers.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, De Beers Canada,

**MS. LISA BEST (GeoNorth):** Lisa Best, GeoNorth.

**MR. LOUIE AZZOLINI (Review Board):** Louie Azzolini with the Review Board.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers, consultant to the Yellowknives Dene Land & Environment Committee.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Rachel Crapeau, Yellowknives Dene First Nation, and Environment Committee Chair.

**MR. LIONEL MARCINKOSKI (GNWT):** Lionel Marcinkoski, GNWT EPS.

**MR. ANGUS MARTIN (Yellowknives Dene):** Angus Martin, Yellowknives Dene First Nation.

**MR. FRASER FAIRMAN (DIAND):** Fraser Fairman, Indian and Northern Affairs.

**MR. KEN DEVOS (Golder Associates):** Ken DeVos, Golder Associates, for De Beers.

**MR. BUDDY WILLIAMS (DIAND):** Buddy Williams, Land Administration, DIAND.

**MS. MARJORIE FRASER (DIAND):** Marjorie Fraser, Land Administration, DIAND.

**MS. GLENDA FRATTON (Gartner Lee):** Glenda Fratton, Gartner Lee.

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**MR. DON HALEY (EBA Engineering):** Don Haley with EBA Engineering, representing De Beers.

**(UNIDENTIFIED MALE SPEAKER):** (inaudible) Dettah.

**(UNIDENTIFIED MALE SPEAKER):** (inaudible) Dettah.

**MR. MORRIS MARTIN (Dettah):** Morris Martin, Dettah First Nation.

**MR. TIM SANGRIS (Dettah):** Tim Sangris, Dettah First Nation.

**MR. HAL MILLS:** Okay, thanks to everyone. A few quick housekeeping items. Your head sets are not in plastic this morning, but I am assured that they have been cleaned if anyone might have a concern. Louie has left a pile of gizmos here, I am not sure what the proper name might be. For those who are interested, this gizmo is essentially an extension between a lap top and a phone line, in case you need a little extra distance to send it all, and retracts into a nice little package. I think it works something like a vacuum cord, it's retractable. You can pick those up at coffee break or you can rush up here at the head table right now and grab them as you wish.

Secondly, Louie has produced two copies only I believe of all the presentations to date, so those of you who have an urgent need to get the copies of the presentations, the PowerPoint presentations that have been used to date, there are two copies of each of them here.

Okay in terms of recapping the technical session, you were all here yesterday so I am not going to do that. We talked about a number of things related to the north pile, worked through quite a few things I think fairly satisfactorily, had a lot of outstanding questions with respect to the geothermal modeling; and you guys had a session last night and as part of that it was agreed that you would report back to us today on essentially what happened there. Is someone prepared to do that?

**MR. GREG ORYALL (AMEC):** Last night in the De Beers boardroom we held a break-out session to discuss further the north pile geo-technical and thermal modeling issues. Attendees were: John Brodie, Chris Burn and Perry Mehling, all representing DIAND; Mark Watson of EBA for Gartner Lee and the Board; Don Haley of EBA representing De Beers; Terry Eldridge and Ken DeVos both of Golder Associates representing De Beers; myself Greg Oryall of AMEC representing De Beers as facilitator and Colleen English of De Beers as the note recorder.

As we did last week, Colleen made some good notes from the meeting and we are currently passing these around to the attendees just for their corrections and comments, and then these notes will be submitted for the record.

In general we discussed issues associated with cryo concentration, the amount of water that might be expected to be held within the north pile system, and whether more or less water is an issue in the north pile management; freezing rates and whether or not it is an issue if the north pile freezes slower than expected. Generally most of the discussion focused on the expected efficiency of the collection system during its collection system; it is likely to be by-passed, is it likely to be effective and so what, is there likely to be any significant impact to the north arm of Snap Lake as a result of that performance.

To summarize the meeting in general, I would say that there was a very good discussion and I think everybody came away with a better understanding of everybody's viewpoints and work that had been done. I think there was general consensus that the design is reasonably robust and that the concept of starting initially in the north pile with the starter cell removed from the lake for the first couple of years gives us an opportunity to learn more about construction methods and techniques that might work and gives us the time to implement and incorporate those into the design of the remaining north pile.

I think I will leave it at that. I don't believe that there were any issues that I would say were resolved, but I think we talked a lot of them down and understood maybe some of the finer points to carry forward. I would invite anyone that was there if you would like to make additional comment.

**MR. HAL MILLS:** Yes and in particular from people who were raising the issues related to this, if you have any comments to add right now as to how well that addressed the issues that you had please.

**MR. JOHN BRODY (DIAND):** Yes, as Greg summarized that was a reasonable summary. I would like to add that one element of the discussion went on to the potential need for a contingency or a modification of the dish design and that was accepted as worthy of consideration by the company.

**MR. HAL MILLS:** Thanks, and I had a quick look at the quite detailed notes that Colleen prepared, and they certainly looked to cover a fair number of things, so that should be valuable.

Okay in terms of today's agenda then, this morning we will have a presentation and that will deal with permafrost, which will be the topic of discussion for the balance of the morning, obviously focusing on not just the north pile but on other aspects of the project and infrastructure related to it with respect to permafrost.

This afternoon there will be a separate presentation dealing with reclamation, closure, revegetation, things of that nature. Then we will have those issues on the table for discussion this afternoon.

I had mentioned yesterday that, or reminded people, that we had agreed to put production rates on right after lunch today. I have had the suggestion just in terms of the balance of time it might be more appropriate to try to work that into the morning discussion, but I will simply leave that for now and see how the morning discussion goes as to whether we seem to have time to discuss production rates there as well.

I wouldn't mind if perhaps during coffee break if somebody could tip me off with respect to production rates as to what is going to be involved in this discussion and how much time it might take. At this point I don't know if we are talking of a five minute time slot or an hour time slot. With that, any questions about the agenda for today or comments? Tim.

**MR. TIM BYERS (Yellowknives Dene):** Hal, I am wondering, I do have one question on accidents on -- the possibility of spills or accidents on the winter road. I am wondering where in the agenda, either today or in the future days, I can bring that up.

**MR. HAL MILLS:** Just my own thoughts on that, the winter road -- I am not sure if you are talking about the main Lupin road or just the side road -- but as part of the infrastructure of the mine we will be discussing that in terms of permafrost today. That might be the right time to jump in with your question. With that, I will turn things over to De Beers to make their morning presentation.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Hal, We have a short presentation on permafrost this morning. I guess in terms of production rates, I would suggest talk to Tony Keane at the coffee break because I think we delayed it from last week to fit his schedule. He seems to be the guy that has the issue there.

I also wanted to remind people that we have arranged to have a presentation on our environmental management system and registration to ISO 14,001 over the lunch period. Also this afternoon on the agenda we have a presentation on air quality and discussions around air quality on site.

With that I will turn it over to Terry Eldridge of Golder Associates to make his short presentation on permafrost.

**MR. TERRY ELDRIDGE (Golder Associates):** A brief presentation this morning on permafrost, specifically discussing the impact of the project on the ground



thermal regime. We had quite extensive discussions yesterday on the north pile, so today we are focusing on the mine, the other infrastructure on the site, the water management pond and the esker corridor development.

This topic was addressed in the environmental assessment report in section 10.2 and the appendix 3.1. The map showing the project just to reorient yourselves. Snap Lake extends around the peninsula, you have the north pile off to the west, process facilities, the mine portal is here, the water management pond, off to the west we have the airstrip and to the south there is the esker.

In terms of the thermal setting, as we discussed yesterday we are in an arctic permafrost environment. The mean annual temperature is about minus 8 degrees Celsius. A low precipitation area, 370 millimeters a year. Very relevant for this project is a thin layer of soil over bedrock, and the bedrock is typically ice-free.

Assessment of the impacts are based on a literature review looking at the impacts of similar activities on other sites, looking at the specifics of the geological characteristics at Snap Lake and our observation that massive ground ice was only encountered in their organic soils in limited areas.

The mine itself, as this portal was driven starting in 2000 through frozen bedrock that portal has been in existence for just over two years now. We have seen no negative impacts from ground temperature changes in the portal or in the underground workings. The rock is very competent and flowing very well at the moment.

For the mine itself there is local warming of the rock around the active workings and nearer the portal. We have not seen any impacts on the openings that have been there for two years now. There is no ice in this rock. It is competent and there will be no long-term impact from changes in the ground regime.

Fairly extensive infrastructure will be developed for the project, process plant, lay-down areas, camp, always using conventional arctic construction practices. Heated facilities are being placed on cuts in bedrock, some of them will be on granular fills but on bedrock. We did drilling with chill brine and ground penetrating radar in the area of the process plant and the facilities and we are not able to identify significant ground ice with either of those techniques.

The road and airstrip will be granular fills placed on other bedrock and mineral soils. There is one area on the airstrip which crosses a bog which has deep organic deposits and ice -- deep meaning an order of three plus meters.

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In terms of operation of the loads and the airstrip, there will be some minor changes in the ground thermal regime. We expect that the permafrost may invade up into some of the deeper fills, but generally when they are on stable changes in ground temperature do not impact the facilities. There is some maintenance that De Beers will have to do on the airstrip where they cross the ice rich materials, but in the long term there will be no impacts from these changes in the ground thermal regime.

The water management pond -- the dams will be raised to increase the pond capacity. That is the main point. So we potentially have a larger warmed area. Raising dam 1 from the south end and dam 2 on the north end to provide additional capacity.

Although the dams will be raised, typically the pond won't be operated at high levels. The idea of the water management pond is to provide a storage area for spring runoff. If there is more water coming out of the mine for a short period than the water treatment plant can handle then we use the water management pond, otherwise the pond is maintained at as low a level as possible so we have the storage capacity available for future events.

So we have higher dams but generally water levels will be no higher, or probably lower than we see today. These dams don't rely on frozen conditions to control seepage. The dams are designed with a cut-off to bedrock, a line around them as a primary control of seepage. We have bedrock foundations for them, during operations. In closure, the idea is to reclaim these, recontour and bring the water levels back to natural water lake levels.

In the long term there will be no changes to the ground thermal regime, or small changes, and during operation we are not operating these ponds in a way that will significantly change the temperature conditions in the ground.

For the water management pond, the first one is that we are not relying on these frozen conditions for containment. Impacts are short term and we will be restoring that area to near pre-development conditions on closure.

The last area I am discussing is the esker. The esker is an area where they have obtained fine granular aggregates for construction. This was accessed previously and has been reclaimed, left in a stable condition. We understand that that has been satisfactorily reclaimed. The esker itself is about nine kilometers south of the project site. Here is Snap Lake so it's accessed by a winter road.

In terms of planning for development of the quarry, there maybe a need for obtaining some fine aggregates during the construction period. As well there might be some other periods during the mine life when we need to obtain small

amounts of fine aggregate for construction, otherwise the esker will not be accessed routinely throughout the mine life. It will just be periodic access during winter.

More on the ground ice. We haven't done detailed work on quantifying the amount of ground ice, but we know there is some there, but it is small in relation to the volume of the esker itself. Each time the esker is accessed it will be reclaimed to provide a stable surface and maximize runoff (we don't want ponding on the esker) and minimize melting of ground ice.

The esker will be monitored over the period of the mine life to see if there are any negative impacts from the way the ground has been left each time we have accessed it, and it will be remediated at that time.

That concludes the brief presentation on those facilities and the impacts on the permafrost.

**MR. HAL MILLS:** Once again I would like you to hold any questions you might have on issues, but do you have any questions related to the presentation itself? Velma.

**MS. VELMA STERNBERG (DIAND):** Velma Sternberg, Indian and Northern Affairs, Mineral Development. Could you please define mineral soil.

**MR. TERRY ELDRIDGE (Golder Associates):** Velma, could you say again. You asked for a definition of...

**MS. VELMA STERNBERG (DIAND):** The term "mineral soil".

**MR. TERRY ELDRIDGE (Golder Associates):** Mineral soils are naturally occurring materials, could be the silt, sand, gravels, anything with a mineral constituent, so we are eliminating the peats and the bog-type materials.

**MS. VELMA STERNBERG (DIAND):** I am just wondering which horizons. I don't want to get into a lot of detail, but I was curious as to why you called it mineral soil as opposed to just soil, and I was wondering which soil horizons would this mineral soil comprise please.

**MR. TERRY ELDRIDGE (Golder Associates):** You mean in terms of A, B and C horizons?

**MS. VELMA STERNBERG (DIAND):** Yes.

**MR. TERRY ELDRIDGE (Golder Associates):** I guess up here that would be all three. We are just trying to identify that soils with organic matter potentially have

uses for reclamation and we want to handle those separately from soils with non-organic matter. Does that answer your question?

**MS. VELMA STERNBERG (DIAND):** I am satisfied with that answer. I just had one other question with regard to -- you said you had been working on delineating the ground ice in the esker -- and I was just curious as to what quantifying methods you used please.

**MR. TERRY ELDRIDGE (Golder Associates):** We have not done detailed work on defining the amount of ground ice.

**MS. VELMA STERNBERG (DIAND):** Okay.

**MR. HAL MILLS:** Chris.

**MR. CHRIS BURN (DIAND):** I wonder if you could define for us the term "ice free bedrock".

**MR. TERRY ELDRIDGE (Golder Associates):** These are low water content rocks. They are very competent and very poor water, so there is no visible ice in them, is what we are using on that, Chris.

**MR. CHRIS BURN (DIAND):** The bedrock in the mine site area then, as far as you are concerned, contains no fractures which might be filled with ice at depth. Is that correct?

**MR. TERRY ELDRIDGE (Golder Associates):** That is correct at depth, yes.

**MR. CHRIS BURN (DIAND):** Depth in this case, for the clarification of the hearing, is below eight meters which is the active layer in the bedrock, so the understanding of De Beers is that there are no fractures that are I guess deeper than eight meters that contain ground ice, which is different from what we thought might be the case beneath the north pile yesterday, but I think the main issue here is not the ice wedges from your presentation, Terry, I think what you are trying to talk about is the thaw consolidation characteristics of the bedrock, which effectively does not consolidate at all when it is thawed Is that right?

**MR. TERRY ELDRIDGE (Golder Associates):** That is correct. There is no changes in the performance of the rock, whether it is below zero degrees or above zero degrees.

**MR. HAL MILLS:** Thank you. Sharon.

**MS. SHARON SMITH (Natural Resources Canada):** It's okay, I was just going to ask about the fractures as well, but Chris beat me to it.

**MR. HAL MILLS:** Tim.

**MR. TIM BYERS (Yellowknives Dene):** I am wondering, Terry, if you could be more specific as to the monitoring plans for the esker. You said that there would be monitoring for any negative impacts on the esker after each time it is accessed. Is that correct?

**MR. TERRY ELDRIDGE (Golder Associates):** Yes, that is correct.

**MR. TIM BYERS (Yellowknives Dene):** Okay, I am pleased to hear that. I guess I am looking for more specifics as to what is going to be monitored. Are we talking strictly the abiotic, that is the non-biological aspects of the esker. In other words, the esker land form and the integrity of the land form, or are we also including impacts on any wildlife use or wildlife habitat on the esker in that monitoring plan?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Tim, the focus certainly of Terry's discussion was on the mass of ground ice in the esker, and so monitoring appropriate to that. The balance would really be addressed through reclamation in terms of the recontouring, etc., that would be done there, but at this stage we do not have any plans for detailed wildlife use surveys of that area.

**MR. HAL MILLS:** Over to you.

**MR. LIONEL MARCINKOSKI (GNWT):** Terry, a lot of the presentations had sketches showing the footprint of the De Beers' site. Is the infrastructure, the road and the esker part of the footprint? It wasn't indicated on the previous plans. What kind of total hectares are we talking about?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Can you just repeat your question again, Lionel?

**MR. LIONEL MARCINKOSKI (GNWT):** On various presentations, this one and others, you indicated the footprint was predominantly the peninsula, the Snap Lake area and the mining activity, but the esker and the road corridor to the esker was not included. Can you give us some kind of idea as to what kind of acreage or hectares this is comprised of.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The 550 hectares basically covers the lease area, so that is the area that we have indicated on the diagrams before which includes the northwest peninsula, a couple of small blotches on the north shore of the lake around the vent raises, the general area around the airstrip and the extended area which covers the area between the west boundary of the north pile and beyond the explosives storage. That is the 550 hectares. That doesn't include the land portions of the winter road...

-- Portion not recorded

**MR. DAVE BALINT (Fisheries and Oceans):** You mentioned in your presentation that dams one and two would be raised, that you would be adding more to increase the height of the dam. Could you perhaps tell me in the period of time for the project when this would occur and when this would occur as far as seasonal effects?

**MR. TERRY ALDRIDGE (Golder Associates):** Those dams we would raise during the construction period. It will be summer construction work.

**MR. DAVE BALINT (Fisheries and Oceans):** Would this occur as soon as the project is given approval? Also while you have the mic, would you please indicate how far along the road this would also occur?

**MR. JOHN MCCONNELL (De Beers Canada):** I will answer the first part. I guess you can't say that it will begin as soon as the project is permitted, because as Terry indicated that work would occur during the summer. If the permit was permitted in October it wouldn't be carried out until the following summer, but it would be the first summer of construction. I think we need a little clarification on your second question.

**MR. DAVE BALINT (Fisheries and Oceans):** A little bit of clarification for the second question is that these dams are used as roads at the present time. Are you just going to increase the area near the road where the water is located at the present time, or will this also extend further than just at that one location?

**MR. JOHN MCCONNELL (De Beers Canada):** I am still not totally clear on your question, but the main access road to the airport right now is along dam two, which is the northern most dam. The road, as part of the development of the site, the access road to the airport will be relocated to the dam one, or the southern most dam. I don't know if that clarifies it for you, Dave.

**MR. LOUIE AZZOLINI (MVEIRB):** Dave, as yesterday I am jumping in probably where I shouldn't, but as evidenced by the fact that your questions aren't being answered by the person who made the presentation, I am not sure if you are asking questions related to the presentation or whether you are getting into other issues.

**MR. DAVE BALINT (Fisheries and Oceans):** I don't think it is really an issue, its just the existing road is at a certain height. If the dam is raised to increase capacity then that may also influence the height of the road at other locations. Just one other question I have, and that is, what would be your projected capacity increases to the water?

**MR. JOHN MCCONNELL (De Beers Canada):** We are at right now about 130,000 cubic metres. When we raise the two dams we go up to, I think we discussed that last week, about 250,000 cubic metres. I can clarify that from the EA.

**MR. HAL MILLS:** Thanks. I believe Rachel indicated that she had a question.

**MR. JOHN MCCONNELL (De Beers Canada):** Hal, can I just comment a little bit further there to the issue that I think Dave was getting at? The width will be increased, because we are raising the dam, the width of that structure will be increased. That road will be higher than it is now. But that is over that southern dam will be a length of 150 metres. That is just off the top of my head, we can certainly look at a map later, Dave, to provide you with the census data.

**MR. HAL MILLS:** Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** You had a picture up there that showed the winter roads and the other road to where you are going to be getting the gravel. Could we see that? This is related to my next question. Isadore had a question regarding the esker. Isadore, (Translation not available). The line down at the bottom, can you explain what it is? Yes, that one.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Rachel, that line is a major esker system to the south of Snap Lake, so that is the existing esker system.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** And how far is that from the site?

**MR. ROBIN JOHNSTONE (De Beers Canada):** It is 11 kilometres south.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** So the place where you are going to be getting the gravel from the esker is quite a ways outside of the footprint?

**MR. ROBIN JOHNSTONE (De Beers Canada):** That is correct. It is 11 kilometres south and will be accessed three or four times during the life of the mine.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** In that case then, are you going to need a permit for the road so that you can gain access to the esker?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Yes, we require permits for that and permission to remove the granular resource at the esker. This is the

esker that we have already removed material from for the construction program, the advanced exploration program.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Isadore's worry was that you would need a lot of the esker material. How much are you going to be needing for your construction phase or for building roads, whatever you need the material for?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Rachel, perhaps if you could give us a few minutes and we can come back to the question with the answer. We have the quantity of the material in the environmental assessment, we don't remember the number off the top of our heads, so we are just going to check that to provide you with the right information.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Okay, that is fine. I will talk to Isadore and see what else he wanted to ask.

**MR. HAL MILLS:** Thank you. Mark.

**MR. MARK WATSON (Gartner Lee):** You indicated in your presentation that there was no impact on the permafrost from the underground mining. Is that correct? What I was curious about was -- first of all, is that correct?

**MR. TERRY ELDRIDGE (Golder Associates):** That is correct.

**MR. MARK WATSON (Gartner Lee):** Just curious of what kind of mining influences you might see as the drifts extend from under the unfrozen ground beneath the lake into the continuous permafrost, I believe it is on the north side into the continuous permafrost. There is some -- have you given that some consideration?

**MR. TERRY ELDRIDGE (Golder Associates):** I am not clear on the question, Mark.

**MR. MARK WATSON (Gartner Lee):** There is a certain amount of heat and so on generated during the mining activities, and the drifts extend from unfrozen ground beneath the lake into frozen rock beneath the permanent onland permafrost. I am wondering if you had any sense of how much temporary thermal influence there was from the mining activities.

**MR. TERRY ELDRIDGE (Golder Associates):** Mark, we have not done any modeling on that aspect, but we are (inaudible) on that side which have no change in performance, whether they are thawed or frozen; above zero or below zero, so we haven't focused on that issue as having an impact on the changes.



**MR. MARK WATSON (Gartner Lee):** I guess it wouldn't so much influence your predictions of strength as much as seepage through the unfrozen around some of the drifts.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Mark, can I clarify? Are you talking about the (inaudible) or are you talking about the drifts and the upper levels of the mine?

**MR. MARK WATSON (Gartner Lee):** Sir, I believe I have to right terminology. The drifts they extend laterally from the main shaft out towards -- or it is directing the kimberlite. Is that the right term?

**MR. JOHN MCCONNELL (De Beers Canada):** The ground under the lake is not in permafrost, so the mining won't have an effect on that. And when we move under the north shore of Snap Lake with the mining work below the level of permafrost. So the mining activities won't ever be in the permafrost except the access ramp and raises for ventilation.

**MR. HAL MILLS:** As a number of you are trying to do, I would like to move to listing of and discussion of issues. Chris has one last question on the presentation. Greig, do you want in first?

**MR. GREG ORYALL (AMEC):** I have an answer to Rachel's question about the esker quantities. In the environmental assessment in section 3.7.3 identified that the total amount of sand quarried from the esker during construction is estimated at about 25,000 cubic metres and during operations it is anticipated that about 13,000 cubic metres of sand may be required on another three or four occasions over the mine life.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I can just add to that too. The disturbed area of esker is estimated to be 0.5 hectares. To put that in perspective on a regional basis, within the regional study area, the area of 31 kilometres around the minesite, there is a total of 552 hectares of esker. So we will be disturbing 0.5 out of the 552 that occurs.

**MR. HAL MILLS:** Thanks for that information. Back to Chris.

**MR. CHRIS BURN (DIAND):** It is correct that the company has not delineated the ground ice conditions in the esker? Is that correct?

**MR. ROBIN JOHNSTONE (De Beers Canada):** That is correct.

**MR. CHRIS BURN (DIAND):** I would just point out to the hearing that there is a lot of publication regarding ground ice conditions in the eskers at the Ekati site. I point out that Diavik anticipated a certain amount of ground ice in their eskers

and they encountered more than they anticipated. Therefore, the assumption that there is very little ground ice in the esker is an assumption which the field evidence from other projects in the region suggests is not a conservative assumption.

Therefore I wonder if the company has an estimate of the range of areas that might be impacted on the esker from a minimum of 0.5 esker to a potential maximum, whether that would be twice the size, whether that would be four times the size -- what is the range of potential area that would be impacted by the activities?

**MR. ROBIN JOHNSTONE (De Beers Canada):** We hadn't estimated that, Chris.

**MR. HAL MILLS:** Okay. I will turn things over to Bill now and he will lead you through drawing up a list of issues you wanted to discuss during the balance of the morning.

**MR. BILL KLASSEN:** As has been the practice, we will go around the room and see what the issues are related to the topic of permafrost and aggregates and so on that people would like to discuss. I would like people to identify what the issues are that they feel need some further discussion. Sharon.

**MS. SHARON SMITH (Natural Resources Canada):** I have a few issues. Some of them we have touched on with various people asking different questions, but I will just try and group them together here. I have an issue concerning the mass of ice in the esker. Also I would like to discuss a bit about the current distribution of **towats** and permafrost thickness. And also related to that, **towats** around the water management pond and what the impact of the pond is on the permafrost regime there. And also the impact of the infrastructure and the other facilities. The final one would be the winter road and its operation. I think that is pretty much all I have on my list here.

**MR. BILL KLASSEN:** Sharon, could you repeat the third one? I didn't catch that.

**MS. SHARON SMITH (Natural Resources Canada):** Okay, so you have the current distribution of the towats, that one?

**MR. BILL KLASSEN:** The one after that.

**MS. SHARON SMITH (Natural Resources Canada):** The water management pond?

**MR. BILL KLASSEN:** Yes.

**MS. SHARON SMITH (Natural Resources Canada):** The towats around that and also the impacts of the pond on the ground thermal regime.

**MR. BILL KLASSEN:** Thank you. Next issue. Chris Burn.

**MR. CHRIS BURN (DIAND):** I don't know if this is the correct place to raise this issue, because it is partly an abandonment and reclamation issue, but the issue of the permafrost aggregation into the pond. The water treatment pond at the termination of mine life. It may be that this isn't the right place to discuss this.

**MR. BILL KLASSEN:** I appreciate the point, Chris, but I think it would be more appropriately discussed this afternoon when we are dealing with site reclamation. So if you could just hold that one.

**MR. CHRIS BURN (DIAND):** That is fine.

**MR. BILL KLASSEN:** Are there other issues that need to be discussed further on this topic? Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Our concern about the esker is that most eskers are used by the caribou. You look at the caribou trails, caribou travel on the eskers. If they are going to be using the trail from the esker and they are going to be changing the size and the shape of that esker for the caribou to walk on, and they are going to be taking a chunk out of that esker it is going to divert the caribou to go in a different direction from how it used to travel.

We were wondering if they can explain how they are going to be taking materials out of the esker so that -- we are just kind of wondering if the trail could still be protected so the caribou can still use it. That is my question.

**MR. BILL KLASSEN:** Thank you Rachel. We will discuss that in turn. Are there other issues? We will just wait for another moment to see if anyone is collecting their thoughts on this, and then if not we will have the coffee break and then discuss the issues. Not to prolong this, it looks as if there are not any burning issues right now so we will take a 15-minute coffee break and then when we return we will start with -- Rachel has one more item.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** With my question, could we get measurement in feet so that we can understand in our heads exactly how big the size is going to be? Because 25,000 cubic metres makes us think it is going to be a huge chunk of dirt being taken out when maybe in fact it might be small. Thank you.

**MR. BILL KLASSEN:** Thank you for asking that Rachel. I still think in those kinds of measures too, so it would help me also. If De Beers can provide us with a conversion from cubic metres to cubic yards and hectares to distances in square feet or in acres that may help. Thank you. A 15-minute coffee break.

--- Break

**MR. BILL KLASSEN:** Just before we get started on the issues, during the break John Ramsey from NRCan approached Hal and me about an opportunity to read into the record an issue related to water that somehow did not make it during the water discussions, so there won't be any opportunity for discussion or resolution of it but we have agreed that NRCan can read this item into the record and then he will be providing a release of the copy of it as well. John.

**MR. JOHN RAMSEY (Natural Resources Canada):** Thank you very much, Bill. Yes this matter relates to the water treatment process and its lime treatment plan for the metal removal; the issue being water treatment process of filtration for the removal of suspended solids appears adequate. The proponent also noted that the addition of a high density sludge treatment plant be necessary depending on metal concentration of effluents. The lime treatment produces hydroxide sludge that will require a disposal site or a co-disposal option. There is no mention of management of generated lime sludge. In addition, the leachability of generated sludge should be examined for long-term storage.

This is considered an issue because large amounts of lime sludge may be generated depending on the metal and suspended solids in effluent. Disposal and stability of sludges should be considered in the planning steps. Thank you very much.

**MR. BILL KLASSEN:** Thank you, John. Does De Beers want to comment on that briefly? John.

**MR. JOHN MCCONNELL (De Beers Canada):** I think it is unfortunate that NRCan is attending these hearings in a hit and miss fashion because that issue certainly could have been dealt with last week under the water treatment discussions when the appropriate experts were here to discuss it.

**MR. JOHN RAMSEY (Natural Resources Canada):** With all due respect to De Beers, our particular expert is involved in a number of presentations and workshops and has actually not been in the office for close to three weeks as it stands right now, and so it is just a question of division of duties; and other matters have actually prevented the actual attendance of that particular expert at these proceedings.

**MR. BILL KLASSEN:** Thank you. We will move to the issues that we have as a result of today's agenda, and we will start with Sharon Smith regarding the mass of ice in eskers.

**MS. SHARON SMITH (Natural Resources Canada):** I think we have already established through the questions that took place earlier this morning that De Beers did not carry out any field studies to assess whether or not a mass of ice was present in the esker. I think we are correct in assuming that now. I am just curious to know why -- I know there were two bore holes drilled there -- there was no GPR surveys done or something along those lines, given that at Diavik and BHP there was a mass of ice in the same types of sediments and that has been well documented. Also in reading the report done by Golder Associates there were photographs of sink holes that are attributed to the melt out of mass of ice, so there was mass of ice in that area. There is a good possibility there is still mass of ice so I guess my first question is, why was there no attempt to try and quantify the amount that may be out there and then use that as a basis of your estimates of how much of that esker you might disturb and what may be the effects of that disturbance.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess from our work in the past the area we have affected has been very small, but I think it is probably a good suggestion that prior to any future work being done some ground penetrating radar be used to detect any large ice lenses in the esker. I guess we are making that commitment that we would do that before any future work on the esker site.

**MS. SHARON SMITH (Natural Resources Canada):** Thanks very much.

**MR. BILL KLASSEN:** Sharon, do you want to continue. Is that all you have on that particular point?

**MS. SHARON SMITH (Natural Resources Canada):** Yes, I think I just wanted to raise the point that there is likely mass of ice out there. I think as well as doing the GPR surveys then you have to take that into account when you are calculating this volumes of material you may in fact have to remove and that there will be melting of the ice and subsidence of the ground and so forth, and that is going to have to be considered I think in your reclamation plans and so forth as well. That is my other comment related to that, I think.

**MR. BILL KLASSEN:** Okay, thank you, Sharon. The next issue, I believe, was something to do with the distribution of tallics and the permafrost thickness.

**MS. SHARON SMITH (Natural Resources Canada):** It seems to me that, in reading the reports, there have been some assumptions made as to how thick

the permafrost is, the size of these tallics, the lakes that these tallics may actually be under and there is a sort of a rule of thumb type of approach used to quantifying that. The groundwater people were here last week, but the distribution of tallics in permafrost does have an effect on the groundwater regime as well.

I take it then there was no attempt to do any kind of thermal modeling to dimensional thermal modeling to try to get a better handle on what the permafrost thickness may be and how these tallics may be distributed under the lakes?

**MR. TERRY ELDRIDGE (Golder Associates):** There has not been any regional 2D modeling done on the thermal regime. In the north lake program that was carried out this year, they have installed some thermometers in deeper holes to measure the thickness of the permafrost remote from the Snap Lake. There are thermometers near Snap Lake which give us estimates for the bottom of the permafrost, so there is some understanding of the thickness of the permafrost away from the influence of the lakes and near the lakes, but there has not been any 2D or 3D modeling done on that.

**MS. SHARON SMITH (Natural Resources Canada):** I guess my concern would be that you only really have, I think, in the north lakes area one bore hole that actually penetrates the permafrost, so you are sort of basing everything more or less on these two bore holes. You do have a lot of lakes there and it's not just the particular size of one lake that influences whether you have a tallic. It is if you put all these lakes together, then the influence of all of them together, so it is not just as simple as saying that is a small lake, that is a big lake, this has a tallic, this one doesn't.

**MR. BILL KLASSEN:** Sharon, if I could interject, not being at all expert in this area, I'm not sure of the nature of the concern. How does this translate into something that might have a negative effect on the environment?

**MS. SHARON SMITH (Natural Resources Canada):** Part of the reason I'm bringing it up is that it is important for the groundwater modeling part of it, which I know was discussed last week, so that is why I thought I would just mention it here because it is a permafrost issue but it has implications for other things, and also in the area of Snap Lake for some of the runoff and seepage issues as well. It is more of a groundwater issue than a permafrost issue.

**MR. BILL KLASSEN:** I'm not sure how to ask De Beers to respond to that. Also not having been here last week I'm not sure of the connection to that discussion. I'm struggling. Louie, can you help me out.

**MR. LOUIE AZZOLINI (Review Board):** Having attended the previous session but not being an expert on any of the topics that I have participated in, a question that I may be able to derive from your statement is, if you don't know what the tallics are around water bodies and you have two bore holes from which to determine the relationship of the tallics to the water bodies, and the depth of the permafrost, how does De Beers know where the water is moving from Snap Lake or from the mine workings, once they are closed, away from there? If you don't know, what is the risk of being wrong?

**MR. BILL KLASSEN:** Is that a fair summation?

**MS. SHARON SMITH (Natural Resources Canada):** Yes. It is more a question of how certain are you that those tallics that you have decided are there are the only connections between the lakes and the deeper groundwater, and how important is it if you are not right? I guess that is why I am bringing it up.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess I still don't really understand your question in terms of what Louie said and what you have said. Louie is asking about long-term effects. I get the impression that you are talking about short-term effects during the operation. Maybe you could clarify that for me.

**MS. SHARON SMITH (Natural Resources Canada):** We are talking about the long-term effects. I am agreeing with what Louie is saying. How certain are you that you have that part right, the distribution of the permafrost and the tallics, and how it influences the movement of groundwater from the mine workings in Snap Lake and so forth?

**MR. JOHN MCCONNELL (De Beers Canada):** I guess it comes back to the issue that has come up a number of times of, when do you have enough data and when do you take the data you have and use your professional judgment and experience to make a decision? I guess our consultants and staff feel we have enough data and we have made the correct decisions. I guess it is up to others to disagree or agree with that and make recommendations to the Board if they feel that the data is inadequate to make those decisions.

**MR. LOUIE AZZOLINI (Review Board):** Susan, I am not sure if this will alleviate or address some of your concerns, but what ultimately came up last week is that there were two general hypotheses with regard to groundwater movement. One is that because of Snap Lake being a head water lake, it would essentially be the highest point of land pushing down on the earth -- the first hypothesis is that water would permeate deep into the ground flow system and by-pass some of the adjacent water bodies and would probably be dispersed or would essentially become equalized with its surrounding environment underneath

in the rock and would come out somewhere much further down and around the general area.

The second hypothesis is that -- and this is the hypothesis advanced by De Beers and it was a conservative hypothesis -- all the groundwater emanating from the workings of the Snap Lake diamond mine would go to the northeast lake. Based on the modeling and the work that they did, which they presented, there was a general agreement that even if all the groundwater from the mine workings was to report to the northeast lake that the effects would not be of concern.

I hear what you are saying in terms of the amount of knowledge necessary to predict where the water is moving, but with the model that they provided in terms of their impact prediction of the water moving underground and what it could do to the environment, the participants generally agreed that if there was a long range transport of groundwater the effects of any unusual concentrations would be mitigated over the long term transport; and that if all the water was transported to the northeast lake that even the concentrations of the elements in that water would not impact that lake in any way. I hope that bit of context helps.

**MS. SHARON SMITH (Natural Resources Canada):** Yes, thank you. I don't want to get into a discussion about groundwater. I was just bringing up the fact that -- just trying to get a better handle on the permafrost distribution in that area and some of the concerns I had about that. We will leave that point for now.

**MR. BILL KLASSEN:** Thank you, Sharon. Before we do leave it though, was there anyone else that had something to contribute to this? Chris.

**MR. CHRIS BURN (DIAND):** I would just point out that when DIAND was conducting its review of the materials, the assumption that DIAND was working with was that the ground beneath the lakes is unfrozen on a permanent basis. It is in what we call a tallic. DIAND also assumed that the ground beneath the land surface contains permafrost. The thickness of permafrost was estimated from the bore hole logs, which we were presented with in the information requests and which we were presented with from the hydro-geological program. In the hydro-geological program the thickness of permafrost was about 225 meters. In the bore hole 30, which is a bore hole at the mine site, the thickness is less than that, but the bore hole only goes to 85 meters, and at 85 meters the temperature is about minus 1.7. So we know the permafrost is deeper than 85 meters. We had to extrapolate that estimate and we again arrived at an estimate of between 150 and 200 meters.

In our understanding the tallic configuration could be estimated readily from the information that was provided, but it is true that there was no delineation of the



tallic configuration by modeling or by other means in the documents that were presented.

**MR. BILL KLASSEN:** Thank you, Chris. Can we move then to your third issue, Sharon, having to do with tallics around the water management pond?

**MS. SHARON SMITH (Natural Resources Canada):** Maybe you could clarify a couple of things concerning the water management pond for me. In your presentation you had mentioned that the dams do not depend -- that the water containment does not depend on the flows and conditions. In reading through the reports, I notice that you describe that there is a tallic, I believe, that the dam sits on and there is a tallic at the south end of the water management pond. Again it was unclear to me what the vertical or lateral extent of that tallic was, and there was a comment made as to should there be any warming or thawing of the ground beneath that dam, there could be seepage occurring.

You seem to be saying two different things. You say that it doesn't depend on the frozen condition but on the other hand you are saying that if things warm up we may get seepage from the pond.

**MR. TERRY ELDRIDGE (Golder Associates):** I can't recall off-hand what the thickness of the tallic there. I think it was in the order of 13 meters from the ground surface that we had thawed conditions in that area. I would have to go back into the information and confirm that. That pond and those dams have been there for about two years now if I remember correctly, and there has just been a recent report issued that discussed the performance and the information presented. I just did a brief review of it before I came here and there has not been a change in the thermal conditions in the area of the dam for the previous two years. We have very stable conditions.

In terms of the design of the dam, we have a liner down to the bedrock, and the bedrock is a competent material, it is fairly tight, so the permanent building is going to increase if it thaws because we have more pour space. So there will be some incremental seepage as warming of the bedrock occurs, but we are already getting some seepage through there that we have seen and that has been incorporated into the water quality model and the water quality predictions in that there would be some seepage through there.

I seem to be wandering on the question, but we are not relying on that frozen condition. There is a liner tied into the bedrock which is a conventional warm climate thawed condition construction technique. If there is warming of the bedrock, the dam is stable, it is sitting on a foundation. We have incorporated the seepage into the water quality model and used that in the impact assessment.

**MS. SHARON SMITH (Natural Resources Canada):** Thank you. Is there any thawing around the water management pond itself, or seepage from the pond because of any thawing of the underlying material?

**MR. ROBIN JOHNSTONE (De Beers Canada):** To my knowledge, there has been no observation of seepage. I think it would be inappropriate for us to comment any more until we have reread that report. We have a report that discusses the performance of the dam to date, but we don't have the details on it.

**MS. SHARON SMITH (Natural Resources Canada):** That is fine, thanks.

**MR. LOUIE AZZOLINI (Review Board):** Is the tallic of the water management pond and the tallic of Snap Lake -- they overlap? Is that correct?

**MR. TERRY ELDRIDGE (Golder Associates):** In the north and south areas we see permafrost at I think about 13 meter depths, so the tallic from the water management pond doesn't connect to the deep tallic under Snap Lake. There is a shallow connection, but not a deep connection.

**MR. LOUIE AZZOLINI (Review Board):** Based on your thermal modeling, will the two tallics at any time connect?

**MR. TERRY ELDRIDGE (Golder Associates):** We did not do thermal modeling on that aspect.

**MR. LOUIE AZZOLINI (Review Board):** Based on whatever analysis you have conducted, will they ever connect?

**MR. TERRY ELDRIDGE (Golder Associates):** We are going to raise those dams to provide additional storage capacity. The pond will typically be maintained as low as possible to provide future storage in the event of future water requirements. We won't be significantly raising that pond for periods of time above what is there naturally, so we would not expect the tallic to develop significantly beyond what it is now.

**MS. SHARON SMITH (Natural Resources Canada):** Actually you answered my next question about the size of that tallic and whether you expected any further increase in it, so thanks you got ahead of me again there.

**MR. BILL KLASSEN:** Sharon, can I just interrupt for a moment. Dave, did you want...

**MR. DAVE BALINT (Fisheries & Oceans):** Just a related question to tallics and the discussion of the lakes, the extent of tallics underneath I think it was the north lakes one to four. Is there a distance that you get away, and this is related to the

water management pond. Is there a distance away from the large lakes where the tallics are non existent? There is supposed to be no tallic below the lakes in the north lakes area one to four, so there is no interchange with groundwater. How far or what is that distance, and how does that relate to the water management pond?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Dave, I don't quite understand your question in terms of any linkage between the north lakes and the water management pond. Can you just elaborate on your question please?

**MR. DAVE BALINT (Fisheries & Oceans):** In the north lakes area no tallics (I think it is north lakes one to four) were to exist. Therefore there is no exchange. We don't have to worry about those lakes. I am just wondering, in relation to this assumption that is made, how this would relate to the water management pond. Is there a distance that as I go from Snap Lake or a large lake where there are no tallics underneath those smaller lakes?

**MR. TERRY ELDRIDGE (Golder Associates):** There will a distance and it will be specific for each lake that you are dealing with; the width of the lake, the depth of the lake, how far that tallic extends under the shoreline. In terms of the water management pond we know that there is a piece of thawed ground between the pond and Snap Lake, and we have accounted for that in the water quality model.

**MR. JOHN MCCONNELL (De Beers Canada):** Maybe Chris can confirm this. I think there is always going to be a small tallic below the lakes. I think what was said last week is that the tallics aren't deep enough to link up with the flow of groundwater at depth. Essentially permafrost extending fully underneath those lakes, but there would obviously be a small tallic there.

**MR. CHRIS BURN (DIAND):** The depth and configuration of the unfrozen ground beneath the lake depends on about four variables and all of these are characterized to some extent in the material that we have been presented with. The variables are: the temperature of the permafrost surrounding the lake; the geothermal gradient (the temperature distribution of the permafrost with depth); the temperature at the bottom of the lake (which describes the disturbance that the lake makes to the permafrost) and then (and this is in many ways the most important) is the width of the lake; that is the amount of disturbance at the ground surface.

With those four pieces of information we can estimate the thickness of the tallics; that is the unfrozen ground beneath the lakes; that is the depth. And we can estimate also the shape and we can determine whether the tallics are what we

call through-tallics -- that is they connect with the unfrozen ground at depth -- or whether they are confined by permafrost.

I have not done those calculations for these specific lakes, so I cannot tell you specifically that for these lakes there is not a through-tallic. But for lakes of similar size -- not in the Snap Lake area but in other regions of Canada -- the calculations indicate that the tallics beneath the lakes are confined. That is, they don't connect with the permafrost at depth.

Now as I say, for these particular lakes I have not made the calculation. The calculation is very straightforward and I can give to whoever wants a reference that will enable them to complete the calculation with a minimum of delay.

**MR. BILL KLASSEN:** Thank you, Chris. Tim Byers.

**MR. TIM BYERS (Yellowknives Dene):** Just to make myself fully clear, because this was also something the Yellowknives Dene brought up and we received a response from De Beers stating that specifically the lakes NL-5 and NL-6 are not wide enough to have a tallic that would connect with deep groundwater.

I am looking roughly at the map, it looks like these lakes are probably about 50 metres wide. So does that seem to be a valid assumption then, based on your knowledge and what you have just stated?

**MR. CHRIS BURN (DIAND):** Characteristically, the width of a lake as you have pointed out and as I indicated before is the most variable condition. The temperature at the bottom of the lake doesn't vary very much from lake to lake on an annual basis. It is the width of the lake that is really the key issue. For lakes of that size and where the permafrost thickness is about 200 metres which is the case in this area, in general -- but again, I say for these lakes I have not made that calculation -- in general there is not a through tallic. But for these specific ones, I have not made the calculation. I just want that to be clear.

**MR. BILL KLASSEN:** Thank you for that clarification. Sharon, the second part of your third question had to do with the water management pond's impact on the thermal regime. Were you indicating that as a result of earlier discussion that has been taken care of?

**MS. SHARON SMITH (Natural Resources Canada):** Yes, I had asked that question about the impact on the thermal regime and potential seepage so that has been dealt with.

**MR. BILL KLASSEN:** Your fourth item had to do with the winter road.

**MS. SHARON SMITH (Natural Resources Canada):** I actually had one more in-between there just about the impact of the infrastructure. I just have a couple other questions related to the impact of the mine and the infrastructure on the permafrost. During your presentation you had mentioned that there is some organic material in the area where the airstrip is going to be expanded. Did I hear you correctly when you said that you were just going to put fill on top of that organic material? Is that what you are intending to do?

**MR. TERRY ELDRIDGE (Golder Associates):** At this stage in the engineering that is what we are proposing, just to advance a fill across that area.

**MS. SHARON SMITH (Natural Resources Canada):** So from my understanding of all your reports, that is the one area where you may have some fairly high ice content in that organic soil, so are you prepared to deal with the settlement that may occur there and have to keep building up the fill to deal with that?

**MR. TERRY ELDRIDGE (Golder Associates):** Yes. It will be an ongoing maintenance issue until it stabilizes.

**MS. SHARON SMITH (Natural Resources Canada):** A couple more questions. I had a few questions about the impact of the mine itself. I understand that the warming near the mine opening or the ventilation raises -- because you don't see any mass of ice there that is not a problem, at least a structural or integrity problem. I just wonder from a seepage point of view, have you considered once thawing does occur and you do start to get some seepage, that that movement of the water may in fact enhance the warming that occurs? And is that seepage of any importance? The increased seepage that you may get?

**MR. TERRY ELDRIDGE (Golder Associates):** That was addressed last week I understand in the seepage and water quality sessions. In terms of is the seepage important, the vent raises an area removed from the lake so we have limited recharge into the area. The main driver is Snap Lake and that is connected through thawed rock directly to the working. So if you look at the impact, very small increment of seepage added from any thawing around the vent raises versus the seepage that is already reporting into the mine workings from very extensive areas under Snap Lake of thawed ground.

**MS. SHARON SMITH (Natural Resources Canada):** Thank you. That is that one.

**MR. BILL KLASSEN:** Okay, Sharon, are we at the winter road issue then?

**MS. SHARON SMITH (Natural Resources Canada):** Yes. So the last point...

**MR. BILL KLASSEN:** Sharon, could I just interrupt. Chris, did you have a comment on this last item?

**MR. CHRIS BURN (DIAND):** I just had a clarification of some of the material I have given on request from the company regarding the tallics and I apologize. In all of those calculations, the assumption is that the lakes have been there for a very long time. I think that the water management pond was built into a preexisting pond. So the assumption in all of those variables that I indicated to you, they all depend on the lakes having been there for a very long time, which I think is the case in your area. I am sorry to interrupt.

**MR. BILL KLASSEN:** Thank you for that clarification. Sorry Sharon. Please continue.

**MS. SHARON SMITH (Natural Resources Canada):** Just a last issue that I wanted to bring up is the operational window for the winter road. From what I understand over the next few years you are going to have the heaviest traffic going up that road. From what I understand, there were some calculations done on how many days the road is likely to be open. My question has to do with the climate data that was used to make those calculations. There were trends, taking the entire record from Yellowknife and working out a trend for that. If you look at the data, in fact you find that in the early part of that record from 1940 to 1970 there has been very little change in air temperature, so there is no trend at all there. As you get into the 70s, 80s and 90s there is actually an increase in air temperature over time and it happens at an increasing rate.

We know through the last ten years or so we have had some of the warmest years on record. I guess my question is, has that been taken into account in trying to work out what that operational window might be? And I know that you are only interested in up to 2010 is the time period, but even past that I would assume that you would still need that winter road to be operational. Is the operational window, if you consider those climatic factors and the more recent warming trends, is there going to be a problem with the road not being open long enough?

**MR. JOHN MCCONNELL (De Beers Canada):** Certainly we require the winter road open past 2010. We need the winter road open annually for the life of the mine for resupply of consumables. I am not sure whether it will help answer your question or not, but we do have a presentation that we could ask Don Haley to give. Don has been very much involved with the winter road joint venture in terms of analyzing both weather data and ice data to make analysis of the capacity of the road moving forward. So if it is of general interest to the forum we could make that presentation now. It is probably about ten minutes, or we could just answer your question directly. I think it might give everybody a little more background.

**MR. BILL KLASSEN:** Thank you, John. Let me ask whether there is that interest. I think at this point in the agenda we have the time and it also may help address some of the concerns that Tim Byers had about spills and so on. I would like to bring that into the discussion. So if people are generally interested then we will have that. Seeing no vigorous opposition to it, we will have the presentation on the road then.

**MR. JOHN MCCONNELL (De Beers Canada):** I will just quickly introduce Don Haley. Don is a geotechnical engineer with EBA and Associates. As I said, he has spent a lot of time in the last couple of years working for the Tibbet and Contoyto Lake joint venture in analyzing trends and what he sees as the ongoing operation of the winter road. So over to you, Don.

**MR. DON HALEY (EBA):** Thank you, John. My name is Don Haley. EBA undertook to prepare a project description for the overall Tibbet to Contoyto winter road a couple of years ago for the joint venture that operates the road. The purpose of that project description, and I will hold it up here, was really to prepare for a renewal for the license and occupation for that road. That is a public document and I think it is even available on the Mackenzie Valley Land and Water Board website.

The information in that document is information that has been used by De Beers for preparation of their environmental impact assessment, dealing with questions pertaining to the future of the winter road, how the winter road is operated. So I am really here as EBA, as one of the authors of this document. That is the document from which the information that Sharon quoted in her question has come from in our estimate of what is a reasonable operating window for the winter road came initially from that document. That is a little bit of background.

We have been studying the winter road and its effects, environmental and engineering issues associated with it now for some time, for the Tibbet to Contoyto joint venture which is really the joint venture of Echo Bay, BHP Billiton Diamonds and Diavik who together in the joint venture operate and manage the winter road.

The first slide is right out of this report and it is a little bit old. There have been some changes since then. What it shows is when we prepared our report a traffic projection of what is going to happen to the road, and you can see that this road has been in operation for some 20 years and we had fairly low traffic volumes during the years preceding the diamond mining industry finding the NWT. It was really traffic that was used to feed Lupin back in these areas pre-1995.

Then, when the diamond mining industry started we saw a huge increase in traffic volume, and the last two years of operation we see about 8,000 truckloads.

Typically about half of that is fuel being carried by tankers and B-Train configurations. What we have done here is in our project description we have projected into the future by canvassing all of the projects that we felt were real or probable in the next -- we were looking actually 20 to 30 years into the future, in order to come up with how much traffic would the winter road likely see. Then we drew a line across here and said that we peak at about 12,000 loads, so we have to be prepared at some time in the future for this road to move from -- it has gone from 4,000 to 8,000 and it has to go, at some time in the future, to about 12,000 loads.

There is a little bit of background in the nature of the road that is predominately over lake ice. Eighty-five percent of the route is over lake ice and there are some 65 portages that the trucks have to cross to go from one lake to the other.

When we started that, we asked ourselves a question. This is going back years ago now, what is a reasonable estimate of operating window in the winter time that we can put forward for planning purposes. We started -- what I plotted here is that since the beginning of the road, this black line actually represents the number of days in those particular years that the road has physically been in operation. That is from the opening date to the closing date, how many days of operation. That is shown in here.

What we have shown in red is the climate. Basically these are the mean annual air temperatures taken from the Yellowknife station and we were just looking here to see what sort of climatic correlation there might be between a number of operating days and the climate. This was an early start. It became quite evident to us that in the early days, that is pre-1995 before Ekati there wasn't really any correlation. Here you can see we have low operating days happening in winters that are very cold. The reason for that is that the road was demand-driven. There was really Echo Bay at that time and they could open up the road, get all of their supplies in and close the road. They weren't really limited by climate as long as they did it within some operating window so they would close it when they finished with it, not when the climate forced them to close it.

So we identified that going forward the last few years when we started looking at our operating window, it is really only the last six or seven years from 1995 on that we can say that there is a reasonable -- it is a reasonable assumption to say that the road duration that year is really climate driven. So that was our underlying hypothesis going ahead.

We looked at all of the operating days for the road going right back to 1983. There is a complete listing of them. We noticed that publication in some of the media reports, what they do is that they get this data and they do an arithmetic average and they say that the average utilization for the road each year is 67



days. Well, we didn't like that. It doesn't stand really much scientific or technical scrutiny, even for a non-scientific operation like the winter road.

So we felt we had to do something better than that. So what was being said at the time is that Echo Bay had actually published a report in 1997 that said you can really count on the road for only 57 days. The arithmetic average which we had seen in some of the media reports was 67 days, but our study suggests that a reasonable planning number is 78 days. I will walk you through some of the logic as to why our number is bigger than some of these other numbers, and in the process will hopefully address Sharon's question. At least she will have a clear understanding then of what we have done and perhaps some of the limitations of it.

So the next thing we did is we looked at climate variability is a fact, let alone the warming trends that we hear about. Climate varies dramatically year upon year. So we looked at the statistical number of operating days relative to a parameter that we called the air freezing index. This is a parameter that is used by civil engineers to predict roughly frost penetration into the ground. What it is is an accumulation over the winter each day of how many degrees that day we had of subfreezing temperatures. So today, for example, if it is minus 15 out and it stayed minus 15, that would be 15 degrees added to the cumulative degree days. This is a parameter that really measures the severity of the winter and it is a parameter that determines for us how soon the road opens, because the opening of the road is really driven by how quickly the ice forms and how soon they can get their equipment on the ice in order to clear the snow and how soon that they can get the trucks loaded, the fuel trucks down the road. That is a function of ice thickness.

This actually looked at probabilistically, that for average conditions, our first analysis said that based on current climatic conditions, not taking into account any climate trend, we should be able to count on 84 days doing a statistical analysis. But in a one in a hundred warm year it would fall to 60 days, and a one in five cold year, for example, we might even get 93 days. Now this range actually fit the operating window that we had measured quite well from that statistical analysis.

However, when we factored in the climate warming effect we said we really can't put forward 84 days, 78 days is the number we wanted to move forward with. I will explain the rationale for that. That is the number that Sharon has seen and commented on.

If we back up and look at the average annual temperatures for the weather stations, the top line is annual temperatures for Yellowknife for which we have a very long record. Sixty years of record at Yellowknife, it is a great record and

pretty nice to work with. This is the Contoyto record at the bottom. You can see it is quite a bit colder at Contoyto, like minus 10 versus minus 5, so these are the opposite extremes of the road. You can see that there is quite a difference.

The road really, climatically, is more driven by the south end which would be better represented by the Yellowknife data set. When we start to look at this monthly each year there is 12 dots on this figure. We start plotting it out and the first thing that really hits you is that there are some very wild swings in climatic information and climatic data over the past 60 years. Some very warm winters, some very cold winters. What we are looking for when we start to ferret out some of these trends, if we are looking at climate warming we are looking for a very, very small signal in a lot of background noise. That is all I want to show you on this diagram that there are huge oscillations here for which we are trying to pick out a very small signal.

This trend, we have shown the computer generated equation here, but this trend for Yellowknife is typically about 0.3 degrees of warming per decade which is a pretty substantial warming trend. That is using the whole data set.

Then we went back and we said, okay -- and Sharon is right, if you look at the data you can see there has actually been a bit of a break point about 20 to 30 years ago where we actually see a bit of a shift. So if you look only at the last 30 years we got a somewhat different trend. A little bit steeper warming trend. So we looked at it both ways. The whole data set and just the last 30 years.

We also looked at it then, the parameter of interest to us is really not the air temperature but this parameter, the air freezing index, which determines how the ice grows. So we have plotted that and sure enough we see a trend in the 60 years of data in our air freezing index as well a decreasing trend. So a decreasing trend means that the winters are getting warmer. And then we projected that out to the year 2010 which is the year that we see our maximum, we need our maximum capacity load on the road. After that it drops off a little bit.

We said, our air freezing index for design purposes should be 31/91 degree days below zero, but we also show a range here which represents one standard deviation of both above and beyond that means. We did the same exercise for only the last 30 years and we show both trends here, and we do see a somewhat steeper curve for the last 30 years.

This is some interesting side data that we haven't used in our analysis, but Environment Canada, interestingly enough, have been collecting data on ice growth in Back Bay here in Yellowknife since 1958 and has been publishing that. So we took a look at that and sure enough there is a bit of a trend there in that ice growth data on Back Bay which would suggest that we have a somewhat

decreasing ice thickness with time. This wasn't actually used in our analysis, it was just a bit of supporting information that suggests that we think we are kind of on the right track with this.

So this is really the result of our analysis. This is the correlation that we have developed. We have plotted the operating window here that we see during the period when we identify that the road is driven by climate as a function of the winter freezing index. These are all the points from the various years. You can see a bit of a scatter here.

I will point out that last year, which is the 2002 year, we are pretty much right on our correlation line. It was a very good year. The year before was one of the worst years for the winter road. Right in here, the year 2000. It just shows you what can influence the winter road because they lost two full weeks of operating window right at the front-end of the road because of a very unusual heavy snowfall that occurred in October and early November which insulated the ice and didn't allow them to get the right equipment on to get the ice plowed early enough.

Now, when we took that two weeks off, if we took that two weeks off, this point here would go straight up and fall right on our line. So this line really is just based on air freezing index. It doesn't take into account other extraneous factors such as early snow cover and things of that type. So there are other factors that affect the winter road operation. Some of them are implicitly built into this over time because they are part of the curve fitting exercise, but there are these factors that offer risk to the operation of this road. And the results of that test, when we go in here at our magic number of 31/91 for the year 2010, we predict 78 days as a mean road operating window for planning purposes.

Now you can see that there is about a nine day variation in each way from that that the operators certainly have to be aware of, and it is really just a matter of managing that risk and knowing that there are real probabilities that it could be as much as or as little as say 70 days, and possibly even get as much as 87 days. Last year they got 85 days. So this, when we went back and looked at it in perspective to the actual operating scenario and the conditions that we felt we were able to get from people operating in those years, this approach seems to stand the test of reasonableness as us engineers like to say. It seems to work fairly well.

Now when we do the same exercise for using only the last 30 years of temperature data, the 1972-2001 temperature data, we see a reduction of about three days in our mean. For our purposes, given all of the other uncertainties, we have stuck with the 78 days. An argument could be made that we should really use 75 days. It really, when you look at it relative to this range here which needs

to go into the planning purposes, it really doesn't matter a whole bunch whether it is 75 or 78. But that is the history of how in fact we have developed our number. Of course, somebody took out my last slide.

My last slide was a picture of a tanker that fell through the ice on the Mackenzie River crossing, which is what we want to in fact avoid as a result of proper planning.

I don't know if I have answered Sharon's questions, she had the benefit of seeing some of this information to read on the airplane on her trip up as I understand, so she has actually seen some of this information and others have not at this forum.

**MR. BILL KLASSEN:** Thank you very much, Don. Sharon, does that help you with the concern that you'd raised?

**MS. SHARON SMITH (Natural Resources Canada):** That certainly provides me with some more information to look at, because originally from the documents that I had, there was this sort of late 70s, the trend in the last 20 years was not taken into account. We are looking at the whole record, and that is why I raised the issue because we have had somewhat warmer conditions over the last 20 years. Just one more question and you mentioned that snowfall early in the season can be quite important. Did you look at all at what the probability of that occurring and how much effect that may make? Sort of the same type of probability analysis that you were doing for the air temperature?

**MR. DON HALEY (EBA):** Yes, we tried, but we gave up. The snow depth data that we have was scattered all over the map and you can generate a computer curve from it, but when you look at it and scratch your head, you say I can't work with this because there is too much scatter in the data.

**MS. SHARON SMITH (Natural Resources Canada):** That doesn't surprise me, because snow is always a problem. But if you have some feeling for the data, the first snow fall or how that's been changing through time, supposedly that is probably getting later, whether or not you get more snow when it does come, that is the problem to work out. I enjoyed your presentation.

**MR. CHRIS BURN (DIAND):** I would like to reiterate that final comment of Sharon. I found it very very helpful and a very interesting presentation. I would point out that the approach that is being used is essentially a statistical one. The statistical approach talks about the variation in the expected number of operating days about a mean. The mean is the middle value and then there is an upper level and a lower level.

In this case, the confidence interval which has been given is the confidence interval for one standard deviation. In the normal distribution, that is a statistical distribution, about 64 percent of the data is within one standard deviation of the mean. Which, over ten years, means that we can expect six years to be within that interval and we would expect four years to be outside of that interval. We would expect two of those four years to be bigger, in other words have a longer operating season, and we would expect two of those four years to have a shorter operating season.

Now over a 20 year mine life, that means that we are not dealing with four years outside, but we are dealing with eight years outside. The most common use of statistical data for us in Canada is when people tell us who we are going to vote for. They will always tell you that 19 times out of 20 a particular party is going to win the election. Usually it comes out that that is the right way. The 19 times out of 20 is the much more frequently used confidence interval, which is the two standard deviation.

I wonder in this case if doubling the confidence interval is of any use in terms of indicating the limits of operating season for the mine over operating season for the winter road in terms of the 20 year mine life operation. And, whether you could give a little bit of information as to what is the 95 percent confidence interval and then whether the lower limits of that are of material importance in terms of the expected use of the road.

**MR. DON HALEY (EBA):** Thank you, Chris. That is very clear description of what we are doing here using statistics and the uncertainties associated with statistics. During the period that we've analyzed and we consider the road to be climatic driven, there was one year that was 60 days. So that is the bottom end in my opinion. I think we've pushed the statistics far enough, I wouldn't talk about one standard deviation or two standard deviations, I would just say that we had better be prepared for the possibility that we could be down in that range again.

For that reason, this is part of a planning exercise. This is a very small part in a very large project and the purpose of that project is to identify for the joint venture how to optimize the use of the road, which means upgrading portages, looking at better ways to manage the ice crossings, looking at the loads on the ice, looking at the speed restrictions, the whole purpose of that is to look into ways and means that we could in fact get more traffic or more trucks down the road in a shorter period of time. That is the purpose of what we are really trying to do here.

I keep reminding my clients that it takes two herc trips to replace one b-train tanker truck. So if we don't get that fuel in that is the only other option. There is a cost associated with that, obviously. So that is the direction that this is going, and the direction is to really use it as a planning tool and to ensure that when the

12,000 loads do come, that we are in a good position to handle them. I must say that the contractor and the joint venture have been very responsive and there has been a lot of elasticity in the system to look at how we can continually improve without compromising safety, but continue to improve the operation of the road, so we get more traffic down in shorter periods of time.

There are a whole lot of questions and issues associated with that, but it is just a matter of risk management.

**MR. CHRIS BURN (DIAND):** I would just like to note for the record that the company is not willing to indicate that two standard deviation and 95 percent confidence interval, and that the company also recognizes that the operation of the road will change over time, because the purpose of his exercise has been to improve the operation of the road. To give the company the benefit of the doubt, I presume the company's position is that the report that has been prepared and the operation of the road has been done in a manner to raise the operating days, and therefore the statistics that have been used in the past may not be appropriate for the conditions in ten year's time because the operating conditions may be better. I would like to note at this point the company is not willing to consider the road operating for a much smaller number of days than those that are predicted within one standard deviation of the line there. That is just my comment.

**MR. BILL KLASSEN:** Does the company wish to respond to that?

**MR. ROBIN JOHNSTONE (De Beers Canada):** The issue of one or two standard deviations diverts attention from what the critical issue is and what the statistics are used to do. Don has already indicated that 60 days is the present minimum in which we have to operate. The critical factor is how we use that information. Statistics aside, what we need to do is we need to prioritize the logistics of it wherever possible, so that we get the right number of loads down the road.

Where the operating window is going to be down around 60 days, we need to prioritize so that the key goods are essentially delivered to site in that period available. So it is used as a mitigation tool. It is used as a risk management tool. Not as a, okay, it is going to be 78 days plus or minus and that is where we are going.

I take your point from a statistical basis, Chris, but I think you are twisting the words when you say the company is not prepared to consider the two standard deviations. We have to consider that information in operational planning.

**MR. CHRIS BURN (DIAND):** I would just like to point out for the record that my original question indicated an identification of the two standard deviation limits and the original answer did not respond to that point. That is the reason I followed up the question in the way that I did. I agree entirely with the company that it will be their job that the materials that they require reach the site under the conditions they are faced with, and I agree entirely that this is a managerial responsibility of the company to its employees and its shareholders.

I would just like to point out that the reason for the follow up question was that the initial question was not answered directly, but I don't think this is a matter that requires any further commentary.

**MR. BILL KLASSEN:** Thank you, De Beers. Thank you, Chris Burn. I want to emphasize the final comments that Don made about getting the loads in and getting them in safely, because that leads into Tim Byer's concern about spills. Now, I don't see that and perhaps Hal can correct me here, as specifically an issue that was going to be addressed, but given the context here I think it is worthwhile. So Tim, could you frame your concern and then when we finish the discussion on that we will move onto Rachel's questions about eskers and volumes and contours and so on. Thank you.

**MR. TIM BYERS (Yellowknives Dene):** I have a couple of questions referring to accidents, but before I do there is one question on Don's presentation that I would like to get out. That is, the length or the operating window of the winter road, whether it is at the maximum of say 90 days or the minimum of say 60 days, does that difference in the length of time that road is open affect at all the management of the traffic on that road?

**MR. DON HALEY (EBA):** Not really. They have a set traffic management practice, and of course if the road is held up then the trucks are backed up. The actual traffic management system is established and it is established before the road opens. As far as I am aware, there really isn't much change to that. Trucks that don't go today usually get back into slots and go the next day or the day after. There are only a certain amount of trucks that depart, and they depart 24 hours a day in certain preallocated time slots.

**MR. TIM BYERS (Yellowknives Dene):** Thanks for that, Don. I guess I am wondering then if a company expects that there is going to be a 76 day window and it ends up that there is a 90 day window, those extra 14 days, would I assume that would mean there would be less traffic on the road for those 14 days or does that mean there would be longer distances between loads allowed; how would that extra play into the traffic that we are envisioning will be using that road?

**MR. DON HALEY (EBA):** We don't know ahead of time what window we are going to have in any particular year. Perhaps last year is an example of how it was dealt with. They had about 8,000 loads designated to be moved down the road and by March 31<sup>st</sup> all of the designated loads were done and officially the road was closed. Now the road was reopened for another 20 days because they needed to get some additional supplies at the last minute into, as it turns out, Snap Lake, so that there was an extension put on the road operating window to handle that kind of last minute traffic. But really, they start as early as they possibly can and they maximize the traffic flow without trying to predict how long the window is going to be. They just maximize the traffic flow in the year.

**MR. TIM BYERS (Yellowknives Dene):** Conversely then, if three-quarters of the way through your season the weather looks like we would have to close it earlier, would that mean you would have to tweak your rules of the road, for instance, having shorter distances between hauls to get more trucks on the road?

**MR. DON HALEY (EBA):** I am not aware of that situation arising. I certainly don't believe that would be the case because the rules are pretty rigid and they are safety based. A lot of them, in terms of rules and distance between trucks on the ice are cast in stone in guidelines. Some of those I have had a hand in preparing. So certainly there would be no tendency to want to compromise safety in any respect.

**MR. TIM BYERS (Yellowknives Dene):** Thanks, Don. I will go on to other questions then that do not relate to your presentation, although you were saying the one missing slide was the truck that went through the ice, and that would have been a great visual for what I had to ask. I notice a discrepancy in one of the figures that I got from a couple of your presentation documents that De Beers has shown over the last year. The probable frequency of a diesel spill, both in the EA report and in your response to an information request, you have said that you expect the possibility of a diesel spill on the ice road would be one in 100 years. But Stella Swanson in the information sessions at the movie house in April said that considering the scenario of a truck breaking through the ice carrying a full load of diesel and this load spilling into a lake, she said, and I quote: "We predict that a spill such as the one described in this scenario would happen once in the life of the mine." So not once in every 100. So I would like some clarification as to which of these two figures are right. Is it once in the life of the mine, which means we will expect it to happen, or is it once in 100 years, in which case it is hard to say it would happen.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Tim, those numbers were based on a risk management, or risk assessment. Now, I know that the number of -- I can't provide you here with specific details on how that is, but I think the



critical thing is that it is less than one in 100 years, and I am not sure where Stella was taking that to say it is less than one in 100 years, but we might expect one in the life of the mine. I can't provide you with clarification on that, but I know it was through a risk assessment.

**MR. DON HALEY (EBA):** I would just like to comment on one of your premises in your question that if the truck breaks through the ice then we have a big spill. I have been onsite now to see at least one breakthrough of a tanker and I have read reports of others. They have a characteristic way of going through the ice. Fortunately, the tractor stays up on the ice so the driver is fine, and the middle dolly breaks through first through the two trailers and the back tanker goes down first, and then the front tanker goes down.

What is pretty neat about these things is that the tankers, even though they are fully loaded with fuel, float. So if the valving system doesn't shear off at the back when it goes through the ice, which often it doesn't and they are in the process now of strengthening those and changing that, then there is no spill or very little spill. So they just come along with another tanker and pump it out and then retrieve the truck, so that when you look at it from a scenario of, let's assume a breakthrough occurs, what are the consequences? The consequences in terms of spill historically have been pretty darn minor. Very few cases and very small amounts of fuel lost into open water.

**MR. TIM BYERS (Yellowknives Dene):** Thanks for that answer, Don. I guess I am confused then. As far as the reporting of your probable expected frequency of diesel spills, as far as letting people know what this probability is, I am confused as to where the one in 100 years comes from versus your risk assessment of one in 25 years.

**MR. JOHN MCCONNELL (De Beers Canada):** I am not sure if I will help you Tim, I might just muddy the water some more. The one in 100 is a statistical measure. We have a mine life that is plus 22 years. If the mine life was 100 years, it would still be one in 100. But for assessing possible risk, we say that there is a possibility that we would have one over the life of the mine.

**MR. TIM BYERS (Yellowknives Dene):** Thanks, John. So basically when we are assessing the risk of this, worst case scenario we are looking at it will happen during the life of the mine, as a possibility.

**MR. JOHN MCCONNELL (De Beers Canada):** That is correct.

**MR. BILL KLASSEN:** Tim, did you have anything further on that topic?

**MR. TIM BYERS (Yellowknives Dene):** One of the fellow on the committee has asked is, what happens to any -- not spills, but leaks -- this is incremental leaks of hydraulic fluids, oils, on the winter road. Just these small little deposits, what happens to those little spills. Is there some way that they are cleaned up and then removed, or do they basically at breakup melt into the surrounding water bodies?

**MR. DON HALEY (EBA):** There is a very rigid spill cleanup protocol on the road. As those of you have been up the road probably encountered the SecureCheck folks, they are there driving up and down the road to monitor speed among other things. In the backs of those trucks there are full spill clean up gear for those small hydraulic oil kind of spills. So there is a very rapid response to any spill of any size and radio contact so they get onsite very quickly. So they are cleaned up very quickly.

Of course they occur on ice so it makes them quite nice to clean up with loaders and things.

**MR. TIM BYERS (Yellowknives Dene):** Thanks for that. There are no further questions from me.

**MR. BILL KLASSEN:** Thank you. We will move then. Chris, you have a comment on this specific topic?

**MR. CHRIS BURN (DIAND):** I have a question regarding the number of loads on the winter road. You have indicated in the future that the road will need to carry 12,000 loads per winter at a maximum. I need clarification, this is 12,000 round trips? 12,000 trips out and 12,000 trips back. Is that correct?

**MR. DON HALEY (EBA):** That is correct, and it represents really the heavy haul trucks. It doesn't include pickup trucks and things like that. These are the heavy haul trucks that we are talking about.

**MR. CHRIS BURN (DIAND):** Thank you. If there were 60 operating days, that represents 200 trucks going up and 200 trucks coming back on any one day. If there are 50 operating days, that is 240 trucks going up and 240 trucks coming back on any one day. I would not want to encourage the use of two standard deviations taking us to 50, let's just consider the 60 option. Are you confident that the road can handle 200 trucks going up and 200 trucks coming back on any one day?

**MR. DON HALEY (EBA):** Just to go back on your two standard deviations. I was actually just thinking about how we wrote this report. In this report we advised in printing that they better be prepared for a range of operating

conditions of 60 to 90. So the 60 is a number that we have said is the minimum in here. If you look at our statistics which have been done in the last few months as opposed to this being two years old, two standard deviations probably come up close to that 60 number. So in fact we are probably pretty close to your two standard deviations in our recommendations that are actually in print in our report. Just to make that clear.

So that is where the 60 number comes from. Now, to come back to your fundamental question, I don't think there is any answer to your question. No one knows -- I don't expect we could run at this time 12,000 loads in a 60-day period, a 60-day window. There is no way of telling that at the current time.

**MR. CHRIS BURN (DIAND):** I guess the concern is that when companies that are different from the operator of the road want to get materials into the sites they will put pressure on the road operator to keep the road open for as long as possible. We always understand that safety conditions are paramount, but when there is a large amount of, basically money at stake, then these issues need to be reaffirmed as being significant. And the safety issues, one would hope, would always remain paramount in the minds of both the operator of the road and the companies.

Because if as Don Haley has indicated, it will be not possible to get the projected 12,000 loads in, then particularly we hope towards the end of the season when the ice is thickest and one hopes it is safest, that is when the pressure will be greatest to put as many vehicles on that road as possible. So that is just a comment in terms of the risk assessment that the board will need to consider, and in some ways this is effectively a cumulative impact rather than an impact of this specific project.

**MR. DON HALEY (EBA):** Just to make a comment to that, Chris, there is a lot of preplanning that goes into the winter road each season. In fact, last week there was a big planning session with all of the trucking contractors and all of the owners' representatives. So they know going into the season how many loads need to go down the road. So that is fixed before the ice starts to form, or about the time the ice starts to form so there is a lot of preplanning into getting ready for the winter road season. In terms of extending the road, I mentioned that the opening of the road is critical because that is when the ice is thin and that is probably the riskiest time, the opening of the road. It is important that they work within guidelines that we have in fact given them for ice thickness that they need to operate specific trucks.

On the other hand, the closure of the road is somewhat different, because at that end of the season the ice is very thick. Troublesome spots have been flooded, there may be a little bit of water or slush on the road, but the breakup -- at least

the closure of the road is really dictated by when the portages start to go out in the sunshine and there starts to be rutting.

So there seldom is a safety concern associated with the closure end of the road, but certainly a land use and environmental damage concerns take over at that point. However, they do have some options to deal with that. That is, at the end of the operating cycle they operate only at night, for example, when there is no sunshine and it freezes up at night, they will continue to send some trucks down and then shut down during the day.

So there is a lot of elasticity in the system and there is a lot of rigid rules on how the road is in fact operated. I could give you a much longer presentation on that but we don't have time today. Safety is the number one consideration always. No one wants to have to fill out any adverse safety reports.

**MR. BILL KLASSEN:** Thank you, Don. Louie, if you have a short comment on this, I would like to make sure that we have enough time to deal with Rachel's question about eskers.

**MR. LOUIE AZZOLINI (MVEIRB):** I will be very short. The review board is concerned with the impact of what could happen on that winter road. In terms of the actual management of that road, if De Beers can't get its trucks up that is not an impact on the environment, that is an impact on De Beers. While although I appreciate what you are saying from a cumulative perspective, unless it has an impact on the environment, the social or the cultural environment, then it is not within the board's purview. I hear you, but you are not quite right.

**MR. BILL KLASSEN:** Dave, I am going to stop discussion on the road now. I want to get onto the eskers. If it is a really burning issue perhaps you can take it up with Don or discuss it with me and we will come back to it after lunch, but I want to move onto Rachel's concern about eskers. The change in the size and the shape of the esker and how that would affect caribou use, whether it might divert them. We need to have an understanding of the areas and volumes we are dealing with in measures we can all understand. Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** We are interested in the winter road use as well. I don't think that subject is going to go away. We had the misfortune of almost losing one of our young people in the late 70s who went under the ice with one of the haul trucks. I am glad to say that he is alive and doing well and is flying for Air Tindi, the very building that we are sitting in. We have some experience with ice conditions and we notice that when we build a hole in the ice to set our nets we look at the thickness. So we have some questions about those, maybe after lunch? Mr. Haley, if you could be here after lunch it would be nice. Because I want to know what it is like with people who are

building roads. Just like us in Dettah in the band office, we are all trying to make a bet to see what time the winter road is going to open towards Dettah. Sometimes it is before Christmas, sometimes it is right at Christmas, sometimes it is after Christmas. This is the kind of info that we need.

Our question about the esker is, the materials, how much will be taken out and how will they be taken out? The permafrost, we are questioning about the thickness of the permafrost and permafrost is probably maybe under the lakes as well. If there is lots of runoff from permafrost melting, we are wondering about the water management plan.

The esker, we are wondering about how much material is going to be taken out, because from talking with the elders there is ice in the eskers. Maybe there is not that much gravel right in the centre of the esker, or what part of the esker holds the most gravel. If you are not getting all that much gravel that you want from one place, how are you planning to use the gravel from the esker? Maybe you could take the material from alongside the esker instead of breaking up the esker. That is what we were wondering about. That way the main portion or the length of the esker stays intact, that way the roads for the caribou stay where they are and the impact on the caribou movement is not affected.

I have more questions on the Tibbet to Contoyto winter road. We wanted to touch on that, but I am not sure if we have time.

**MR. BILL KLASSEN:** Perhaps we will deal with the questions you have raised about the eskers and then if there is time we can come back to the winter road matter. De Beers, can you respond to these several points that Rachel has raised, please? Thank you.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Thanks for your question, Rachel. I was actually out at the esker with elders from Lutselk'e and we had lunch out there. The area that is estimated to be impacted is about three times the size of this room. So that is the area over which it would be disturbed. Now one thing about the eskers in that area is that they stop and start a lot. They are not -- it is not a continuous where it is continuing for many miles. It is interrupted in many places by small streams or lakes. I think about 500 metres from where the esker is at the moment, it ends in the lake -- probably about 200 metres. And then about a kilometre on the other end it also ends in a lake too. So the esker is sort of chopped up naturally in that area. The idea was not to basically cut the esker off, it was to remove the granular material and then recontour it. It is recontoured after we have removed the material. Where we removed it from the last time and where we had to thicken it, we certainly noted caribou trails or caribou tracks across that surface, so they were using it. It would certainly not be the intention to disrupt that.

So material has been taken off the top and side so that the esker does stay as it is. There is no point in us going down, right down to where the ground ice is, but what we want to do is we want to try and minimize the area from which granular resources are extracted. So that is what the focus has been.

How am I doing at answering your question?

**MS. RACHEL CRAPEAU (Yellowknives Dene):** I am just thinking, I wonder if Isadore is okay with your answer, and Lawrence. Because they both asked me to ask this question. Also, it makes me think about how Alfred said, if we were not there or one person out of the community who everybody could talk to and listen to had been there to walk around and see what areas you are going to be using and what you are going to be taking and where you are going to be moving it, we cannot really talk about it amongst ourselves and feel that we are satisfied that things were done to our satisfaction.

It sounds like you are going to be taking and fixing, so we will see what happens. Thank you.

**MR. TIM BYERS (Yellowknives Dene):** I think I didn't hear an answer to the second part of her question which was the feasibility or lack thereof of instead of taking from one spot, maybe if you will to simplify it, gouging. Making a gouge in the esker. Have you looked at all at or thought about the feasibility of, instead of doing that, taking everything from one spot if it is feasible to take linearly, smaller bits from the side of the esker and maybe covering a longer distance. Is there any cost-benefit analysis of doing that, both costs to you and costs to the environment, and vice versa?

**MR. ROBIN JOHNSTONE (De Beers Canada):** We haven't done that. We haven't done that assessment. The key factors, I think, would be that we would have to create more access to it. I think it is one of those judgments as their value in creating a larger area. One of the reasons why we want to keep the area small in part is because we understand the significance of eskers in terms of heritage resources. So we have done intensive surveys to ensure that there are not heritage resources there. So that would also -- it is not an easy, answer Tim. That would also have to be factored in.

Wherever possible our attitude is to minimize disturbance without taking away its ability to function. That would be a choice here, I think. That doesn't answer your question either.

**MS. RACHEL CRAPEAU (Yellowknives Dene):** It is not just heritage resources, but (translation not available), home of the bears, home of the animals, that is what we are thinking about. You are disturbing and impacting

their homes. Maybe that is why we have been seeing a lot of bears at our hunting camp, which we didn't normally run into. I mean, Angus had to deal with a bear when they were hunting during the fall. We had a young hunter be interrupted or surprised by a bear while he was cutting up his caribou meat. He turned around to turn to go get his gun and he fell against his knife. I mean, I was the one who organized that hunt and I was in a fit trying to figure out how in the heck am I going to get a plane over there, how do I get an emergency situation handled really quickly. There are lots of bears in our area and it is not far from your exploration back then. Maybe you weren't there then. It was probably Winspear.

But these things have an impact and we are trying to anticipate the impact. So we just want to get a better picture of how we are going to preserve things for future use. Thank you.

**MR. BILL KLASSEN:** Thank you, Rachel. The De Beers representatives, we are just about exactly on 12 o'clock, we are not going to have time to go around the table to see whether we have wrapped up the issues, so we will need to do that after lunch. Louie, since we are having the presentation on ISO 14000 over the lunch hour, is lunch being provided in the room? I am not clear on that.

**MR. LOUIE AZZOLINI (MVEIRB):** Thanks to De Beers it is being provided, so there will be food available. So thank you De Beers.

**MR. BILL KLASSEN:** Let me echo that. In terms of how we handle the presentation then, do we let people get their food and then we will have the presentation? Mr. McConnell, do you have some advice on that?

**MR. JOHN MCCONNELL (De Beers Canada):** I am not sure the food has arrived yet, so perhaps a five-minute break and just give us time to load up the presentation and then we can make a judgment, if the food is here. Otherwise, the presentation is probably about 20 minutes.

**MR. BILL KLASSEN:** Okay, thank you. We will do that. We will take a short break. Rachel, you had one comment?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** What is the presentation going to be on?

**MR. BILL KLASSEN:** Well I will let John talk about what it is on exactly.

**MR. JOHN MCCONNELL (De Beers Canada):** It covers our environmental management system and registration under ISO 14001.

**MS. GLENDA FRATTON (Gartner Lee):** If Patty is coming. Unfortunately she didn't speak to me about this. She was at a couple sessions that I wasn't. I could call her and ask her.

**MR. BILL KLASSEN:** I don't think that is crucial, is it John? Just by way of laying background for why we are having this session?

**MR. JOHN MCCONNELL (De Beers Canada):** She just seemed to have a very strong interest. If we knew she was coming and is just five minutes late, we could wait. I think it is probably best to carry on.

Our presenter this afternoon is John Goyman. John is our operations manager and along with having responsibility for the day-to-day activities at the site, he's also been tasked with putting systems in place so once we move towards construction and operations it is a nice seamless process in terms of both environmental management systems, safety systems, human resource development and all those things that go into making project an operating mine.

So I guess with no further comments, I will turn it over to John Goyman.

**MR. JOHN GOYMAN (De Beers):** Thank you, John. Good afternoon. I am going to walk through the development of our environmental management system. We started the development in September of 2001 and we will basically talk about what the system is based on and how we got from December of last year to where we are now.

For some people they might have a question in their mind, what is an EMS? An environmental management system basically defines and establishes a company's environmental policy and what our objectives are with regard to that policy. It can be utilized by an organization to deal with any immediate or long-term impacts of its products, services and processes on the environment.

Why EMS and why ISO 14001? Well, the De Beers group of companies is committed to having all of its operations attain ISO 14001 registration. All of our operations in South Africa are ISO 14001 certified and several of our exploration activities and our offices here in Canada are also registered. It only made sense for us to also follow along that path.

The establishment of an EMS and using ISO 14001 as a platform facilitates the establishment of a manageable risk management process for the project. On the public side, it ensures transparency through third party audits.

So the overall benefits of the EMS, of course disaster avoidance and response, better performance as an operation, of course the ultimate registration. It ensures legal due diligence, risk management, complements employee and public health



and safety, provides tools for the staff, provides a forum for public reporting to demonstrate our performance. It demonstrates corporate, social responsibility and leadership, and lastly contributes towards sustainability.

Our commitment as De Beers Canada Mining, we are committed to a ten-year registration before the end of this year. In fact, our registration audit is being conducted even as I speak. Our registration will align and be maintained in all stages of the sites development. Right from the get-go we felt it was important to establish our EMS, right in the care/maintenance mode. Then, expand it for construction, through operations including decommissioning and reclamation. We felt that was a way of demonstrating our responsibility to the environment.

So what is ISO 14001? I am sure most people here are aware but we will go through this anyway. It is an internationally recognized standard that targets environmental management systems specifically. It sets out expectations for developing, maintaining and improving an environmental management system and it serves as a tool to measure, evaluate and audit environmental programs within a company.

It also provides the tools necessary for establishing environmental goals and targets, evaluating how well these goals and targets are being met and continuously improving performance. That is one of the key fundamentals of ISO 14001, is continuous improvement. Not to try to oversimplify things, but the basic elements of ISO 14001 is that a company, first off, has to establish an environmental policy. After the policy has been created then based on that policy we move forward into a planning mode where you start to develop your environmental management system. Upon development, then you implement and operate the system. As it is being operated, you are constantly monitoring, checking, following up with corrective action.

Then, on a regular basis you are required to have a management review, i.e. the main principals of the company up to the CEO level are involved in ensuring that your environmental management system is meeting the requirements of the environmental policy, or the statement of the environmental policy. Based on that management review it contributes towards continual improvement.

To touch on environmental policy, a copy of the environmental policy is included in the EA, and basically De Beers has stated in their environmental policy that we are committed to the concept of sustainable development and, accordingly, we will conduct all of our activities in compliance with legislation; and in the absence of legislation apply good management practices. We will protect the environment. We will implement and maintain a management system which is this environmental management system. We are ensuring awareness among employees, contractors and the general public, and to communicate in a

transparent manner. So briefly that is what this environmental policy statement says, and our environmental management system has been built based on this statement.

Stepping from the environmental policy into the planning, in the planning we have to consider legal requirements, environmental aspects and their significance. You develop objectives and performance targets, and in order to achieve those objectives and targets then you develop your environmental management programs. Of course in implementation and operation, there is a reporting structure and responsibilities assigned. There is training and awareness. There is internal and external communication protocols established. Operating procedures are established, including emergency response, and of course EMS documentation and document control.

In regard to checking and corrective action, there is ongoing monitoring, there are audits. There are second party audits which we consider internal audits. They are conducted by another group within De Beers on our behalf. Then there are third party audits which are conducted by independent registrars. Of course, as I mentioned before, the management review where there is a senior management review of the effectiveness to ensure continuous improvement.

If we look at the basic building blocks on how we pulled our environmental management system together, the first step was establishing all of the aspects involved in the project and what their potential impacts were. Just to make sure everybody is on the same wave length, to define an aspect it is based on an element of an organization's activities, products or services that can interact with the environment. A good example would be effluent discharge.

With regard to the definition of impact, it is any change to the environment, whether it is adverse or beneficial, wholly or partially resulting from our activities, products or services. An example would be water pollution.

When we were establishing what the aspects and impacts were, we had to decide what they were applied to. They are applied to all of our activities, products and services within a defined boundary, and that is based on the Snap Lake footprint site and the YK office. It is also based on defined areas, departments, facilities and activities; and in an operation shutdown/startup mode and also in considering normal, abnormal and emergency situations.

In order to that, we established a care and maintenance facility/activity framework. This framework – I apologize for the slide, the sheet is way too big to get on to one slide and it extends to the right and includes site supports and storage, airstrip, roads and transportation. Basically what we did was we looked at all of the activities, all of the main activity areas and infrastructure on site and

then based on that drilled down into what specific activities and aspects would possibly have an impact on the environment. All of the aspects and impacts were based on all of the infrastructure and activities on site. This will be carried forward -- this is a platform to build on as we move forward in the project.

Risk assessment was applied to all of the aspects when considering the probability of occurrence and consequence of occurrence. A rating of one to five would be applied for the likelihood of occurrence and then the consequence of that occurrence considering several factors, employee and public safety, impact on the environment, cost, public and stakeholder relations, socio-economic impacts and regulatory impacts. The risk assessment compiled the score from the probability and then the highest single consequence for wherever it may lie in here, the highest single consequence for that aspect. Any radiance of six to 10 were considered significant and required immediate action, and any from two to five timely action.

With the aspects and impacts, overall we identified 187 aspects for the property in the care and maintenance mode, and we had 57 significant impacts greater than six, and all of those had objectives and targets set for action. Of 130 rated less than six, 47 of those still had objectives and targets set for action as a management decision. That took us through establishing the aspects and impacts.

In regard to objectives and targets, in May and June based on the risk assessment of those aspects, we developed our objectives and targets. Tasks or programs were developed based on those and responsibilities assigned. An example of an objective and target would be that we developed a program for aerosol reduction. The objective was to investigate the use of alternative products, or products using hand pumps to reduce the quantity of aerosol cans at site. We set a target of a 20 percent reduction in use by December 31<sup>st</sup> of this year, and that has been achieved and more at this point in time. That will give you an example of what an objective and target might be.

The next stepping block was to the environmental management programs themselves. This table here shows 15 of our environmental management programs. This one here, the incinerator maintenance program, it is a program that was developed to ensure that our incinerator was constantly working at its maximum potential or efficiency. The purpose there was to reduce emissions.

Right below that we have our STP operation program, that is our sewage treatment plant, and the whole purpose of that program was to ensure regulatory compliance. Right below that is our energy use program, and this was to reduce our energy demands, to reduce our fossil fuel consumption and also emissions. So that just gives you an idea of some of the programs we have in place.

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After the programs were developed the next step was to develop our guidance document. As you know, any system requires a lot of paper. All of these binders you see here on this table, this is our environmental management system in document format as it stands today. The guidance document basically is a site and facility description. It covers off what the purpose and scope of the environmental management system is. It gives a description of the environmental management system and how we applied the specific ISO elements to our Snap Lake EMS.

This was followed by the development of the system procedures. There are 17 system procedures, and this is required by ISO 14,001. Basically these system procedures highlight the scope of responsibility, assigned responsibility, ensures the identification of all the aspects and impacts, ensures the establishment of objectives and targets and the subsequent development of environmental management programs to ensure that you meet those objectives and targets. The system procedures also provide for a regular review, monitoring and assessment and in its entirety system procedures facilitate continuous improvement.

The next step was to develop operational procedures and basically to date we have developed 43 operating procedures. They provide detailed operating criteria to minimize any potential environmental impacts. An example would be wildlife encounters.

I am not sure how well you can see that from where you are sitting, but this is OP-14 which is a procedure specific to wildlife encounters on site. It defines the purpose, defines the scope and then gets into the specifics of the procedure. How drivers encountering wildlife, how they are expected to interact. It states that hunting, fishing and the presence of dogs are not permitted on site. What to do in the case of encountering wildlife if you are in a vehicle or if you are on foot. Then it follows up with the reporting of such, so every individual is responsible for recording sightings and reporting to the supervisor, and then the supervisor is responsible for reporting the sighting to RWED. It has reference materials and revision control sheets. That just gives you an idea of what our operating procedures would look like, and that is just the one example, wildlife encounters.

Then we moved on to developing our monitoring procedures. Basically to date we have developed 33 monitoring procedures, and they are particular to equipment, calibration and operation, and field monitoring activities. The sample we are going to touch on is groundwater sampling. Again it describes the purpose, the scope and the particular procedure for collecting water in our piezometers, what materials are required and then a step by step procedure on how to go about collecting the sample to ensure that the sample has been collected properly and handled properly. Then of course references.

After development of the monitoring procedures all of these documents we created obviously started to create paper, and you obviously have to have some form of document control. Our records basically are the forms we work with and it's our format for document control, and it provides an auditable record of activities within the EMS. As I mentioned before, we are presently undergoing our registration audit and this is what the auditors head for. They love to get their fingers in the paper and they dig deep.

Just to point out that a significant element of our records is the legal review of legislation, acts and guidelines, and those are the four big blue binders on the end of the table there.

Once we had all that in place then we looked at implementation. We basically implemented our EMS at the start of August and continued it through to the present date. We implemented the system and it has involved a lot of training of all of our personnel and contractors. It is imperative that all of the employees understand what the EMS is all about, and utilize it to the best benefit of the project.

In conclusion, the EMS that we have presently developed will be expanded upon to reflect any increased facilities and activity levels during the various stages of the project's development, and certification will be maintain throughout all stages of the project. Our third party registrar has agreed to that protocol where whenever we have increased facilities or activity level, then a continuous certification process will be maintained by them having their annual, and if required, more frequent audits.

Results of these annual third party audits will be made available to the public. And that's it. Any questions?

**MR. BILL KLASSEN:** Thank you, John. That was really informative. Does anyone have any questions, and for the benefit of everyone else, I suggest you use the microphone, because this room really swallows sound. Tony and then John.

**MR. TONY KING (Gartner Lee):** John, who are the third party registrar?

**MR. JOHN GOYMAN (De Beers):** We are using BSI.

**MR. TONY KING (Gartner Lee):** Who, sorry?

**MR. JOHN GOYMAN (De Beers):** BSI. All of these third party auditing terms or company names are all sort of like acronyms like KPMG and BSI and... that's the name of the company, is BSI. They are a multi-national company.

**MR. TONY KING (Gartner Lee):** Thank you.

**MR. BILL KLASSEN:** John, go ahead.

**MR. JOHN BRODY (DIAND):** I have two questions. The first one relates to your environmental policy. You said that in the absence of applicable guidelines or regulations that you would apply good management practices. I was just wondering about the word good versus the use of best management practices.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think that the key is that there is always the matter of what tools exist in the world that we can use, but what tools can we actually use at Snap Lake. So you know, and it's a matter of... our intention is to do a really good job. The practicality is that there are some times when the environmental costs benefits of a solution are not straightforward, that... for example, I know Martin Rawlings coming later today, that the difficulty in a place like Snap Lake of using energy intensive mitigation methods is a real problem, because it just increases our impact on the environment through emissions. So that's the emphasis on good practice. It does provide us with latitude as to what we use, and you know, that is certainly the intention there.

**MR. JOHN BRODY (DIAND):** Thank you. I have one other question, and maybe I just wasn't paying careful attention. The ISO classification you are seeking, is that for De Beers worldwide, or just for the Canadian operations?

**MR. JOHN GOYMAN (De Beers):** We are seeking certification specific for De Beers Canada, the Snap Lake project and our office here in Yellowknife. You have to be site-specific and operation specific. It does not necessarily... you cannot just register your corporate office and it umbrellas the rest of the operations or activities. They have to be site-specific.

**MR. JOHN BRODY (DIAND):** Thank you.

**MR. BILL KLASSEN:** Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** Do I have to wear my... yeah, I guess I have to. I was going to say which hat do I have to wear. Looking at BHP and Diavik, the two mines that have come in before De Beers, they have developed a number of best practices or good practices. They've defined some critical success factors in terms of what they believe they have to achieve, or what are the critical elements they have to achieve for safe, acceptable operation. Are you considering building on some of that? Because what I am seeing here is the operational component based on a risk analysis, but I'm wondering if you are going to be a bit more reflective in terms of some of the practices from a

management standpoint that are occurring at existing operations and then building on that to develop a higher quality standard.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I don't know, Louie. I wasn't following the question entirely because I was figuring that all the questions are John. Thankfully, this John was paying attention.

**MR. JOHN MCCONNELL (De Beers Canada):** I think, Louie, we are always conscious of what the other operations are doing. We have a very good rapport with both Diavik and BHP. That's not to mean we can't work closer together on developing practices. I think in terms of HR planning, it's probably where we are the closest aligned in terms of there is a mine training committee that involves all three operations, as well as the Con Mine. So I think we are doing some of that. It could be better.

I think in terms of ISO, I guess we would like to think we are leading the pack. BHP is starting implementation of registration of ISO. You know, it is a very rigorous undertaking, and I can't imagine after the detail we have had to go through what it is like to register a mine the size of Ekati, but they are moving in that direction, and I understand Diavik is also looking at it as well.

Do you have anything to add to that, John?

**MR. BILL KLASSEN:** Does anyone else have any questions? Louie again.

**MR. LOUIE AZZOLINI (MVEIRB):** I'm going to take off my review board hat, if people don't mind for a moment here, or is that illegal?

**MR. BILL KLASSEN:** I don't think the session is in session. I think this is the lunch hour. Go ahead.

**MR. LOUIE AZZOLINI (MVEIRB):** I would be interested if... ideally, I do believe in a free market competitive approach to environmental management, and I would be really curious if De Beers would be willing to compete against Diavik and BHP to increase its operational performance on whatever agreed upon basis across the other companies. In other words, compete and the winner gets something in return from a shared contribution. In other words, compete with the other companies to achieve higher environmental standards.

**MR. JOHN MCCONNELL (De Beers Canada):** I assume that was putting your MBA hat on when...

**MR. LOUIE AZZOLINI (MVEIRB):** Yeah, and it is, actually, and there are a number of ways of doing that, but essentially, self-regulation through competitive

action rather than, you know, having people stare down government enforcing regulation in ways that may or may not be as productive.

**MR. JOHN MCCONNELL (De Beers Canada):** Yeah...

-- Interjection

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think that... what you are suggesting is the equivalent of three people deciding to go on a diet and challenging each other to who is going to lose the most weight.

-- Interjection

Right, so... you know, I think it's that...

-- Interjection

-- Laughter

You know, while I take our point, I think that the key is that we are not doing this as a race. We are doing it because it is a good idea and there are equivalents that... I think it would be hard to do that in a meaningful way because of some of the differences in operation. I'm not saying you couldn't do it across it, but it's... given that those mines are already designed, they are locked into the plant and this sort of thing... you know, I think it would be too complicated. I think... and I think that it detracts from the intent. We are wanting to do the best job that we can and we are wanting to improve as much as we can, so regardless of where the government has got, you know, it's providing us with the mandate. We are being proactive. We are not waiting for government to say improve your environmental performance.

**MR. JOHN MCCONNELL (De Beers Canada):** I certainly don't toss it aside completely, Louie, because I think there are examples of it, maybe not on the environmental side but certainly in mine safety, yeah, all the mines compete against each other and I think Tony will verify that the mines take it very seriously. I think it is coming up with the measure that is the difficulty, and perhaps we are talking Kyoto here, and we can see what happens there in terms of measure.

**MR. LOUIE AZZOLINI (MVEIRB):** Thank you for entertaining my philosophical ramblings. Thank you.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I guess I would be really interested in asking what people think of it. You know, how much of this



presentation has increased your understanding of what ISO is? And do you think that it is valuable?

**MR. BILL KLASSEN:** This gentleman whose name I don't know, and then Tim.

**MR. DEAN CLUFF (RWED):** I'm still not that clear, really, on the ISO. I see that there's some standards and targets and there's accountability, and it's going to be made public, but I'm still not clear. Are there other specific targets that you make? I saw in the flowchart that there's continual improvement, so do you start off with something and you get approved and you are trying to reduce it by 10 percent in the life of the mine, or details like that?

**UNKNOWN SPEAKER:** In regard to continuous improvement, on an annual basis, we are going to be audited by a third party. And if you cannot demonstrate in that audit that there has been continuous improvement, you will not be recertified. So it is a requirement of the standard that you continuously improve.

As far as the targets and objectives go, they are not set by any ISO standard. They are established by the company themselves, and then you are judged on your performance based on your targets, but it has to be in an improvement mode.

**MR. BILL KLASSEN:** Tim.

**MR. TIM BYERS (Yellowknives Dene):** I'm just wondering, this is a presentation on 14001. I'm wondering if other parts of the 14000 series is also applicable to you guys, and I don't really have a whole lot of knowledge about any of these other aspects, but I noticed, for example, 14004 is also an environmental management system protocol. I'm wondering if your company has any other parts of the series that they are using to come up with environmental management plans.

**UNKNOWN SPEAKER:** We are exclusively using the 14001 for our environmental management system platform. But we do plan on using... right now, it's an OSHASH 18001 rating, which will soon be either... we expect next year will be an ISO 18001 standards. And that is in regard to safety and health.

So we do plan on incorporating more international standards into our systems management.

**MS. JANET HUTCHISON (NSMA):** One of the parts of your flowchart was development of monitoring procedures. Am I right in understanding that those procedures have been developed as part of your application, or they are in process?

**MR. JOHN GOYMAN (De Beers):** The monitoring procedures are specific to the activities on site at present. Those will be expanded upon as we move forward, so again, this is a living system and nothing in here is stagnant, so we will be building on an ongoing basis. By no means is this complete.

**MS. JANET HUTCHISON (NSMA):** Are the existing proposed monitoring procedures, are those available to the public?

**MR. JOHN GOYMAN (De Beers):** Yes.

**MS. JANET HUTCHISON (NSMA):** And all the lovely binders in front of you, are those available to the public? Is that a no, John? I don't think I have another one, Louie.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I just know that you would love to read these binders.

**MS. JANET HUTCHISON (NSMA):** I want to see the blue binder.

-- Laughter

**MR. ROBIN JOHNSTONE (De Beers Canada):** Oooooooh, the blue binders.

**MR. JOHN MCCONNELL (De Beers Canada):** I think she sees a marketing opportunity.

-- Laughter

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think one thing that we need to make clear about the monitoring is that it is specific to the activities on site, so you know, we need to discriminate between the actions that we have taken on site and then the impact predictions, the biophysical wildlife effects monitoring program, that sort of thing.

But there are synergies there, you know, and I think that that's certainly something that we're not puzzled over, but certainly have pondered over a lot, is that we... you know, ISO provides us with a system that is subjected to scrutiny and that we can make the results of available to the public, and where that lies in relation to monitoring, and other monitoring that is done, I think a lot of the wildlife management measure fit underneath this, and that we've still got, as Andy discussed, we've still got a lot to develop and include, so you know, working out how that fits and without creating duplication is something that we are still working through.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess John Brody asked the question about when good or best practices regulations don't exist. I should point out that these four binders here aren't the same thing, and the title on them is Laws Affecting the Snap Lake Advanced Exploration Program. It is kind of hard to believe that when you look at these four binders there could be a law that doesn't exist for activities on site.

**MR. ROBIN JOHNSTONE (De Beers Canada):** But Janet wouldn't know because...

**MS. JANET HUTCHISON (NSMA):** John, stop taunting me with the binders, okay?

-- Laughter

**MR. BILL KLASSEN:** Are there other questions? Tim, then Tony.

**MR. TIM BYERS (Yellowknives Dene):** The reason I brought up 14004 is that I read somewhere, mostly from this paper is that 14004 provides more direction than does 14001. As an example, 14004 apparently requires measurable targets. In other words, not just "we will reduce carbon emissions or acid rain emissions" but by how much. That is what 14004 does that supposedly 14001 doesn't. That is why I was wondering if 14004 is included in your management system.

**MR. JOHN GOYMAN (De Beers):** At the present time, 14004 is not considered, but it is out there as a potential to contribute to continuous improvement.

**MR. BILL KLASSEN:** Tony had a question, and then Louie.

**MR. TONY KING (Gartner Lee):** Thanks, Bill. Having been involved in some of these sort of similar exercises in the mining industry, I think that the step that De Beers has taken is very important, particularly at this stage of their operation where they are in the long process of getting through the environmental assessment process and getting their operation up and running. This process requires a lot of work to put together the paperwork. As John said, there is a huge amount of paperwork. It does give a lot of substance to the kinds of things they are doing, and I think one of the examples, for instance the risk assessment process and assessing and assigning risk values is I think very important in the process that they are going through. I think it will be a big help to them and to others in the future to judge the performance and be able to monitor things a lot more effectively.

**UNIDENTIFIED SPEAKER:** I was actually going to say something along those very lines. In the NWT it isn't something that is done a lot, the ISO 14000 component. The fact that industry is doing it here, and I would be hard-pressed to

see government departments go out and do it and actually achieve that. I am not trying to bang on them, but there is an issue being taken. What it does, it does benchmark at the very least what is going on. Once you have a benchmark then you can start cranking things up. That is where I think a lot of current industrial processes in the NWT are lacking, is that everyone is doing good things but no one is benchmarking and tracking for management purposes. Without sounding like an industrial (inaudible) I mean, they are doing a good job. I think it's a good start. I think it's a great start.

**UNIDENTIFIED SPEAKER:** Just to follow up on Tony's comments, and thank you for those positive comments, Tony, but that risk assessment we have already seen the benefits of it. Obviously it focuses you on what are your highest risks. Tim talked about the risk of a major oil spill on the winter road. That is a big risk. We talked about, is there going to be a year when you can't get supplies up to site? That's a big risk. So it does focus you on those things and hopefully you are thinking of ways around mitigating those high risks. Certainly some of those smaller ones that are out there that are smaller in terms of dollar value, we have had a look at and come up with ways of dealing with them and lowered the risk.

**MR. BILL KLASSEN:** Does anyone else have a question or an observation on this? Well if not then I would like to thank you, John, that was most instructive. We will reconvene at 1:30.

-- Break

**MR. HAL MILLS:** In terms of our agenda. We didn't get to sort of go around the table this morning as to how you felt about how all your issues were addressed, so we are going to do that. Rachel, who is not back yet, indicated that she had at least one more question related to winter roads that she wants to fit in. We have got the production rate question. We've got a fairly good sized set of three presentations that De Beers will be making, and then back into all the issues that you want to raise with respect to reclamation, closure, revegetation and air quality.

So I would like to get started then, mainly turning to Sharon with respect to the list of five or six issues that she raises. If you feel these things are still issues, whether you are fairly satisfied with the responses you've got and if you feel they have been resolved.

**MS. SHARON SMITH (Natural Resources Canada):** I think the discussion and the answers are quite helpful to me and I appreciate Don's presentation and the responses from De Beers. I have some more information, I would like to be able to take that away and think about it and decide once I have some time to think

about it what issues may be left outstanding. So it may still be something in a technical report is what I am saying.

**MR. HAL MILLS:** Thank you. Anyone with respect to that set of issues that Sharon brought up?

**MR. LOUIE AZZOLINI (MVEIRB):** Sharon, I guess for the record and for the board's benefit, if I understand you correctly you don't want to say anything one way or the other about the presentations and whether they have addressed some of your issues?

**MS. SHARON SMITH (Natural Resources Canada):** No, I am not saying they didn't address. I mean, I asked questions and they addressed some of the issues, I just want a bit of time to assimilate everything from today and then decide on that at a later time. Okay?

**MR. LOUIE AZZOLINI (MVEIRB):** Thank you.

**MR. HAL MILLS:** The next issues were with respect to the use of the eskers. Rachel is not here. Does anyone else from the Yellowknives care to comment on that? Tim.

**MR. TIM BYERS (Yellowknives Dene):** Yes, I think after discussions with Dean Cluff on eskers and its use by wolves, and some of the elders suggestions on how best to remove material from the eskers, it seems to me that there is going to be a need for further discussion on eskers and the use of eskers by the local wildlife and how best to remove material. Ultimately it sounds to me like the Yellowknives would probably require a site visit to the esker itself at some point. So those are my only comments. I hope they are helpful.

**MR. HAL MILLS:** We also had -- it would be fair to call it a bit of a sideroad discussion on the various things related to the winter road operation. Is there anyone who cares to comment as to how satisfied they are with that presentation and any results from it? Of course, Rachel may have a particular question to ask related to that if it is still possible. Tim.

**MR. TIM BYERS (Yellowknives Dene):** I will let Rachel voice her questions on the winter road. She can express her questions better than I can. The only thing I would add is on the idea of the probable frequency of diesel spills on the winter road. When I and the Yellowknives Dene land and environment committee are discussing this particular aspect I feel safe in telling them that it is probable that a diesel spill will occur on the ice road based on what I have heard today. Thank you.

**MR. HAL MILLS:** On Rachel's particular question, I just want to note that we aren't quite sure how long Don Haley is going to be with us. I am not sure what the window of opportunity is going to be there.

Production rates then, before we have the afternoon presentation. I will ask Tony Keen to address that.

**MR. TONY KING (Gartner Lee):** Just going back, and I am not sure if production rate is maybe the correct title, in one of the earlier information requests De Beers responded that the host rock dilution of the oil was originally estimated at 20 percent but was currently being reexamined. Then in one of the later information requests responses, and I quote, questions related to the effects of dilution and the relationship to the waste rock pile would benefit from further discussions at a technical session.

I guess the implications are that if dilution, if waste rock dilution increases from the underground mining then the amount of waste rock onto the north pile is greater. As they indicated it would benefit from discussion and I was wondering if there was any comment to that. Thank you.

**MR. GREG ORYALL (AMEC):** Tony, that is certainly true that over the last year or so we have been looking at a continue evaluation of mining methods, the mining resource, dilution, and the numbers have all been going up a little and down a little. I think at the time of the EA we were forecasting at that time about 20 percent mining dilution and there was some internal dilution as well that was included within the grade of the kimberlite itself, and that added up to approximately 23 million tons of rock being mined and processed in the plant, and some of it going underground in the rest of the north pile.

I think the current estimates by some of the most recent modeling by De Beers is in the neighbourhood of mining dilution approaching 30 percent but with reduced internal dilution offsetting some of that. That is resulting in somewhere approaching about 26 million tons of material mined over the mine life. Now if that were actually true, if that were to happen, that would mean that there would be about somewhere less than a metre, 0.9 metres in overall height on the north pile, for instance. It would maybe increase the mine life by a year and a half or two years, maintaining the same production rate.

One thing I want to stress is that these are variations that are still within the range of certainty or variations on the resource itself anyway, which I think is about plus or minus 15 percent. So these are kind of the normal to's and fro's as recalculation is being done. Right now there is a lot of work being done to refine the mining method so we can take less rock with that, because it is obviously beneficial to do that.

As far as capacity within the north pile, certainly the north pile has been situated, as far as we saw yesterday with respect to surrounding land forms, in a way that another 0.9 metres in height will disrupt anything in any visual fashion.

Similarly, the north pile has also been located to allow potential area to the west for additional storage because as I think has been stated in the project description and the EA that we still don't know the ultimate bounds of the resource and of the mine. We've only identified a certain tonnage and we are aware that continuing exploration over the course of operations may well increase the mine life, so it was prudent to site the north pile on an area where there is room possible for perimeter expansion.

So having said that, there are lots of opportunities, I think, for material storage. But the dilution still seems to be within the manageable range of our estimated accuracy. So a long answer to a short question.

**MR. TONY KING (Gartner Lee):** Thanks, Greig. I guess having been present at the discussion yesterday on the north pile and having seen the detail of the contours and the shape and the capacity and so on, I think that answers that question. Thank you.

**MR. HAL MILLS:** Tony, do you have other questions with respect to production rate?

**MR. TONY KING (Gartner Lee):** No I don't, Hal.

**MR. HAL MILLS:** Does anyone else have questions or concerns with respect to production rates? Does De Beers have any comments that they wish to make? Okay, let's move along then. I understand you have a series of three presentations to give. Over to De Beers for that.

**MR. JOHN MCCONNELL (De Beers Canada):** We have three presentations. The first is by Greig Oriel and it provides an overview on closure. Then we will have a presentation on the reclamation, particularly related to revegetation, and then the third presentation covers air quality and it is the environmental assessment aspects of the air quality. So I will turn it over to Greig Oriel.

**MR. GREG ORYALL (AMEC):** Thank you, John. Can you hear me? Is this loud enough? No one is answering so I presume you can't hear me. What I will do today is describe briefly the physical aspects of the closure plan, and then after I speak Mark Ely will talk a bit about revegetation.

Briefly, we are looking at four assessment facilities for closure. There is the north pile itself which is the largest land form on the site, which is the processed

kimberlite and waste rock pile that we discussed yesterday. There are all the buildings and facilities located on site, primarily crowded into that end of the peninsula, but some located around the north pile such as the explosives manufacture and magazines and so on.

There are the site roads to and from the facilities and the airstrip, and then there is the underground mine along with the ventilation raises, the two ventilation raises that are located on the north shore. Finally, I just want to touch on the monitoring plan, some of the monitoring elements associated with the physical closure of the site.

Closure has been outlined in the...

**MR. HAL MILLS:** Excuse me, Greig.

**MR. MARK DAWE (Environment Canada):** I missed something about the schedule. Are you having three presentations in a row, the third is air quality? Okay, and then air quality discussion is going to take place at around 4:00?

**MR. HAL MILLS:** It will take place when we get to it, I'm afraid. There is no predicting it with great accuracy. Greig, while I have the mic on, could you slow it down just a bit? I think the translators are...

**MR. GREG ORYALL (AMEC):** This topic has been addressed in section 10.2 and two parts of appendix 3 in the environmental assessment reports and in a number of information requests.

A map, just to briefly remind us of the proposed facilities. The bulk of the buildings and facilities are located in this part of the site, with a few located out here, and explosive storage and magazines to be located there. The underground mine itself occupies an area approximately like this under the surface, with the two ventilation raises on the north shore, approximately here.

Then there is the north pile itself that we discussed yesterday, and the water management facilities associated with that north pile. And then there are the site roads and the airstrip.

We described the north pile yesterday in some detail and showed how it will be reclaimed progressively during the course of operations. We also showed that most of the coring materials will be obtained from within the north pile footprint, including the quarry materials that will be used for a lot of the capping of the north pile.

We also showed yesterday how the potentially acid generating rock, the PAG rock which is the metavolcanic that we encounter in the first two years of mining



will be deposited in the base of the north pile, and then encapsulated within the process kimberlite.

Also, we didn't discuss yesterday, but in the EA it describes a solid waste, an inert solid waste landfill that will be operated in the north pile and then also capped and encapsulated within the processed kimberlite.

This is a picture, you probably recognize this from yesterday, or something similar, showing the status of the north pile at about year 10. The starter (inaudible) has been complete and filled and capped. The east cell, this region now, is just nearing completion, final drainage and finishing off of that pile is nearing completion, leaving the western cell for kimberlite deposition.

As Mark will talk about later, we will have an opportunity to start looking at things like revegetation and performance of the closure of the north pile as early as perhaps year three of operation when the starter cell area is capped.

At the end of the mine life, this is what the pile will look like, with the entire north pile capped, contoured to provide drainage with no ponding or collection of water at all on top of the pile. Then the perimeter drainage collection system and forwarding system and water treatment facilities in the water management pond still in place for the time being.

When we have demonstrated that the water being collected by the system is suitable for direct discharge and no longer requires treatment or any special handling, then the water management system will be decommissioned and all of the drainage system and ditches will be taken apart, drainage will be restored with natural drainage patterns, some of which flow off in this direction, some off into here, some berms or small dykes that have been constructed to manage and control drainage during operations will be removed. Then the dams that have been built around the ends of this original lake, the former water management pond, will be brought down or breached to restore the natural flow of that lake region before operations.

Turning now to the closure plan for buildings and facilities, all buildings will be removed on closure, will be taken down. Material and equipment that has resale value will be removed from site and salvaged, resold. Material and equipment that doesn't have resale value will be disposed in the underground mine or in a licensed landfill, perhaps in or associated with the north pile. All foundations will be removed to a metre below natural ground level, and all site will be graded, scarified, and recontoured to restore it to its natural topography and drainage.

Culverts and embankments along the sides of roads and airstrips and so on will be removed and drainage patterns restored, reestablished. And all fill materials will be recontoured to existing topography.

The underground mine will be used for disposal of inert building materials and equipment to the extent that we can. Certainly any oils and re-agents and other materials will be removed from the mine, transformers and anything else that has to be taken out will be removed. When the mine is... when the material has been disposed in the mine, it will then be allowed to flood, much as we've done the last year or so, and then all the openings will be sealed, plugged and made safe, so it's not possible for persons or animals to enter.

Throughout the closure activities, there will be continual monitoring and in fact, throughout the operation activities, because in the area of the north pile, for instance, we're experiencing closure from year 3 or 4 of operations, so there will be continual water sampling and sediment sampling of the run-off and discharge from the site. There will be thermal monitoring of the north pile, even during closure, until we're happy that we've established the water quality or the water patterns that we expect.

Shallow ground water monitoring around the pile itself for the same reason, and of course, regular visual inspections of surface facilities. This in addition to whatever other post-closure monitoring, biological monitoring and whatever environmental monitoring is required. And the closure plan will of course be developed to meet the current requirements for the ...(inaudible)... restoration guidelines in the Territories.

So in conclusion, the proposed decommissioning measures will provide what we believe is a stable facility for post-closure, and we have the opportunity at the very early stages of operations to start understanding that and refining that and developing a better closure plan as we go on.

We are currently working on the specific step-by-step details of implementing closure. As you can imagine, it's a bit like building a house, but you are unbuilding it and you've got to do the right things first so everything is left when we are finished, so there are more details associated with how the closure will be actually implemented, but this I think gives you an overview of what we propose to do, and in what state we propose to leave the site behind. Thank you.

Mark, maybe you would like to talk about the revegetation.

**MR. JOHN MCCONNELL (De Beers Canada):** Maybe while they are changing presentations there, I will just introduce Mark briefly. It's Mark Healy. He's a reclamation specialist with Golder. He has over 12 years of reclamation

experience, ...(inaudible)... on-the-ground work ranging from mine sites to pipeline areas. Once you are ready there, Mark, it's all yours.

**MR. MARK HEALY (Golder Associates):** Can you hear me okay? Okay, before I start, I'm a lefty so when I'm using the pointer, I may kind of turn my back on to you. So I don't mean to be rude.

The purpose of my talk is essentially to complement what Greg started off, and just essentially provide you with some additional information pertaining to revegetation, specifically baseline information, wildlife habitat and biodiversity, and reclamation planning, restoration of ELC units that are not expected to reestablish on their own, salvage and reuse of desirable growth media, and test plot design data collection and information, information use.

The topic has been addressed in the environmental assessment report, section 10.3, appendix 3-1.1, and the listed information requests.

So this is, for a setting, this is looking obviously east-west at the mine site. It is in the tag shield eco-zone. It's predominantly a heath boulder complex, about 55 percent of the landscape setting is comprised of that, about 35 percent water, and the remaining a variety of minor ELCs.

This is near where the north pile will be, and it gives you a good illustration or example of what the heath boulder complex looks like. You can see a range just from 30 to about 80 percent of exposed rock, with vegetation patches in the communities in and around the rocks, so it's fairly barren, harsh, stressful environment for plants, especially on exposed areas.

You have already seen this picture, but again, as Greg mentioned, the majority of activity will be in this disturbance patch here and where the north pile is. There is these narrow linear corridors over to the... close to the storage area, but the real purpose of this slide is to just give you an illustration that there's a lot of areas within the lease, which is 550 hectares, I believe, that won't be impacted by disturbances, so the vegetation communities in those locales will persist and these narrow disturbance corridors, we have propagule, or plant sources, that we anticipate ...(inaudible)... or pioneer into some of these disturbance corridors over time. Same with some of the patches here. The big issue, of course, will be the north pile.

With any reclamation program, the biggest thing to do is try to minimize the amount of reclamation you have to do. And so in this case with the De Beers Snap Lake, we try to minimize the size of the overall footprint. For the baseline data, there is 120 plots, or plant communities surveyed and classified in 120 plots within a regional study area, and that gave us our baseline information for what

the community types were, and again, a lot of it was the heath boulder, which is a fairly homogenous community.

The idea will be to salvage growth media, soil and organics, when technically feasible. Again, it's very limited in the area.

And lastly, it will be ...(inaudible)...and natural vegetation community through primary and secondary succession. And by reestablishing that native or local plant community, in turn we will reestablish or maintain the wildlife habitat potential, as well as the biodiversity.

Revegetation plan overview, as Greg mentioned, we will be able to start probably at year two or three on the north pile, so that will be a good start point that we can start to gage for the ensuing years for the life of the mine, and we should be able to learn a fair bit from that, and then we can in turn apply those to other locales within the mine site. Obviously, where landscapes have been modified, we will want to recontour them and also create what I just termed microsites, so we can get some of these unique ELCs within the landscape.

There will also be the use of a variety of revegetation techniques, which pre-range everything from seeding local species to direct placement of salvage material, and that would be a good example to be on the north pile, where we could take some of the heath boulder material over the east block and place it on top of the starter cell.

So in that case, you are going to retain a lot of the lichen species, some of the other four grass propagules that are contained within that material.

Again, as Greg mentioned, there will be that progressive reclamation, so it is going to be a continuation of learning in that application. Obviously we will adapt and utilize revegetation knowledge obtained from other mine sites, kind of look at the successes and failures. There is no use reinventing the wheel if you don't have to.

And there will be the establishment of some tests or monitoring plots to assess plant regeneration and establishment. Some of those will be implemented right from the get go, just so we can start to monitor some of the functions and the processes that are happening out there. What type of species are starting to recolonize on their own? And those are the ones we really want to try to capitalize on and utilize for other... speaking too fast?

**MR. HAL MILLS:** Yeah, if you could take the occasional break. As well, I'm not quite sure whether everyone understands this or not, but if you could perhaps explain what ELC is for some of the people please.

**MR. MARK HEALY (Golder Associates):** My apologies. ELCs are ecological land classifications. And what they essentially do is delineate different types of vegetation communities into polygons, and they usually have some type of similar characteristics, maybe... whether found on the landscape, an example would be an open black spruce forest is one type of ELC. Heath boulder, if you probably can recall that first or second slide where it showed the rocks, and it interspaces the grasses and forbs and low shrubs growing.

There was seven within the local study area, ELCs within the regional study area... gosh, I've forgotten exactly how many... 12, yeah, but again, the heath boulder was a predominant one. It covered 55 percent of the local study area.

And lastly, adaptive management, which is essential and on any reclamation project, again you explore your successes and you learn from your failures.

Protocols and standards, we will meet and exceed the regulatory requirements and the end goal, which I'm sure I'll probably ...(inaudible)... will be equivalent land capability. ...(inaudible)... won't see that in our lifetime, but that is what we are striving towards.

Conclusions, some of this will be repetitive. Again, we minimize or De Beers minimized the footprint. The landscape will be left in a state that will allow natural ecological processes to continue. The progressed reclamation as I mentioned earlier, as well as Greg. There will both be short- and long-term monitoring and permanent plots. This point is very important. A revegetation plan has to be flexible. Again, some people fall into the trap of establishing one procedure, one protocol and trying to follow it through to the end of the life of the mine, and they get kind of tunnel-vision, and sometimes they get side-tracked, and they don't have the successes that they want, so you have to be able to respond, and that's why we have to have it a flexible plan.

Of course, De Beers will continue to work closely with stakeholders, regulatory agencies to achieve collective objectives, and in summary, this conclusion, I think it is very important we keep in mind that the landscape and the plant community that is currently there developed over hundreds and thousands of years, with a variety of interacting biological processes. And we cannot, as much as we would like to, duplicate those in 20, 30, or 50 years. In fact, we don't even know what a lot of them were. But what we can do is create a landscape that is possibly suitable for natural recolonization encroachment, with possibly some assisted planting and seeding to help start off that process towards equivalent land capability, stay or a mature or climax community, or late serial community, however you want to phrase it.

I think that's about it. If you want me to go over it again slower, I can, but...

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**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Mark. Our next presenter is Martin Rawlings. Martin is a air quality engineer with Golders. He has over 15 years of professional experience in the environmental consulting business, specializing in air quality modeling, dispersion modeling, atmospheric science and environmental assessments. So it's over to you, Martin.

**MR. MARTIN RAWLINGS (Golder Associates):** Can everyone hear that all right?

**MR. HAL MILLS:** The other Mark wants to speak here.

**MR. MARK DAWE (Environment Canada):** Unfortunately, our air quality guy is not here, and he was expecting this to happen a little later in the afternoon. I'm just wondering if we could delay the presentation until he could be here. I noticed the GNWT's is not here either.

**MR. HAL MILLS:** Okay, if people prefer, I expect that's probably okay with De Beers, is it?

**MR. MARK DAWE (Environment Canada):** Thank you very much.

-- Interjection

**MR. HAL MILLS:** ... a process here, Steve. What we do next is see if there are any questions on the presentations before we get to the issues. Are there any questions or clarification with respect to the two presentations you've just seen? John.

**MR. JOHN BRODY (DIAND):** One question on the closure plan. You referred to the standard of the current Northwest Territories water board guideline for abandonment of mine sites.

I don't know when you put your presentation together, but recently, DIAND has come out with a mine reclamation policy. I presume the company would be adhering to the objectives of that policy?

**MR. JOHN MCCONNELL (De Beers Canada):** We had quite the debate about whether that was a new policy or a new guideline last night, and when it actually came out, or if it was still indeed in draft form, but we are aware of the policy and we've used that in putting our plan together.

**MR. JOHN BRODY (DIAND):** Thank you. Yeah, I believe that policy has been signed, so it is in effect, and further to that, I understand that DIAND is also working on a updated mine reclamation guideline, which would be an update from the current water resources bluebook, which came out, I believe in 1992, so

an update to that is being prepared, and I anticipate it may be available for public dissemination in probably less than six months is my guess.

-- Interjection

... provided for your information at this time.

**MR. JOHN MCCONNELL (De Beers Canada):** Yeah, we are aware of that. It actually I think has been circulated in draft form, and they are asking people for comments on it right now, so we agree that it should be out and in six months to a year. Generally, I think translation takes longer than the content, so it might be a little longer than six months.

**MR. HAL MILLS:** Any other questions or clarifications? You still have another one?

**MR. JOHN BRODY (DIAND):** I have a couple of questions on the revegetation, which I would like to proceed with just a comment that I'm pleased to see that you are actually considering it rather than sort of declaring this to be barrenlands and there is no vegetation.

My question is there was mention of salvage of growth material. Is there an intent to stockpile that material, or only to salvage say from the east cell, say for reclamation of the starter cell.

**MR. JOHN MCCONNELL (De Beers Canada):** Actually, you reminded me of one point we did want to clarify from this morning's presentation that is related, so maybe I will just ask Greg Oryall to clarify the comment about when we build the airstrip, that we would just be burying the organic material that was in the road.

**MR. GREG ORYALL (AMEC):** Thanks, John. Yeah, I just wanted to reconfirm with our office in Vancouver, and I've since called to confirm that in fact, our construction plan calls right now for excavation of that peat that crosses the airstrip. Terry's perfectly correct that from a structural point of view, we can build on top of that, but we've included the costs and the time to excavate that peat and replace that with the structural fill material, so that peat is available for revegetation purposes to be stored somewhere.

**MR. JOHN MCCONNELL (De Beers Canada):** So to get back to your question, John, the answer is yes, we intend to wherever possible stockpile the peats and that for use in reclamation at the end of the mine life or during the north pile reclamation.

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**MR. JOHN BRODY (DIAND):** Okay, thank you. One last question. In the revegetation, it was suggested that there would be, or I guess implied that there would be revegetation of the starter cell, and I guess I had previously envisioned that the north pile was going to be largely a mound of...what would look like a mound of granite, boulders of ten to 25 centimetre type diameter, and now you are suggesting there may be some revegetation in that pile. Could you just sort of clarify that for me?

**MR. MARK HEALY (Golder Associates):** Well, on the surface, there is this... there is, in that heath boulder complex, there is lichen, there is... which has been there for hundreds and hundreds of years, so instead of simply burying it, we thought of trying to salvage what we could and place it on top of the closure. Just again, to provide some diversity of start point, through time, in amongst the cracks and the crevices between the rocks, there will be some organic accumulation, and some rooting materials, so you will start to get some localized growth in there.

**MR. JOHN BRODY (DIAND):** Thank you.

**MR. BUDDY WILLIAMS (DIAND):** Just two points right now, I guess, or comments. The first is in respect to the mine reclamation policy, and just to point out that it was signed off by the Minister in July of 2002, and I believe it did receive a wide distribution shortly thereafter, so it definitely is in effect.

The second one relates I guess to the slides on the abandonment and reclamation plans or the general principals. There was a reference to the disposal within the north pile and underground. I am wondering if a little bit more detail could be given as to the distinguishment between what goes in the north pile, what goes underground, and just how the operation of the north pile would be conducted to facilitate that disposal at the end of mine life. The way I understand it now is for the most part, progressive reclamation will be carried out for the life of the mine, resulting with capping of the north pile.

I'm assuming that there will be a bit of volume for materials to be disposed of in the north pile, and I'm just wondering how that will be carried out, I guess, as it relates to your presentation. Thank you.

**MR. GREG ORYALL (AMEC):** Yes, it's... you make a good point, that certainly once the north pile is closed, it is difficult to put materials within it. When we've looked at a number of scenarios for mine closure, including suspension of operations, indefinite suspension, temporary stoppage, there are some scenarios under which the underground workings themselves may not be available for material disposal, in the event, for instance, that the mine is flooded for some reason, and operations are suspended before completion of the mining plan, we



would not be able, for instance, to truck materials underground, obviously. So under those circumstances, we would plan to utilize the north pile, the inert material landfill in the north pile for disposal of building materials and so on.

Certainly there would be no difference between what is put underground and what is put in the north pile. I think anything that is not acceptable, any hazardous or reactive materials, would all be taken off site and would be put in neither location, in any case.

**MR. HAL MILLS:** Just a second. I'm not sure if Buddy has a follow-up or not.

**MR. BUDDY WILLIAMS (DIAND):** We'll be going around later for further discussion on any other issues as relates to the A and R. This is more for just clarification on the slide...

**MR. HAL MILLS:** Exactly, yes.

**MR. BUDDY WILLIAMS (DIAND):** So that will do it for the time being.

**MR. HAL MILLS:** Okay, Tim and then Steve.

**MR. TIM BYERS (Yellowknives Dene):** Thank you. I've got a couple of questions. The first one is I am wondering if your company has any idea of putting measures in place to prevent the introduction of non-indigenous plant species, that is species of plant that do not normally grow in the area. I know BHP has had weed species from the south that were introduced, not voluntarily, but introduced onto their study plots. And what we were told was that these were seeds coming in off the boots of workers on the mine. I am wondering if there is any vision at all of what measures you could put in place to prevent the introduction of potentially colonizing species that should not be there.

**MR. ROBIN JOHNSTONE (De Beers Canada):** That is basically a new issue that you brought to our attention, Tim, so we haven't thought through that issue.

You know, on the whole, the exotic species one is, essentially it's the reclamation plan, the revegetation plan, is not to use exotic species, but that is distinct from the seeds on boots issue, so we don't have a policy on that.

**MR. TIM BYERS (Yellowknives Dene):** Thank you for that answer. My second question might be a bit more provocative, but in looking at your closure plans, I noticed that... well, first of all, is there a time frame for your monitoring programs for the various aspects of your closure? In other words, after closure, is there going to be monitoring such and such for two years, three years, whatever it happens to be?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Tim, we don't have those details. We recognize that one of the things that we are wanting to do is make the most of the 20-odd years of experience we are going to be able to gather with the starter cell of the north pile, and that while we are doing that, we also have the opportunity of observing encroachment along the likes of the roadways when it comes to vegetation.

Probably one of the key differences with this approach is that what we are really wanting to do is essentially let nature run its course. The environment that is up there is the result of ecological processes of thousands of years. And we want to look for opportunities where we can assist it, but we don't want to drive it, basically overtake it, if you like, because I think some of the experience in southern Canada, and Mark can probably talk to this more, is that to some extent, there is a lot of problems with that, and that it's continually driving it.

We want to leave the land in a way that will facilitate the ecological processes that have started as the way it is and basically continue with those, so in terms of the monitoring, we think we should have a good handle on that, and that a lot of the details are not going to come for some years yet.

**MR. TIM BYERS (Yellowknives Dene):** So basically what we are hearing is that this is a closure plan for the footprint only. I guess my big multi-million dollar question may be, that's fine for the footprint, I understand what you are telling us for the footprint, but as far as monitoring of potential closure, post-closure impacts, we have been told that we won't be able to see groundwater that has been contaminated by moving through the closed mine shafts, we won't even see that hit the northeast lake for 60 to 150 years, so we are talking three to five to eight generations of the descendants of the people who live here.

With such a long time frame before an impact, if any, will even be experienced, I guess my big, over-arching question to both De Beers and the regulators is will this northeast lake be monitored for water and sediment quality, however many generations down the road, and if anybody has talked about this or has any ideas how this will occur and if it will occur? Or, 150 years from now, will we just all forget about it?

**MR. HAL MILLS:** Tim, I know it's a fine line, but I keep trying to draw a differentiation between issues that you want to discuss and clarification of the presentation, and I quite believe that you are into an issue, so if I can invite you to raise that, and I want to get to going around the room and drawing up that list of issues for discussion shortly, so I would like to wrap up things shortly with respect to the clarification, but Steve has indicated that he has a question.

**MR. STEVE MATTHEWS (RWED):** A question for Mark. In your presentation, you used the term equivalent land capacity, and that's also used in the assessment report. I wonder if you could define that for me, and specifically, I'm interested to know whether you use that term in an ecological sense in terms of habitat capability and things like that.

**MR. MARK HEALY (Golder Associates):** That... equivalent land capability of course originated on landscapes or utilized for agriculture, forestry production and other uses, and it's found its way into a variety of sites throughout the world now.

My definition of it, my working definition, is to rehabilitate the landscape so that its potential biological productivity is similar to that that existed prior to the disturbance. Or are alternatively similar to the biological productivity of the surrounding undisturbed landscape.

**MR. HAL MILLS:** Okay, as I was trying to wrap things up, a whole bunch of hands went up in the air down here. I will just point out one more time, if you spend the rest of the afternoon discussing the presentation, you won't get to discuss the issues. Mark.

**MR. MARK LANGE (Fisheries and Oceans):** I've got some questions on clarification on the presentation, but I'm quite willing to go to the full-fledged discussion and wait to bring these comments up then. I think I've partly got an answer to my question, which was I wanted some clarification on what was the goal, De Beers' goal towards reclamation, and I kind of heard two extremes. Well, the landscape takes tens of thousands of years to form, and another goal of facilitating the establishment of the structure, the landscape structure. I just want to make sure I had the goal straight, particularly in reference to your last comment on bioequivalence.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Mark, what's your question?

**MR. MARK LANGE (Fisheries and Oceans):** What's the goal of reclamation for De Beers at this site?

**MR. MARK HEALY (Golder Associates):** I'll just back up for a minute. You sound like there was some confusion between the ecological processes and plant ...(inaudible)... taken hundreds of thousands of years, and then also our statement of manipulating the landscape to set those processes in motion. Is that kind of the gist of your...?

**MR. MARK LANGE (Fisheries and Oceans):** Yeah, I guess I'm wondering what are you expecting to see after you call reclamation done? What is the goal?

**MR. MARK HEALY (Golder Associates):** Well, the goal, the short-term goal over the next 20 plus years will be to establish a landscape profile that will promote a continuation of successional processes of local endemic or native species. Unfortunately at this juncture, our knowledge about the physiology and morphology of a lot of these plant species, we don't really know how they are going to respond to disturbances. Some may respond very favourably, some may not, and that would be part of the monitoring program, just which species do respond in the positive.

And then again, if I could use an example from south of the 60, a lot of times for reclamation success they will use numbers, such as 80 percent live plant cover. In a lot of cases, you can achieve that in 10, 15, 20 years in favourable growing habitats. In this scenario, very harsh and stressful growing habitat, everything is delayed, so we cannot really use that as a gage, say 80 percent cover is success in reclamation.

I think what success in reclamation is is we have to look beyond just the plants, but at the processes occurring.

Does that answer your question?

**MR. MARK LANGE (Fisheries and Oceans):** Yeah, that answers my question. I guess we will continue that discussion after we completed the clarification process.

And I think I will leave it at that, just kind of questions to think about in a few minutes that I would like to ask is how do you know when these reclamation goals have been achieved? I think you mentioned the equivalence land capability, so bioequivalence, and you mentioned this 80 percent I guess productivity or biomass was used in the south, and I would like to further that discussion. And in addition, how do you measure for those successes? Thanks.

**MR. HAL MILLS:** Okay, I believe Glenda and Tony indicated and now Chris is joining in as well, questions of clarification. And Velma as well. Okay, Glenda.

**MS. GLENDA FRATTON (Gartner Lee):** I just have one clarification question, and then I will hold off on my other question. The presentation actually cleared up several of the issues that I had, but I'm just still a bit unclear with the north pile, what is the plan for that? Or not plan, but what are the goals for that? I mean, with respect to reclamation, revegetation. Mark did talk about it a little bit earlier, so...

**MR. ROBIN JOHNSTONE (De Beers Canada):** It starts with covering of it in granite. Ultimately, to paraphrase, a return to equivalent land capacity or the term

that's used, we're letting nature run its course. But that doesn't mean that there are not opportunities for us to assist it along the way, and you know, people have discussed the work that has gone on at BHP, and you know, our emphasis is not on the introduction of exotic species. We want natural species that will reflect the local biodiversity to basically establish there, but if there are opportunities to see how well some of the material that we've scraped off the surface from elsewhere through the bogs or whatever to see if that assists with basically the natural colonization period, then we'll do that.

But you know, it's one, we'll watch and see what happens with mother nature. The second is we will identify opportunities wherever we can apply adaptive management to try and assist that process along the way.

**MS. GLENDA FRATTON (Gartner Lee):** I guess Mark had mentioned something about the starter cell and that there is... I don't know whether it was soil... not soil movement, but some salvaging. That's what I'm trying to clarify.

**MR. GREG ORYALL (AMEC):** Yesterday, we discussed in some detail the evolution of the north pile. It will be constructed in three segments, or three cells. The first of these is the most southwest part of the north pile, closest to the airstrip and the plant site. That we called the starter cell. It's at higher ground elevation so the pile is relatively shallow, the process kimberlite pile there, and it will only take about two years or so before that part is complete.

And then process kimberlite will start to be deposited in the next cell, which we've called the eastern cell, and which will then allow that starter cell, that first area, to be contoured and capped with granite. And at that point, that area now is available to start understanding revegetative processes and so on.

**MS. GLENDA FRATTON (Gartner Lee):** Thanks for that. That clarifies.

**MR. HAL MILLS:** Okay. Chris.

**MR. CHRIS BURN (DIAND):** You've made it clear that the principle purpose of the reclamation, particularly the revegetation, is for ecological and what might be characterized as esthetic purposes. Are there any other effects other than ecological or esthetic that you expect your revegetation program to achieve, particularly on the north pile?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Chris, you've got some in mind, I think, so can you tell us what they are and then we will get back to you? I'm not sure where you are going or what you are alluding to, Chris.

**MR. CHRIS BURN (DIAND):** The presentation of revegetation has been exclusively in terms of the species that are to be present, and in terms of the

abundance of those species. To some extent, the distribution of those species on the pile and in the other structures.

My question concerns the long-term evolution of that feature in other than a sufficial fashion. In other words, manipulation of the surface of the pile may have implications for the internal composition and the internal nature. Of course, from my perspective, I'm referring primarily to thermal or temperature conditions within the pile.

And my question is whether the reclamation program, not specifically the revegetation program, the revegetation is the emphasis of the question, whether this has considered or has a purpose which is associated with, one would expect, the long-term conditions within that structure.

**MR. ROBIN JOHNSTONE (De Beers Canada):** No.

**MR. HAL MILLS:** Velma.

**MS. VELMA STERNBERG (DIAND):** I have three questions, two on vegetation, one on reclamation, and they hopefully only require a yes or no answer. And I would also like to apologize in advance to anybody, because they might seem like questions from left field, but I do have a point to which I would like to get to.

The first question is for reclamation. Did De Beers examine options for alternative use of the site, and/or consult with the First Nations in regard to alternative site use?

**MR. ROBIN JOHNSTONE (De Beers Canada):** No.

**MR. JOHN MCCONNELL (De Beers Canada):** Just to add to that, I mean, there has been informal discussions about things like this would make a nice hunting camp or fishing camp at the end of the mine life, but that's as far as it's gone. I think there is plenty of time over the next 25 years to have those discussions.

**MS. VELMA STERNBERG (DIAND):** Yeah, my questions are not intended to cast aspersions. I'm more curious than anything else. Okay. I was very happy to see not only plants mentioned, but lichens mentioned during the revegetation presentation, and along that line, I wish to know, does the reestablishment of vegetation include the reestablishment of fungi species?

**MR. MARK HEALY (Golder Associates):** Yeah, we've included fungi species also. And just as a side note, on some mine sites I've looked at, fungi actually ...(inaudible)... in some locales coming back into place, and I think there is some symbiotic relationships between it and other species.

**MS. VELMA STERNBERG (DIAND):** That's correct. Fungi are also very good metal collectors in some cases. Okay, and the last question is has De Beers examined the productivity of the process kimberlite with regard to sustaining vegetation and... I'll just leave it at that.

**MR. ROBIN JOHNSTONE (De Beers Canada):** No, we haven't. We are aware of growth. We are aware of kimberlite being used as a growth medium, but not in relation to endemic species.

**MS. VELMA STERNBERG (DIAND):** Thank you very much for your answers.

**MR. HAL MILLS:** Are we ready to draw up a list of issues that you want to discuss? Mark.

**MR. MARK DAWE (Environment Canada):** The air quality guys are here now, so whenever you want to schedule that presentation, thank you for holding it up.

**MR. HAL MILLS:** Sure, we'll just skip any issues related to this and go to air quality.

-- Laughter

I think we can ask the air quality guys to just wait for a while. I'd like to draw up a list of issues you want to discuss before we have a coffee break. Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** My issue would be directed to the GNWT. My question to them would be basically if they are responsible for providing seeds or seed banks to proponents who wish to revegetate.

**MR. HAL MILLS:** Okay, thank you. Other people with issues to raise? Tim.

**MR. TIM BYERS (Yellowknives Dene):** You've already heard my previous issue at length. The other thing I wanted to ask was as far as vegetation and reclamation, if uptake of heavy metals and/or other contaminants in the vegetation will also be looked at as part of your reclamation program? And also, a question regarding closure of the mine shafts and that is whether there will be any things like diesel and oil products from the trucks servicing the shaft. Or like materials that will be locked into the shaft fumes, whether there will be an opportunity to have all those fumes expelled before the vents are close, so those types of things, what can end up being locked into the shaft at closure is what is of concern. Thank you.

**MR. MARK LANGE (Fisheries and Oceans):** I feel kind of odd asking these questions here. They don't really have to do with fish, do they? Anyway, here it goes. Furthering on the clarification of the goal, just two questions; how will De

Beers know when the reclamation goals have been achieved, and how will they measure whether or not reclamation was successful or not?

**MR. HAL MILLS:** Thank you, Mark. Other issues? Perry.

**MS. PERRY MEHLING (DIAND):** Perry Mehling, for Indian and Northern Affairs. Based on yesterday's discussion on the uncertainty of the thermal freezeback, or rate at which the north pile will freeze, there are some implications for geochemical, long-term geochemical issues and management of potentially acid-generating material. And I think the issue comes... how to phrase it. The issue is how to best manage PAG materials and other materials, given a variety of rates for freezing of that north pile. The... I believe the original reclamation plan identified a frozen pile where we are talking a two-metre lift that's going to be where the two-metre outside layer that's essentially active, and I understand eventually that pile will probably be frozen, but there are some issues along the way if that freezing takes a greater length of time.

**MR. HAL MILLS:** Anyone else? Glenda.

**MS. GLENDA FRATTON (Gartner Lee):** This is not really new issues. I just wanted to get an expansion on how wildlife habitat will be considered in the revegetation, or whatever you want to call it. I keep calling it a plan, but I know you don't have a plan yet, they are more considerations.

And just an expansion on soil handling, if there are certain areas identified for soil excavation. I know the airstrip was one. I'm just wondering if all those areas have been identified.

**MR. HAL MILLS:** Okay, thanks. Buddy.

**MR. BUDDY WILLIAMS (DIAND):** I've got a question, I guess, on the alternatives and the various disposal options and how De Beers arrived at this particular option for closure, more specific to do I guess with the disposal areas, locations and so forth.

**MR. HAL MILLS:** Okay, will that do? Okay, let's take a short coffee break and then get into the issues. Thank you.

-- Break

**MR. HAL MILLS:** We are hearing from Joe Michel from Lutselk'e, and he will be introduced by Florence Catholic, and then we will deal with the issues. The one that Perry Mehling put forward will be dealt with first, because... if I had a siren, I would use it. Thank you. We do have a lot of ground to cover, and there are some people who are not going to be available to us beyond today, so we do



need to take advantage of their expertise, so the schedule for the remainder of this afternoon is that Joe Michel from Lutselk'e who has arrived will be given an opportunity to speak, and then we will deal with the issue and the one that was raised by Perry Mehling will be first on the agenda, so Ken DeVos can help with a response to that, and then probably somewhere around quarter after four, after we have wrapped up the issues, we'll have the presentation on the air quality.

So I will... you will need your translation devices, and we seem to have had a bit of a technical problem with one of them here, so as soon as Florence is back, I will ask her to introduce Joe Michel.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Mahsi. Before I introduce Joe Michel, the elder from Lutselk'e, I just want to say some things in regards to this process. Lutselk'e is a community that is east of this community of Yellowknife on the east arm lake. It's close to the area that has been discussed this week and last week. It's in the area where our main food source, which is the caribou, migrates through.

And this week, I also talked about this new process in doing environmental assessment. Lutselk'e is now going through three environmental assessments, one in BHP, which was done under the Canadian Environmental Assessment Act, which had a different process. Also through the Diavik Diamond Mine, which was under another process. And now we are here with De Beers, which is doing a process under the Mackenzie Valley Lands and Water Board, under their Mackenzie Valley Impact Review Board.

Lutselk'e's opinion on who makes decisions in regard to license and permitting is well-known, because we don't acknowledge the Mackenzie Valley Lands and Water Act, which this scenario is going through.

And so, although we haven't really asked questions, or made comments on the beautiful presentations, we know that we have an opportunity by request to the impact review board or De Beers that these sessions be carried out in our community to our members within our language.

I find that the technical words, it's very complex to understand...

-- Portion not recorded

...to things that we can understand. And so I just want to be put on record that by not saying anything, it doesn't mean that we consent with what is being discussed here.

So having said that, I told you earlier that we had an elder coming here to talk about the caribou and wildlife. And although we had said we would do this on

Friday, he's got to leave tomorrow, and so I appreciate you giving us time to allow him to speak now.

**MR. JOE MICHEL:** (translation not available)

**ALBERT:** (translation not available)

**MR. BILL KLASSEN:** I would like to thank both Joe Michel and Albert for their comments and the concerns that you have raised will be taken into account by the Mackenzie Valley Environmental Impact Review Board, and as I'm sure you understand, the reason we are having these discussions is so that some of the problems that you have observed will not happen with this mine, so thank you again.

I would like now to move to the issues, and the first one that we have for discussion is the one that Perry Mehling raised, and Perry, you may want to restate that, but I have it as the freezeback rates of the north pile, and the effect on the potentially acid-generating material, and then there was some more, so if you can restate that and then we will have the discussion on that, and then we will move to the top of the list again.

**MS. PERRY MEHLING (DIAND):** That's stating the issue pretty fairly. I think it is a matter of the rate that the north pile does freezeback. De Beers has identified an active two-metre layer for their long-term geochemical source at closure, and I think that that is probably to be obtained at some point in the future, but we are not quite clear of the timing of that, and there are some aspects that might be considered less appropriate if materials don't freeze quickly back. And I'm thinking of the metvolcanic material, which is located at the base of the pile. If the assumption is that that freezes rapidly, then it doesn't provide much source. If it does not freeze rapidly, then it is located on the place where water may travel, and may be flushed more easily, so some of the strategies that have been proposed are appropriate for rapid freezeback, but may not be optimal if freezeback rates are somewhat retarded.

I guess that's the issue. I'm not quite sure where to go with it.

**MR. BILL KLASSEN:** I wonder if someone from De Beers, I think... was this Ken DeVos' issue or... who wants to address it?

**MR. KEN DEVOS (Golder Associates):** Perry, I agree that with respect to the thermal modeling that some of the assumptions would have to be revisited if there was any significant changes in the thermal regime of the pile, some of the geochemical assumptions, I should state. With respect to placement of the metavolcanic rock, I think the strategy for encapsulation of that rock in the pile is

a sound strategy, regardless, and it's a robust strategy, regardless of whether the pile freezes back or whether the material is there in an unfrozen state. The reason being that the metavolcanic material, if it is in any way potentially acid generating, it will have to react with the atmosphere with the oxygen in the atmosphere, and by encapsulating that material and burying it in kimberlite, we very much limit those potential reactions.

And one further point, by placing it in the starter cell at a higher elevation, it will minimize the contact with any residual water that would be flowing through that.

**MR. JOHN BRODY (DIAND):** I'm just thinking of your response just now. If the pile were to thaw, do any of your seepage models show that that material would remain in a saturated state in a thawed pile configuration, or would the water table drop to a level that would allow that material to not be saturated.

**MR. TERRY ELDRIDGE (Golder Associates):** John, the modeling shows that the preatic surface drops toward the base of the pile. It might be elevated three to six metres above the bottom in some sections, but the material that will be saturated will be above the preatic surface by several metres. There's been lots of recent work done on construction of covers for materials retaining saturation above the level of preatic surface itself, so the groundwater level would be a couple of metres above the bottom, and saturation some level above that. We have the soil water characteristic curves of that material, but I haven't calculated what the level of saturation would be above the preatic surface.

**MR. JOHN BRODY (DIAND):** I understand what you just told me, but if we were to envision that material in the starter cell being several metres deep or more, would a water table and a saturated zone above the water table, would the top layer, or the upper-most elevation of the metavolcanics be in a... situated so that it's excluded from oxygen?

**MR. TERRY ELDRIDGE (Golder Associates):** John, the intention is... that's what we are working towards, but we have not done the detailed layout of the berms and where that material will sit in the starter cell, but the idea is to get it in the lowest part so that it will be saturated.

**MR. JOHN BRODY (DIAND):** In that case, wouldn't it be better to have it in the east cell where it would be situated lower, rather than at a starter cell, which is at much higher elevation?

**MR. TERRY ELDRIDGE (Golder Associates):** The materials coming out during the development phases of the mine, so it's early in the mine life, and we want to use it as constructively as possible, so the idea is to get it into the starter cell where we start burying it immediately. It's providing two benefits. It's being

used in the containment and as well, it's being buried very quickly as opposed to stockpiling it and having it sit out in the east cell for several years before we start placing PK on it.

**MS. PERRY MEHLING (DIAND):** I think it's been identified fairly recently as an issue, and I think we are sort of dancing around what has been considered. I think there's options, or arguments that can be made for where it is and made for against possibly where it is that should be considered.

The ones I raise, I guess, are the fact that it's at the base, the material that may be problematic is at the base of the pile. If it doesn't freeze rapidly, it may be an issue there, and I'm putting lots of qualifiers in here, because I haven't thought this one through entirely myself.

Also, I think that the strategy in a thawed pile would have been more towards blending rather than segregation, although burying is a encapsulation is another method of dealing with it. But there is some slightly different approaches that would be taken if this material does not freeze rapidly, and I think those need to be considered. I don't think we need to answer that necessarily now, and I'm not sure that it makes a huge difference to what you have in place, but I think that... I don't know that it's worth really discussing it a whole bunch further without just speculating or talking around it. But it is a consideration that has not been addressed to this point.

**MR. BILL KLASSEN:** Thank you, Perry, and the De Beers spokespersons. Chris, do you want to comment on it as well?

**MR. CHRIS BURN (DIAND):** Yes, the only comment I would make is to remind the hearing that the thermal conditions within the north pile are not understood or not determined in a way that DIAND considers to be reliable at this time. And therefore, any long-term projections about the temperature conditions in the pile, whether the pile will remain frozen for thousands of years or for hundreds of years, or whether it will indeed freeze at all is an issue that in DIAND's view remains, at this point, unresolved.

**MR. BILL KLASSEN:** Thank you for that clarification. Perry.

**MS. PERRY MEHLING (DIAND):** I think one of the issues that Chris raised earlier is the application of the revegetation will have or placement of organics on that surface may have some influence on the thermal regime in the long-term, and that should be considered. I don't necessarily think it's a negative or a positive, but it's a factor that should also be put in place.

**MR. BILL KLASSEN:** Okay, anything else from De Beers on that issue before we move on to the next one? Okay, the next one that I had on the list was more a question raised by Louie Azzolini about the seed bank, or who was going to provide the seed for revegetation. Was this something that, if I have my notes correct, Louie, you are wondering if it was GNWT?

**MR. LOUIE AZZOLINI (MVEIRB):** That is correct. The board often looks or wonders what it can look to in terms of benchmarks and what is required legislatively for proponents to live up to. And during other environmental assessments, it's had to deal with replanting, for example, along pipelines, and even during the BHP environmental assessment, some issues or questions came up about revegetation there.

I think to address some questions that I think may come up, are there standards that either the GNWT or federal government have with respect to revegetation, and if having seeds or similar materials to accelerate the revegetative process is needed, does any of those governments provide it to the proponent?

**MR. LIONEL MARCINKOSKI (RWED):** I'm not sure if the GNWT has a policy on seed or seedbank, but I know Steve had mentioned just prior to him leaving that we do supply seedlings in some areas, and those seedlings are generated from indigenous seeds from the Territories that we would be more than happy to share with De Beers.

In terms of a policy, I think I would like to pass this over to Indian Affairs or DIAND if they do have a policy on revegetation of seed.

**MR. BILL KLASSEN:** Is there someone from DIAND here?

**MS. TAMARA HAMILTON (DIAND):** We don't have any policy on seedbanks or providing seeds. As it was raised, we do have a mine reclamation policy, and in there it doesn't talk about providing any seeds or seedlings to the proponents.

**MR. LOUIE AZZOLINI (MVEIRB):** Thank you.

**MR. BILL KLASSEN:** Thank you.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I would just like to comment on that, that De Beers considers that the natural process of invasion more closely approximates an appropriate genetic source with the biodiversity and plant life incorporated.

**MR. LOUIE AZZOLINI (MVEIRB):** Thank you. Noted.

**MR. BILL KLASSEN:** Okay, thank you. The next item on the list of issues was Tim Byers, consideration of uptake of metals by vegetation and is there monitoring of that planned.

**MR. TIM BYERS (Yellowknives Dene):** With BHP, in their revegetation program, they identified, for example, nickel and I believe molybdenum, as a couple of heavy metals that are being absorbed by some of the plant life. So of course, then the consideration would be how would that affect herbivores, rabbits, caribou, that type of thing, who would then come along and eat those plants.

So I'm wondering if De Beers and Golder will be looking seriously at evaluating what type of contaminants are being taken up by the plant life that is being part of the reclaimed area?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I would like to ask you two questions, Tim. What sort of plants are they and what are they growing on at BHP?

**MR. TIM BYERS (Yellowknives Dene):** They are growing on, well, there are two different soil subtrays, if you will. One is straight kimberlite and the other is a combination of kimberlite and fertilized soil mix, I believe it is, but that is in their annual report document, as well as their reclamation program documents.

And the type of plants are a type of grass or carax, I believe, but I do not know the exact species.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Regarding contaminant uptake in plants for revegetation, we have not looked at that, Tim. There are critical differences between BHP's revegetation and De Beers. The north pile, one of the largest areas for reclamation, will be kept with approximately 0.5 metres, 50 centimetres or two feet of quarried country rock granite. And that revegetation will occur through natural processes on top of that. So we are dealing with growth on a material that exists within the... basically within the countryside, if you like, and so I would anticipate that the predicted uptake would approach that that occurs naturally.

But De Beers has not looked further into that, but you have to remember the critical difference and the difference in physiology in terms of the rate of growth and the rate of uptake between the natural species and a grass species implanted.

**MR. BILL KLASSEN:** Anything further on that one, Tim? I would like to thank Louie for the lights.

**MR. TIM BYERS (Yellowknives Dene):** I don't have anything further on that point at the moment. I will have to go back to the BHP data and see the specifics, but it's not totally resolved in my mind if you are not looking at it period. Then it definitely is still a big issue, I would think.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think we need to think more about the linkage, Tim, and the linkage between what contaminants would likely occur, so I'm not saying that we're not looking at it any further, but we will have to think about it.

**MR. TIM BYERS (Yellowknives Dene):** The obvious linkage to me is that the link between your vegetation after you've walked away and everything is well-vegetated and its effects on the health of whatever caribou, rabbits, et cetera, are eating that revegetating vegetation.

**MR. ROBIN JOHNSTONE (De Beers Canada):** We understand that, but remember that we are not talking about lush growth on the north pile by the time we finish the project. So what I'm saying is we understand that there is a mechanism by which those... by which metals may occur, but given the distinct difference between growing on kimberlite and growing on granite, we need to have to think about how that would occur and what the species are and how they would uptake those.

**MR. BILL KLASSEN:** Moving on then to again your issue, Tim, about closure of the mine shaft and what would be locked in.

**MR. TIM BYERS (Yellowknives Dene):** Yeah, one of the questions that came up was whether there would be any diesel, oil or other minor spills within the mine shafts over the operation life, whether those would be locked into the post-closure shafts, whether any remaining fumes for diesel would also end up being locked in or would they be vented out before the vents are plugged up? I guess those are the questions on that.

**MR. GREG ORYALL (AMEC):** Tim, I am sure there will be minor spills and so on throughout operations, and those will be managed and cleaned up on an ongoing basis. At closure, all oils, lubricants, and any other hazardous materials will be removed from the underground mine itself. We will still have on surface the truck shop and repair base which have wash facilities and any equipment or parts that we plan to store underground at closure will be washed of hydrocarbons and so on, and if that can't be done, then that equivalent will be taken off site, but there will be nothing placed underground that has diesel, oil, or other things like that left in it. Does that answer your question?

**MR. TIM BYERS (Yellowknives Dene):** Yeah, it does. And another thing that just entered my mind was that, is there going to be any containerized items that will also be put into the shafts, things that are no longer needed and that you don't want to truck back out to the south. Are there going to be any containerized items, whether they be chemicals or any inert items that you are going to be leaving in the shafts?

**MR. GREG ORYALL (AMEC):** Certainly no chemicals or any reactive items will be placed underground or, for that matter, in the north pile. Inert materials may be broken down containers themselves, or pieces of steel, things like that can be placed underground.

**MR. BILL KLASSEN:** Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** A follow-up to that question,\* during the lifetime of the mine, there may be machinery operational components that won't be required. Will they be placed back into the backfill area and covered with cement, if they've gone through the same process of delubrication and cleaning and so on?

**MR. GREG ORYALL (AMEC):** That's a possibility, if the equipment has been suitably cleaned and is suitable for landfill, but on an annual basis, there are going to be so many trucks heading out on return trips that we are more likely to take advantage of that and haul that equipment or those materials off site each year.

**MR. BILL KLASSEN:** Thank you. I think that takes us to Mark's question about how De Beers will know when revegetation goals have been achieved. Was that yours?

**MR. MARK LANGE (Fisheries and Oceans):** Yeah, that was the question, and in addition, what kinds of measures De Beers have thought of using to answer that question.

**MS. SANDRA MARKHAM (Golder Associates):** Could you repeat the question, please?

**MR. MARK LANGE (Fisheries and Oceans):** There's a goal stated earlier that I captured in my notes, so I will repeat it here, just correct me if I'm wrong. The goal of reclamation is to establish landscapes that promote successional processes for local species. I think that's what I captured, and my two related questions, how does De Beers know when they've achieved that goal of reclamation, and how are they going to measure its progress?



**MS. SANDRA MARKHAM (Golder Associates):** Okay, the first question, we'll know when we've achieved that goal when we see the return of natural functioning ecosystem processes, so we will be watching for those. How that will be measured will be through a monitoring program. The types of things that we would be measuring would include things like percent cover of plants, species richness, different types of species in different kinds of landscapes that have been established. We would also be looking at soil processes, if those are also becoming established.

And just a reminder that for the heath boulder environment, in a natural setting, the percent cover vegetation on average is about 26 percent based on about 20 plots of measurement, so we are not expecting lush vegetation cover, certainly not in the short term and likely not in the long term.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I would just like to add to that too. I think it needs to... you need to get back to the mine site reclamation policy for the Northwest Territories, which states, and I quote: The required standard of reclamation should be based on the 1994 Whitehorse mining initiative definition, "returning mine sites and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activities. So part of me would say too I would certainly be interested in hearing on what the government's goal, specific indicators when they established this policy, were, if anybody would like to comment.

**MR. BILL KLASSEN:** Does anybody want to respond to Robin's question on that point? Is there anyone here who has the answer? Mark, do you have it?

**MR. MARK LANGE (Fisheries and Oceans):** No, I don't have the answer but man, I'd be curious to know the answer as well.

**MR. BILL KLASSEN:** Do you know the answer, Rachel?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Who did you say put that policy together?

**MR. ROBIN JOHNSTONE (De Beers Canada):** It's DIAND.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** But is that the Mackenzie Valley resource management act?

**MR. ROBIN JOHNSTONE (De Beers Canada):** No, it isn't but it is for the Northwest Territories, Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I would like to make a point about revegetation. If they are going to be attempting to revegetate

the area, presently, do they do collecting of the seeds of the area, like, the natural grown area seeds? I mean, I wouldn't mind going out there and doing that kind of work, checking to see what kinds of seeds grow in the airstrip area and the landfill area and the north pile area. It would be really interesting work.

Most of our young people are wondering what it's like to plant things and see if it grows again, and I know that it is not going to be like a jungle by the time the reclamation work is all finished, and we are not talking about jungle conditions, but this is the North. We are talking about reseeding. I was just wondering if seeds were going to be brought up from down south and used. I understand that that's not going to be happening, and that's good, but I know that with our study on berries, we check to see if, from the ground into the roots and into the berries, if there was a way that the arsenic transferred from the ground into the berries, and we found that they did.

So depending on where the reseeding is going to be done, it will be interesting to see what the plants are going to be like when there is regrowth in an area.

So I'd like to just keep an eye on this, if we could, and maybe if we could do something together on this kind of work. Just my comment. Thank you.

**MR. ROBIN JOHNSTONE (De Beers Canada):** A bad day in the field always beats a good day in the office, Rachel, that's my motto as well. And I think this is a good example of community involvement with monitoring. I think this is another example to add to the list of what would be very useful.

**MR. BILL KLASSEN:** I see Velma has joined us at the table. Did you have a comment on this aspect?

**MS. VELMA STERNBERG (DIAND):** Just with regard to the question of the mine site reclamation policy. I actually brought a copy along with me today, and with regard to Robin's comment about the Whitehorse mining initiative, the policy states site-specific criteria should be developed by regulators, and the guidelines that are currently under review address some detail of reclamation, but again, I have to reemphasize that it's site specific, so reclamation practices, or revegetation practices are addressed in general, but you can't be specific to every different site in the Northwest Territories, and there are also some references to other acts that have to do with revegetation. And in order to fully answer the question, I would have to ask that you give me until tomorrow or Friday where we could probably come back with a little bit more detail with regard to the site specific reclamation. Thank you.

**MR. BILL KLASSEN:** Thank you, Velma. Mark, another comment on this.

**MR. MARK LANGE (Fisheries and Oceans):** Yeah, thank you, Robin and colleagues for that answer, and for the clarification. Just focusing on maybe some potential fish issues, I thought I heard...

**MR. BILL KLASSEN:** Excuse me, we are dealing with issues that have been raised. That one wasn't raised. Tell me how it relates to your plant question:

**MR. MARK LANGE (Fisheries and Oceans):** Mark stated earlier that they would look into reestablishing drainages as part of the reclamation. I heard water and I heard potentially fish in there. What are De Beers I guess measures to see whether or not they have reclaimed drainages adequately?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I'm tempted to ask DIAND whether it also includes guidelines on drainages, but that would be very unfair.

Mark, we have not considered that around... by no means do we have a visage... envisage lake trout habitat on the north pile, so we... I know you would like it, but we have not provided that with consideration.

**MR. BILL KLASSEN:** Thank you. I think we will move on to Glenda's points now, one having to do with wildlife habitat as a consideration and revegetation.

**MS. GLENDA FRATTON (Gartner Lee):** Yeah, I was just wondering. Mark had mentioned it in his presentation that it would be considered, and I'm just wondering if you could expand on that.

**MR. MARK HEALY (Golder Associates):** Wildlife habitat in my mind is considered when we want to promote an endemic or a natural vegetation community. In its current state, it's being utilized by wildlife, so the assumption is, or the ideals are that if we promote the same type of flora community in the future, it will be utilized by wildlife habitat in the same manner.

I will also add that some habitat, like some earlier serial stages, may be conducive or more supportive of certain types of wildlife in its early stages, like some early growth, very succulent, very yummy to rodents. But over time, you know, we expect that it is going to reestablish itself as productive habitat.

**MS. GLENDA FRATTON (Gartner Lee):** I guess I'm wondering if there are certain areas that are going to be disturbed that are more important to wildlife habitat than other areas, and whether you have certain targets for that. I realize that most of it is heath boulder, but I'm just wondering if that was considered.

**MR. MARK HEALY (Golder Associates):** I think a simple answer to that would be no.

**MS. GLENDA FRATTON (Gartner Lee):** Thanks for that. Should I move on to my next question?

**MR. MARK HEALY (Golder Associates):** No, I think Florence has a comment on this topic.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Not a comment, but if you could repeat your two comments, because I could not hear it very well. If you could just say that slowly and loudly.

**MR. MARK HEALY (Golder Associates):** The first comment was that we want to promote the reestablishment of the local or the existing flora community. And from that, it stands to reason that it will also produce similar types of wildlife habitat, because again it is the same species. We are not introducing any new species.

In regard to planning for specific habitats, wildlife habitats that may be more important than others, no, we did not consider that in the reclamation plan.

**MR. HAL MILLS:** Okay, thank you. Your next point then, Glenda.

**MS. GLENDA FRATTON (Gartner Lee):** Yeah, my next issue, or point, anyway, had to do with the soil handling, and I was just... or not the handling itself, but the planning behind that. I'm assuming De Beers has located areas where they are going to salvage soil from, and I'm wondering if that has been done, and if there are certain targeted areas where that soil is going to be moved to.

**MR. ROBIN JOHNSTONE (De Beers Canada):** A collection of soil will be opportunistic where it exists. Certainly the north pile and the airstrip are identified as areas where, large areas that may be recovered from, but the details have not been worked out.

**MS. GLENDA FRATTON (Gartner Lee):** So I understand as you are saying the details haven't been worked out where... well, I know you are saying the north pile and airstrip have areas where it's going to be removed to. Is there any planning in the works where... sorry. You know basically where it is going to be removed from. Do you have any idea where you are going to move it to and will it have any... will it be targeted towards establishing certain communities that might not reestablish easily on their own?

**MR. ROBIN JOHNSTONE (De Beers Canada):** No, we have not given that consideration, Glenda.

**MR. HAL MILLS:** Okay, thank you. Rachel, do you have a comment on this?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** When you were talking about reclamation and animals, you mentioned the word yummy, and I was thinking, okay, is the plant supposed to be yummy or is it the animal that's supposed to be yummy? I mean, lemming sandwiches don't appeal to me, but wolves might find lemmings yummy. Are we talking about rabbits or grouse or ptarmigan? Just wondering.

**MR. MARK HEALY (Golder Associates):** Actually, both are yummy, so... no, early ...(inaudible)... vegetation is often very succulent and it is very attractive to a lot of rodents, as well as birds too, so that is actually one of the problems sometimes in revegetation, is young plants being eaten. It also... seed ...(inaudible)... is also another problem. When we seed, often birds will come down and pick the seeds, as will rodents. So I hope that answers your question.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Another one I had was there was a woman, there was women from Sweden, I believe, that did some work in arctic vegetation, and they were botanists. They studied plants. They noticed that the female plants that the lemmings did not like, but they liked the male plants. I was thinking, are we going to be watching out for things like this or are we going to get that particular at all?

-- Interjection

But the re-population of the lemmings in a certain area was really right down, and they were wondering why. And I was thinking I hope we are not going to be planting the wrong things. You look at failure and then wonder why.

**MR. ROBIN JOHNSTONE (De Beers Canada):** It's obviously reaching either that time of the day or that time of the technical session -- our sense of humour is getting out of control. So we are going to be looking for Swedish botanists...

-- Laughter

... and we'll be planting them wherever necessary.

-- Laughter

Sorry. The answer, Rachel, is we are essentially letting mother nature do his or her job -- I'm not quite sure what it is these days, but... so the... overall, the mine site will be re-invaded by plants, and so that it's basically it's mother nature that will take care of that, so... you know, I think that lemming densities are notoriously hard to interpret when lemming populations... when there are many of them, it's easy to see. But when there's very few of them, they are very difficult to detect. So I don't know if that helps you out at all.

**MR. HAL MILLS:** I'm trying hard to get this wrapped up by 4:15 so we can get to the air quality, and we still have one issue that Buddy Williams raised, so can we stop the discussion... it's wonderfully intriguing. When I was asked to come over here to deal with these sessions, I was afraid I would be bored, but this is most interesting. I want to find out more about these Swedish botanists. So Rachel, with your permission, I will move to Buddy Williams and the question he has about how closure options were decided upon. Sorry... okay, one more time, Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** My issue is that we're very interested in the revegetation process because it's food for the wildlife down the road, and we would want to make sure that we are part of that process and we are very interested in working with anybody, including Swedish people. I mean, Norwegians watch their land very carefully because they've got reindeer as we have caribou. We want to make sure that we have the right food for our animal, and that... I mean, yesterday, I was getting a little bit tired and I was even thinking about Mel Gibson and asking him about cryo-something, like freezing stuff, and I was thinking I better not ask any questions or I might get a little bit crazy, but I talked earlier with Mr. Haley before he left, just to finish up on our issues regarding the winter road. And that he told me that I could ask my questions to somebody else about the winter road, so that I could have some closure on that subject. We're still worrying about the winter road and transboundary issues regarding them, and the issue of the access road control for the winter road use and the monitoring effects and the clean-up, just some concerns, so that it's tabled. Thank you.

**MR. HAL MILLS:** I don't know whether that requires a response, but go ahead, De Beers.

**MR. JOHN MCCONNELL (De Beers Canada):** I think Rachel's issues were with the Contwotyo to Tibbitt winter road, and Don felt most of her questions were related to the administration of that road, and probably the best person to answer was a representative from the winter road joint venture, and I think he suggested Chris Hanks. And he said he would contact Chris and have him in due course contact Rachel to see if they can't sort out the questions.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Thank you. Our concern is that throughout the lifetime of the mine, the Yellowknives Dene First Nation members would like to be part of monitoring and looking at what's happening with the winter road access into the site, the road that goes to the... where you are going to get your gravel from, to the eskers, or any new roads that you are going to be building, we're going to be watching the roads. It's a concern of ours, okay? Thank you.

**MR. HAL MILLS:** Thank you. Buddy Williams.

**MR. BUDDY WILLIAMS (DIAND):** The hour is getting late, so I will keep this brief. More or less, we were wanting to know about how De Beers arrived at the current A and R goals and plan as presented today. I know earlier this summer we had requested information through an IR on what some of the alternatives were, and a rationalization, I guess, as to burial on site of infrastructure, debris and so forth versus removal. I know the response at that time from De Beers and I can quote it, it's short. It's that the linkage of the cost of the lifecycle of the project alternatives to disposal and final decisions on intended disposal methods are not available at this time. Once detailed engineering is complete for the information, plans will become available.

I probably have a two-part question to that. One is I guess at this point, how certain is De Beers in what it presented today as its final goal for A and R activities, and secondly, leading to that decision as to what they would do, the information on alternatives on I guess cost considerations and how that has been factored into making that decision. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** I'm not sure if you were here on the first day, Buddy, but De Beers did make a presentation at which we stated that although most of the detailed engineering has been put on hold, one of the areas that we are carrying out work at present is on the closure and restoration plan, and we would hope to have that finalized within the next few months, particularly related to sitting down with DIAND and negotiating an environmental agreement and related security bonds for the project. So that work is ongoing, it's still evolving, and we would hope to have the details sometime within the next couple of months.

**MR. BUDDY WILLIAMS (DIAND):** So just to confirm then, as far as the plan as presented today is still subject to change. That is your initial feelings on A and R work and depending on what other requirements may be set out later on, that is subject to change as well as your own internal engineering work to be done on it. Is that correct?

**MR. JOHN MCCONNELL (De Beers Canada):** I think we presented today the basic concepts. I think there could be modifications coming out of the environmental assessment work. I think we heard some of Bruce's concerns, and you know, we're going to have to have a look at that, so there will be a number of things factored into the final closure plan, and I would suggest that they will probably be refined a number of times over the mine life as well, but we are doing more work on it now and we will have more details, particularly in the area of costs related to closure.

**MR. BUDDY WILLIAMS (DIAND):** So is the information available as far as the alternatives as you have examined and arriving at this current plan?

**MR. JOHN MCCONNELL (De Beers Canada):** I guess... you know, we haven't looked at a lot of alternatives. We've probably had meetings where different ideas have been thrown out on the table, and then we think what we have selected is probably the best practice, and from the experience of the engineers and the consultants involved in the project.

**MR. LIONEL MARCINKOSKI (RWED):** Depending on what your process is, we also have concerns in terms of the final reclamation, or the location of the land fill and the land plan that was proposed in the north waste pile, which was presented earlier by Greg yesterday in the animation. At one point, it wasn't there in the animation, and then in the earlier presentation this afternoon, the landfill and the landplan were both in starter cell.

**MR. HAL MILLS:** Okay, thank you, Lionel. Buddy.

**MR. BUDDY WILLIAMS (DIAND):** I will just make one last comment and end it there. I will just point out, I guess, for the purpose of these hearings then, as a reference to the terms of reference for this EA, and depending on what version of the terms of reference you have, it's either lines 567 through 572 or 164 through 170, and that at this point, I think are the terms of reference states that De Beers shall provide a clear visual and textual description of the proposed development site at closure, after restoration. Abandonment restoration components and activities should be listed. Rationale and alternatives that have been discarded should be listed. For example, the removal of all the material from site versus partial, total burial including costs, details of methods and location of materials disposed, both on and off site, including the structural foundations at the bottom of the mine water clarification pond.

I'm not sure we've arrived, or that information has been presented to date, so we would leave it as an item that still needs to be further addressed in these hearings. Thank you.

**MR. BILL KLASSEN:** Thank you, Buddy, and then I will turn it over to Hal for the wrap-up on the issues.

**MS. VELMA STERNBERG (DIAND):** I didn't have an issue until there was some discussion between Tim Byers with regard to contaminants in the plants, and this is more along the lines of a suggestion as opposed to an issue or question. I'm wondering if there has been any sampling of the plants lichen or fungi, and has... has multi-element analysis been done on any of these species to find out if we already have natural contaminant collectors growing in the area? I'm not aware



as to whether there is a lot of kimberlite outcropping or subcropping in the...what do you call it, the RSA, but I'm very well aware of plants growing that are natural collectors of metals, and these plants actually thrive. They are not harmed. I don't know. I can't speak for the animals that eat them, but I'm just curious as to whether it's possible for De Beers to do some kind of biogeochemical analysis and perhaps be able to provide some clarification for the questions that Tom has raised.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Yes, we said that we would give this item further consideration, that we do have taken samples of lichens for... I know, metals, but I'm not sure as to what the full ...(inaudible)... on lichens, and there's also been some vegetation and some soil testing that was also used in the wildlife health assessment as baseline, so some of that information exists.

Getting to your comment around whether we would selectively plant them or selectively encourage them, I think that would be problematic, because we would not be able to keep that environment in a steady state forever and ever.

**MS. VELMA STERNBERG (DIAND):** Yeah, sorry, I didn't mean to imply that you would be selectively planting, because... okay, thank you.

**MR. HAL MILLS:** Okay, thanks. We do want to save as much time as we can for the air quality discussion, but we want to have a quick wrap-up now in terms of the issues we were discussing this afternoon to get your impression as to whether they are still issues or whether they've been resolved or not. So we will go around the room fairly quickly. The first was Perry's, and she has left the room, I believe. Does anyone want to comment on Perry's behalf? John.

**MR. JOHN BRODY (DIAND):** At this point, we see the issue as still unresolved.

**MR. HAL MILLS:** Okay, thank you. Next was Louie's issue with respect to... where did Louie go?

**MR. LOUIE AZZOLINI (MVEIRB):** I'm very satisfied with the response, thank you.

**MR. HAL MILLS:** Okay, thank you. Next was Tim with respect to the uptake of heavy metals.

**MR. TIM BYERS (Yellowknives Dene):** I'm satisfied with the answer of where they are with that at currently with that issue, but I would like to see at some point some work done on uptake of contaminants as part of your reclamation measurement.

**MR. HAL MILLS:** Tim, you also had an issue regarding the mine shafts.

**MR. TIM BYERS (Yellowknives Dene):** That is I think a big issue for all mines in the area for the Yellowknives Dene. Rachel could probably speak better to it than I can, but I think that has always been a concern with what type of materials are left in a mine shaft or in a landfill. The idea is that nobody wants to have a big garbage dump beneath or on top of the land, and so that is something that will be of continuing concern.

**MR. TIM BYERS (Yellowknives Dene):** Mark, with respect to goals.

**MR. MARK LANGE (Fisheries and Oceans):** The answer to my question on goals generally satisfied me. I guess part of the landscape that was described in the presentation included 55 percent terrestrial formation and 35 aquatics, and I'm not sure how the reclamation goals would apply to aquatics. I'll leave it at that for now, but it may be an issue. Perhaps my colleagues whose mandate is to evaluate reclamation will be able to come up with a conclusion on that. Thank you.

**MR. HAL MILLS:** Thank you. Glenda, you had several things related to wildlife habitat and soil handling, et cetera.

**MS. GLENDA FRATTON (Gartner Lee):** I guess I got some answers to my questions and I just would hope that De Beers might consider some of those in developing their revegetation plan. So I'm good for now, thanks.

**MR. HAL MILLS:** Okay, thank you, and Buddy.

**MR. BUDDY WILLIAMS (DIAND):** I think at this point we will take a look at the information so far and we're not sure yet as to how much of an issue it will be.

**MR. HAL MILLS:** Okay, let's get that air quality presentation going, pretty soon it is going to be dark.

**MR. JOHN MCCONNELL (De Beers Canada):** Mark, are your guys here? Are your guys here, Mark?

**MR. MARTIN RAWLINGS (Golder Associates):** The purpose of my brief talk this afternoon is to respond to four issues raised regarding air quality. The first one was the...(inaudible)....method....

-- Interjection

I do have a mustache, but I'm going to resist clipping it on there. Is that a little better? Excellent. The first issue was with respect to the assessment methods

and the use of Northwest Territories standards. The second issue I'll talk to is about the emissions used in the dispersion modeling, and factors such as seasonal variations and some of the compounds that weren't included in the EIA. The third item I'll talk about is emissions control and mitigation measures included in the modeling, as well as proposed by De Beers, and finally I will talk about the monitoring program and equipment that was proposed.

**MR. JOHN MCCONNELL (De Beers Canada):** You sure know how to empty a room there, Mark.

**MR. MARTIN RAWLINGS (Golder Associates):** It's a fact of life with air quality, I'm afraid.

-- Laughter

They usually put me at the beginning so everyone is here, but I will live with that.

The assessment methods were discussed in the EIA in 7.1.5 and although it was an issue with respect to the technical sessions, no IRs were asked regarding the assessment method used. The emissions used in the modeling were summarized in the EIA and detailed in a number of information requests. The emissions controls and mitigations again were summarized in the EIA and then led to in much greater detail in a series of information requests that were responded to.

And finally, the monitoring program for ambience was discussed in the EIA, both the monitoring that's being done so far and what's being proposed in the future, and there were three IRs that dealt with monitoring.

Generally, the assessment methods incorporated four factors. It incorporated magnitude, geographic extent, frequency, and reversability. The issue that was raised regarding the technical sessions dealt with magnitude. For the most part, we used Northwest Territories standards where they were available and compared the modeling predictions to those standards. In the absence of Northwest Territories standards, we used standards from other jurisdictions such as the USEPA or other Canadian jurisdictions. Generally, if there was a predicted increase in concentrations, a low ranking was given to the magnitude. If the increase resulted in an exceedance, or concentrations in excess of the most stringent guideline available, a moderate rating was applied.

And finally, if the concentrations were predicted to exceed the least stringent of, or highest number criteria, then a high rating was applied. We've looked at it and gone back based on the issue that was addressed for the technical session, and changing the ...(inaudible)... speed would not have changed the environmental

consequences predicted in the EIA or the impact predicted for the EIA. There would have been a change to the magnitude for PM-10 and PM-2.5 from moderate to high, but the predicted concentrations are restricted to the active mining area, and they were predicted to be reversible in the short-term, so overall, these both received a low consequence.

Emissions used in the dispersion model were detailed in the application, and then at some length detailed in the information requests. In preparing the estimates for emissions, we used conservative emission factors, and we built an additional contingency factors to ensure the predictions were erring on the high side rather than underestimating possible emissions. An example of some of the contingencies we included in our assessment were 200 percent contingency on the mine feeders, a 100 percent contingency on the power plant, and a 50 percent contingency on all underground mining activities.

We looked at carbon monoxide and VOCs, which were identified in the issues regarding the technical session, and identified those as having very low emissions compared to some of the other compounds. And resulting in low predicted concentrations with respect to guidelines and standards. For this reason, we didn't carry them through in the environmental assessment.

Sulphur trioxide SO<sub>3</sub> was also discussed in the technical session issue, and it was assessed indirectly through the dispersion modeling. The model that we used allows for chemical transformation. The sulphur dioxide that's released from the stacks of the power plant and from the mine heaters gets converted to SO<sub>3</sub> in the atmosphere as it reacts with oxygen, so that was addressed.

The emissions and controls and mitigation that we used were primarily with respect to the underground ... (inaudible) ... activities, where a 50 percent reduction was applied, and with respect to the emissions at the processing plant, where a 70 percent reduction was applied.

Although there's a number of other mitigation measures associated with the project, those were not included in the dispersion model. This again leads to a conservatism in the predictions, since the actual emissions will likely be mitigated further than we assessed.

Finally, monitoring program and equipment was addressed with respect to the impacts we were predicting, and it was comparable or in excess of similar projects.

Finally, the summary of the results that we found, the emissions from the project with respect to SO<sub>2</sub>, total suspended particulates, PM-10 or respirable particulates, and PM-2.5 were all less than one ton a day. Emissions of carbon

monoxide and volatile organics would be considerably lower than that. The emissions of oxides of nitrogen from the mine ...(inaudible)... to the power plant and the mine heaters, totaled 5.7 tons a day.

Overall, the emissions controls and mitigation measures were found to be effective. The underground mining in a wet environment significantly reduced the particulate emissions compared to other mining techniques. The wet processing used in the plant reduces fugitive emissions and emissions from the correction and processing of the ore.

De Beers also has made commitments to minimize the exposed areas, to develop a plan to mitigate dust along roadways and haul routes, and finally, to minimize fuel use. Minimizing fuel use reduces emissions, both of greenhouse gases and the other compounds that we talked about, and also saves De Beers money.

Finally, the monitoring programs and equipment, the plan is discussed in the EIA is to continue with the TSP and dust fall monitoring program at the site. During the winter months, the dust fall is monitored as dust falls in the snow. The intent is to have the equipment on the site meet manufacture specifications.

And finally, this was discussed at lunchtime today, there's an environmental management system being incorporated at the mine site which will provide a mechanism for continuous feedback on how De Beers is doing with respect to environmental parameters of the site.

So to conclude, with respect to the assessment method, changes to the method would not have changed the conclusions reached in the EIA regarding the consequences associated with air quality. The emissions used in the model were conservatively predicted and included contingency factors, but still were predicted to be lower than would have occurred at an open-pit mine. The resulting concentrations predicted by the modeling comply with all available criteria outside of the active mining area. The emissions and controls and mitigation at the site is incorporated in the design of the project. The project is designed in such a way that it minimizes releases. This is better in some ways than putting end of pipe pollution control systems on that tend to use more energy, resulting in greater fuel use, greater emissions, and greater greenhouse gas emissions.

And finally, the monitoring program and equipment is consistent with the predicted impacts for the project. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** Thanks, Mark.

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**MR. HAL MILLS:** We've got some guys just raring to go here. Okay, open for questions.

**MR. DAVE FOX (Environment Canada):** Thank you, Martin. With your presentation, you touched on just about all of our questions and clarified a number of them. There's some aspects that still needs further consideration, I think. First of all, I would like to say that after reviewing the work that you have done on the modeling, overall it seems to be very well done and I appreciate the conservative nature of the emissions that you are putting in there.

But modeling is only as good as what you put into the models, and the emissions for one are at best very uncertain, no matter how you work it out. There isn't enough information to determine the actual emission values that are estimated, no fault on the proponent, but emission factors are just limited in nature.

So that leaves a fair bit of uncertainty in the emissions itself. You are trying to cover it with conservative contingency factors, but it's impossible to say just how well that will cover all the factors of the emission estimates. So that in turn brings uncertainty into the modeling itself, and the modeling that you showed us tended to be a near exceedance levels. I am thinking of the PM-10 with the near exceedance with the B.C. PM-10 guidelines, as well as the PM-2.5 estimates, or are not in exceedance but it's not insignificant either.

In considering that the NWT is the signatory on the Canada wide standards, we are wondering... Environment Canada is encouraging De Beers to be proactive and actually set up monitoring to try to demonstrate the Canada wide standards for PM-2.5 will not be exceeded in the early stages or later on in mine development. As well, there is talk of CWS for standards for PM-10 as well, so we would encourage De Beers to monitor for PM-10 as well as PM-2.5. And that way, we can demonstrate that things are being met and that we'll lose all the uncertainties with the modeling that's been shown.

So I guess my question is, is De Beers planning on including that into their monitoring network?

**MR. ROBIN JOHNSTONE (De Beers Canada):** A couple of things, Dave. Firstly, De Beers is certainly committed to operating basically under the law wherever those laws exist, so we need to get that clear.

Then, we've also committed to developing monitoring programs in consultation with communities, regulators and governments, so you know, I think that you basically highlighted certainly your interest in PM-10 and that will go on to the stack of suggestions, basically. You know, that we're basically committed to monitoring, whose goal is to confirm impact predictions.

So ultimately, we are looking at a monitoring program by which we will confirm that Martin's predictions certainly stand up through time.

**MR. HAL MILLS:** Anything further, Dave?

**MR. DAVE FOX (Environment Canada):** No, that's good for now.

**MR. HAL MILLS:** Okay, over here.

**MR. GRAHAM VEALE (RWED):** Martin, you mentioned that your emission estimates for the power plant and for mine heaters were conservative, and that you had actually allowed a 100 percent contingency and 200 percent for I think the mine heaters. How was... is that based on that fuel consumption? I know it's based on I think on 24,000 cubic metres per year consumption for the main power plant, so if that's 100 percent too high, would we be expecting that the fuel consumption will be around 12,000 per year?

**MR. MARTIN RAWLINGS (Golder Associates):** When we estimated the emissions, Graham, we were provided preliminary estimates for fuel requirements, for mine heating, and for the power plant system. The contingencies were applied to those initial estimates of fuel requirements. Since that time, De Beers and its engineering team have gone through a number of iterations to optimize energy efficiency and find other opportunities to reduce fuel usage of the site. I believe that through the environmental management system, one of the aspects that will be tracked will be fuel consumption and usage, and be able to confirm the conservatism in those estimates.

**MR. GRAHAM VEALE (RWED):** That sounds pretty good. I think part of the issue would be that given that your air quality predictions are based on these estimates, that it will be very important if De Beers track these over time, so that we can be sure that there is no creeping up or exceedances of the values that were used in the modeling. So I guess a question for De Beers is will this be done?

**MR. ROBIN JOHNSTONE (De Beers Canada):** I believe I addressed that in my response to Dave, that basically we'll monitor to confirm impact predictions.

**MR. GRAHAM VEALE (RWED):** I think that was ambient monitoring that you were talking about to do, but what I am saying is are you going to have a fairly comprehensive tracking of emissions, emissions inventory so that we have some comfort that your emissions are not exceeding those that were used in your modeling?

**MR. ROBIN JOHNSTONE (De Beers Canada):** At this stage, we don't know, Graham, that, and again, we've stated that monitoring programs will be

developed in conjunction with regulators and the EA process is part of the opportunity to identify those issues.

**MR. HAL MILLS:** Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** I'm curious to find out when you were provided the preliminary information on the various components of the mine, and because there were a series of iterations where mine heating components were being changed and so on, so by being able to get a sense of when you were provided that information, maybe we could all get a sense of sort of how many iterations may have happened between you receiving the data and the mine plan beginning to firm up.

**MR. MARTIN RAWLINGS (Golder Associates):** Louie, I don't have the exact date of when we received the fuel consumption information for the heaters and power plants that we used to estimate our emissions. There was an understanding at that time that there would be iterations to the design, and that was one of the reasons why we added those contingency factors, which are quite large, 200 percent on the mine heaters, 100 percent on the power plant, to accommodate some of those changes without having the concern that the final numbers would be higher than what we estimated.

**MR. MARTIN RAWLINGS (Golder Associates):** I can add a little bit to that in that the emissions presented in the application are consistent with the project design on which the application was based.

**MR. GREG ORYALL (AMEC):** I presume that you are referring to... I know that at one time we talked about propane heating and so on and changed it and diesel heating. This certainly reflects the current concept of diesel heating.

**MR. HAL MILLS:** North.

**MR. NORTH DOUGLAS (Rae-Edzo Métis):** I have two questions here. One is how much fuel is the mine going to use? I know the mine will be there probably about 25 years. How much fuel are they going to be using?

And the other thing I am looking at, because how much fuel that is going to be used over the life of the mine, and it's going to be a lot of hydrocarbon based emissions that are going to be spread out all over the land. And have they taken into effect what is going to happen to the plants because of the hydrocarbons are going to be deposited into the soil and that, because it's going to affect the wildlife. Those two questions here.

**MR. MARTIN RAWLINGS (Golder Associates):** With respect to your second question about the... what we would probably refer to as products of incomplete



combustion from the burning of the diesel fuel, they were included in the predictions and the deposition on the surrounding soils and vegetation was incorporated in the EIA, and that in turn was passed through to the wildlife, the vegetation, and health sections of the assessment.

**MR. GREG ORYALL (AMEC):** You asked a question about annual fuel usage on site, and the estimation is that we will be using about 45 million litres of diesel fuel each year.

**MR. NORTH DOUGLAS (Rae-Edzo Métis):** Thanks.

**MR. HAL MILLS:** Florence.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** 45 million litres of fuel -- how much truckloads is that?

**MR. GREG ORYALL (AMEC):** I'm not certain for the fuel alone, but it's approximately 2,800 truck trips each year to provision the mine, and I would think that probably a larger portion of that third to a half is fuel.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Has De Beers looked at other source of energy?

**MR. GREG ORYALL (AMEC):** First, on your previous question, to be more specific, that fuel usage is estimated to be 1125 truckloads per year. As far as alternative energy sources, yes, we've looked at a number of alternative energy sources, and those studies are referred to in the EA. I don't recall off the top of my head what section they are in, but there is a section of the EA I believe that's devoted to alternatives, and they will be outlined in there. We certainly looked at wind power, solar power. We've had recent discussions about the possibility of hydroelectric power in a power line to the site. And we also looked at propane usage for mine air heating, because that is a substantial draw on the fuel.

**MR. HAL MILLS:** Okay, further questions or comments? Was it Glen? Graham.

**MR. GRAHAM VEALE (RWED):** I just heard a value there of 45 million litres of fuel per year. I'm just doing a quick buck of the envelope calculation based on what we were given for the amount that was used in the model, I see it comes out roughly about 54 million litres. Now, 54 compared to 45, I'm not sure that jives with Martin's statements that they were 100 percent conservatism and 200 percent built into the model. That seems pretty close to me.

**MR. MARTIN RAWLINGS (Golder Associates):** I'm not sure, Graham, if the numbers you are looking at for diesel fuel usage incorporate the mine fleets as well.

**MR. GRAHAM VEALE (RWED):** Yeah, you may be correct in that, yeah.

**MR. MARTIN RAWLINGS (Golder Associates):** I think, Graham, Greg Oryall can confirm this, but the mine vehicles do consume a considerable amount of diesel fuel in addition to the heaters and power plant.

**MR. LAWRENCE GOULET (Yellowknives Dene First Nation):** I would just like to know if the company put into effect a little over 20 years or even more of underground mining using say diesel drills, dump trucks with loaders with diesel. I wonder if they took into consideration the amount of exhaust that comes out of those machines will be built up on the underground workings. I wonder if they know that, the build-up of 25 years, or even more, of soot that builds up is taken into consideration, and if the water gets in there, and if they close the mine, it's going to be... I don't know, it might be a problem there.

**MR. GREG ORYALL (AMEC):** Certainly the build-up of diesel exhaust in the underground workings from the equipment is of paramount importance and it's very important to human health as well, and the underground mine ventilation system is designed to have the capacity to change the air out and in effect keep the mine air clean.

**MR. HAL MILLS:** Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Part of Lawrence's question is monitoring going to be taking place of this emission of exhaust going to the atmosphere as well, because it's going to be underground, it's going to be pumping the air out and it's going to go out in the air and it's going to be emitted through the atmosphere. We're wondering how the monitoring is going to be done.

And the other question I had was regarding air quality, how well De Beers deal with the amount of dust that is going to be raised during the construction of number one, the north pile, and two, the building of the infrastructure, three, the airstrip, four, the haul roads, five, the haul roads and the eskers. There's going to be truck hauling items on the winter road. There's going to be dust being raised and it is going to affect the quality of the air. We are just wondering how that is going to be dealt with. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** I think there were probably three questions there. The first one was related to the diesel exhaust fumes underground, and certainly there is day-to-day monitoring of buildups of exhaust fumes underground, and there are guidelines under the mine safety act that have to be met before personnel can work in those areas, so those are monitored on a

daily basis, and ventilation is changed as is necessary to ensure that those guidelines are met.

I think Martin can talk to monitoring of exhausts and air quality from the mine, and then he can also talk to dust suppression.

**MR. MARTIN RAWLINGS (Golder Associates):** Perhaps, Rachel, one of the things that we should point out is that in our assessment, we did include those exhaust fumes that are occurring underground, and we expected them to be exhausted into the air, and we included that in our assessment. We've heard Environment Canada talk about desires to have a monitoring program, or perhaps additional monitoring on the site, and De Beers had indicated that they will work with the regulators and stakeholders to ensure that that monitoring is to people's satisfaction. The third question that was raised with respect to dust on some of the activities in and around the site, and De Beers has made it clear in the EIA that they intend to implement a program to suppress the dust and minimize the dust from roadways and from the airstrip, and from construction activity. It should be pointed out that this mine is different than some of the large, open-pit mines in that there is limited truck haul back and forth from the mine. Most of the ore is going to be transported to the surface by conveyor belt, which will be covered to try to minimize the dust coming off of that conveyor transport.

**MR. HAL MILLS:** Any other statements or issues people wish to raise? Any other questions? Shall we do a quick wrap-up of the things that we raised here? Dave first then in terms of the modeling with limited data and monitoring for PN-10.

**MR. DAVE FOX (Environment Canada):** Our main issue was on the monitoring and whether De Beers would include monitoring PN-10 and PN-2.5. It remains to be seen whether De Beers are actually going to monitor that, so for now, until we go through the process of the consultation, we're satisfied for now.

**MR. HAL MILLS:** Graham, your concerns.

I think most of the concerns that I had around emissions were adequately dealt with by ...(inaudible)... presentation, and provided De Beers is prepared to undertake adequate tracking of their emissions over time and have an adequate ambient monitoring program, then the answer is fine for now.

**MR. HAL MILLS:** North, are you satisfied with the response you got on impacts of the fuel usage on vegetation and wildlife?

**MR. NORTH DOUGLAS (Rae-Edzo Métis):** I'm just getting curious how much tonnage of hydrocarbon emission will be spread out on the land. That still is not clear. I would like to raise that again. Thanks.

**MR. MARTIN RAWLINGS (Golder Associates):** Perhaps I can turn to the EIA and give you an indication of perhaps greenhouse gas emissions annually, which is a good surrogate for what you are asking for.

Overall, it was predicted that the Snap Lake diamond mine would release 101 kilotons of equivalency O<sub>2</sub> annually. A kiloton is a thousand tons. By contrast, the estimated emissions in Canada of greenhouse gases annually is 694,000 kilotons of equivalency O<sub>2</sub> per year.

**MR. HAL MILLS:** A quick calculation here is that you are going to contribute 6 percent of everything from Canada?

**MR. MARTIN RAWLINGS (Golder Associates):** It was 694,000 kilotons a year Canadian, 101 kilotons a year from the Snap Lake project.

**MR. HAL MILLS:** That makes a little more sense, thank you. North.

**MR. JOHN MCCONNELL (De Beers Canada):** What's that percent, Hal?

-- Laughter

**MR. NORTH DOUGLAS (Rae-Edzo Métis):** Thank you very much. I just wanted to put it on the record, that's all. Thanks.

**MR. HAL MILLS:** If we could finish going around in terms of the questions that have been raised, and then come back to you, is that okay? Lawrence, are you satisfied with the answers you got with respect to the exhaust emissions from underground? You are? Thank you. And Rachel, with respect to your questions on the monitoring of the underground emissions and on dust.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Yep.

**MR. HAL MILLS:** Thank you. Tim.

**MR. TIM BYERS (Yellowknives Dene):** A couple of questions then. One is monitoring of emissions. I'm wondering for the underground workings, does that mean there will be some kind of monitor sensor within the underground workings? And also, will there be some kind of sensor at the vent raises to find out what's being expelled at that point?

**MR. JOHN MCCONNELL (De Beers Canada):** For underground, it's more common to actually do a physical measurement by hand, because where you are really concerned is at the working face where the guys are working. You know, it's not as critical in the main drifts because that's usually where you have lots of ventilation.

So there will be sensors underground but the main method is actually physically by hand, and there would be sensors at both intakes and the exhaust, measuring various emissions as well.

**MR. HAL MILLS:** Anyone else have anything to say before we close? Tim.

**MR. TIM BYERS (Yellowknives Dene):** And question number two is dust, as far as monitoring programs for air quality, I think one of the aspects of dust that is... the question that has been raised in other mines is the effects of dust, not only on surrounding plant life and the viability of the surrounding plant life under deposition zones but also water quality in any water bodies that are beneath deposition zones. And this came up with BHP where they had reference lakes that were determined to be the... reflect pre-development case for water quality, and then a few years later they find uh-oh, the dust is generated by the mine is actually floating on to those lakes, and now we have a question as to whether water quality in those water bodies is still pre-development quality.

So I guess I would just like to get that out there, that that's a concern of mine as far as making sure we monitor the dust deposition for both those two concerns. Thank you.

**MR. HAL MILLS:** Any comment from De Beers? No? Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** There have been a number of suggestions, and as De Beers has said, you know, they are going to consider these suggestions as to what they will do with them.

De Beers has also started in its environmental assessment report a statement of commitments or summary list of commitments, and we're asking, the board's asking the technical reviewers to provide their analyses at the end of the day with these technical reports in February.

So we're hoping that De Beers can provide the technical reviewers their... I guess their commitment one way or the other with respect to monitoring and so on so that they can incorporate that into their technical reviews, which will ultimately go into I guess the hearing component of it.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnstone, De Beers. And likewise, technical reviewers will comment on what their recommendations for monitoring are in their technical report.

**MR. LOUIE AZZOLINI (MVEIRB):** That is correct, unless they explicitly ask you to tell them one way or the other. I understand where you are going, okay. ;

**MR. HAL MILLS:** I guess I would like to draw the session to a close, and just on a bit of a personal note, I will not be with you anymore. Mike Bell will be returning as facilitator tomorrow, along with Bill Klassen here. And I just wanted to thank you all for your patience and cooperation and striving to make the sessions as productive as we could. Thank you.

-- ADJOURNMENT

December 4, 2002

December 4, 2002

# **MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD**

## **De Beers Snap Lake Technical Sessions**

**December 5, 2002**

### **Yellowknife, Northwest Territories**

**MR. MIKE BELL (Facilitator):** Okay. Good morning, everybody. My name's Mike Bell. I'm one of the group animators and teller of tall tales. So, our role is to try and keep people on track. We usually start the morning by going around and asking everybody to give their names, so we've got it for the record. So, when we come around the table this way we'd ask the people in the back to come up and just speak into the microphone so we know who's here. Okay?

**MR. BILL KLASSEN (Facilitator):** I'm Bill Klassen. I'll be helping with the facilitation.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Florence Catholique, Lutselk'e Dene First Nation.

**MR. DAVE BOWEN (Fisheries and Oceans):** Dave Bowen, Fisheries and Oceans.

**MS. HEIDI KLEIN (Gartner Lee Wilson):** Heidi Klein with Gartner Lee Wilson for the impact review board.

**MR. ED WEICK (Consillium/Gartner Lee):** Ed Weick with Consillium and with Gartner Lee working on the socioeconomic impact.

**MR. ROY ELLIS (Ellis Consulting):** Roy Ellis with Ellis Consulting Services working for the impact board.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers Canada.

**MR. PETER HOMENUCK (IER Terriplan):** Peter Homenuck with IER Terriplan. Responsible for socioeconomic work.

**MR. ROBIN JOHNSTONE (De Beers):** De Beers Canada, Robin Johnstone.

**MS. ANNETTE WILSON (IER Terriplan):** Annette Wilson with IER Terriplan.

**MR. TIM RATION (IER Terriplan):** Tim Ration with IER Terriplan.

**MR. ANDY SWIDERSKI (Terriplan Consultants):** Andy Swiderski with Terriplan Consultants.

**MS. BETTY BESWEICK (Golder Associates):** Betty Beswick, Golder Associates



for De Beers Canada.

**MS. LISA BEST (GeoNorth):** Lisa Best, GeoNorth.

**MR. ANGUS MORGAN (Yellowknives Dene):** Angus Morgan, Yellowknives Dene First Nation.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, De Beers Canada.

**MR. LOUIE AZZOLINI (MVEIRB):** Louis Azzolini with the review board.

**MR. DAN WESTMAN (RWED):** Dan Westman with RWED.

**MS. LESLIE GREEN (Golder Associates):** Leslie Green, Golder Associates.

**MR. CLAY BUCHANAN (RWED):** Clay Buchanan, RWED, GNWT.

**MR. JASON MCNEILL (RWED):** Jason Neil, RWED, GNWT.

**MS. TARA NAUGLER (ECE):** Tara Naugler, Education, Culture and Employment, GNWT.

**MR. DAVID GILDAY (ECE):** David Gilday, Education, Culture and Employment, GNWT.

**MR. ANDY LANGFORD (HSS):** Andy Langford, Health and Social Services.

**MS. DEANA TWISSELL (HSS):** Deana Twissell, Health and Social Services.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, North Slave Metis Alliance.

**MS. JUDY FAMULA (Environment Canada):** Judy Famula, Environment Canada.

**MS. GINGER LESTER (MACA):** Ginger Lester, Municipal and Community Affairs.

**MS. CAROLYN DOYLE (ECE):** Carolyn Doyle, Education, Culture and Employment.

**MR. FRASER FAIRMAN (INAC):** Fraser Fairman, Indian and Northern Affairs Canada.

**MS. SHEILA MONTGOMERY (CARC):** Sheila Montgomery, Canadian Arctic Resources Committee.

**MR. JAMES SANGRIS (Yellowknives Dene):** James Sangris, Yellowknives First Nations, Environment.

**INAUDIBLE:** Inaudible, Dettah.

**INAUDIBLE2:** Inaudible2 for Dettah.

**MS. JULIE GREEN (CBC Radio):** Julie Green, CBC Radio.

**MR. JOHN GOIMAN (De Beers):** John Goiman, De Beers.

**MR. MIKE BELL (Facilitator):** I'd ask the people who just came up to just speak into the microphone and tell us who you are so we've got you on the record.

**MS. DEBORAH ARCHIBALD (RWED):** Deborah Archibald, GNWT, Resources, Wildlife and Economic Development.

**MR. MIKE BELL (Facilitator):** Turn it on, please. It was on.

**MR. BILL HORN (RWED):** Sorry. Good morning. Hi, I'm Bill Horn. I'm one of the consultants for the same organization.

**MR. DAVID ELLIOT (RWED):** David Elliot, also a consultant for the GNWT.

**MR. MIKE BELL (Facilitator):** Would you speak into the microphone? Just give us your name, please.

**MR. ALBERT BOUTILIER (Lutselk'e):** Albert Boutilier from Lutselk'e.

**MR. MIKE BELL (Facilitator):** Okay. Good. We're very happy to have everyone here. Especially happy to have our Elders back who were here in some previous sessions. What I would like to do at the beginning is just go through a bit of a format. We have a changing cast of characters in here. You missed, on the first or second day, some very exciting conversations about blue-green algae. I'm sorry for those who missed them, but we really had these and they were winners. But anyway. You can go out with them again, no thank you. As I mentioned, when we got to animals it was finally nice to talk to something I could talk about something I could see.

Anyway, we have a few procedural situations, so I'll explain before I ask Bill to wrap up, just give an overview of yesterday. Because we're recording the transcripts we ask people always to give their name before they speak. This is a bit cumbersome and the De Beers folks never seem to get the drill down very well from my past experience. But, anyway, we get through it. So we'd ask you to please give your name and organization so we'll have them and we'll know who's speaking in the transcripts because the transcripts basically are coming out.

The procedure we usually follow, since we're responding to the environmental impact study and we're reflecting some questions, the process usually works like this. It starts with De Beers making a presentation. After the presentation, we'll find out if anybody else is making little presentations or small ones around the same subject. Then we ask for clarifications, questions for clarification purposes only so we just try and get more information through clarifications. And then, hopefully, it will

work that this is when we take a break.

Next, we come back and we say to people, Do you have any concerns? And we list the concerns and that provides us a list of concerns and we make the list first so then we can go through them one by one by one and we can also make some comparisons when concerns are similar. So the second thing we do is go through the concerns.

When we come to the end of the segment we ask people, Have your concerns been address or are there some issues that you wish to highlight for the benefit of De Beers and for the benefit of the board because these concerns probably, the issues probably will manifest themselves in the technical reports after this session?

So, the process then is the presentation, clarification, list of concerns, work our way through the concerns and then basically a summary at the end where we try and consolidate which concerns are still outstanding. I don't know if there's any questions about that. Okay. I guess the best way to do it is to do it. Just in terms of the recap yesterday, why don't we just refer to Bill.

**MR. BILL KLASSEN (Facilitator):** I'm Bill Klassen. We dealt with, and those few of you who were here yesterday will recall, geotechnical issues and most of the matters that were raised were resolved. We had lengthy discussions on the north pile. The thermal regimes. We dealt with permafrost site reclamation and closure and had an interesting discussion about re-vegetation and also dealt with air quality late in the day. During the lunch hour, De Beers provided a presentation on ISO 1401 that was also quite enlightening. As I say, most of the matters were resolved. The one other point that we'll probably need to remind people of a couple of times today is that tomorrow we will not be in this room. We will be at the Royal Canadian Legion, which is further back up, well, almost downtown. So, bear that in mind. Tomorrow we're at the Legion. That's all I have.

**MR. MIKE BELL (Facilitator):** Okay. Just for the agenda today, as you see, we have a day and half to deal with socioeconomic. There'll be a presentation, "Overview of the Socioeconomic Components," this morning by De Beers. And then we'll deal with socioeconomic impact assessment. It says approach and methodology. We have found it more beneficial after the presentations to lump the issues together rather than trying to just have a conversation about approach and just have a conversation about methodology because it gets too, there's too much overlap in these things. So we'll deal with questions around approach and methodology. We'll have lunch and then there's CEA affects mitigation, impact management measures in the early part of the afternoon and sustainable economic development towards the end of the afternoon. Are there any questions about the process? Everybody is clear about what we're doing? Andy, do you have a question? Okay. Good. Well, why don't we start then with the De Beers presentation.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Thanks, Mike. I

think, Mike, over the last couple of days we've actually been quite a bit better. So, maybe it's your influence. Just sort of a housekeeping item. Bill mentioned yesterday that we gave a presentation on ISO 1401. I think in the presentation John Goiman mentioned that we're presently being audited for registration and I guess I'm pleased to tell everybody we have been now recommended for registration. So, the audit's complete and we will be registered this year. Thanks, Mike.

—Laughter

We do have a couple presentations today. First thing, because it is a bit of a new cast here, although there's a few familiar faces, we'd like to have Betty Beswick come back up and just act as our tour guide to set the scene for these technical sessions. Then I'll be providing a short overview on socioeconomic impact analysis. Then we have Peter Homenuck of IER to provide the presentation, which addresses some of the issues that were raised prior to this technical session on socioeconomic impact analysis.

Peter is a former professor and is a socioeconomic impact analysis specialist. He's worked on many impact analyses across the north. Has been on both sides of the table. I think through the Diavik process was actually on the government side. So, he's seen it from both angles and certainly brings 30 years of experience to this process and we're delighted to have him here with us today.

We'll start out first with Betty Beswick. I'll just turn it over to her.

**MS. BETTY BESWEICK (Golder Associates):** Alright. I'm going to be here to just give a very quick overview of where we are in the process and where we're located in the world for this project. We started out, De Beers started out with community consultation and collected baseline environmental information in 1999. That work has continued through to today and will be continuing through the life of the project.

In February 2001, De Beers put forward applications for a land use permit and water licences. That happened with the Mackenzie Valley Land and Water Board. A few months later, the board referred it to an environmental assessment. Mackenzie Valley Environmental Impact Review Board then provided De Beers with a final terms of reference for that impact assessment in May. Those terms of reference included consultation and development in their development.

The environmental assessment report which responded to those terms of reference was submitted in February of this year. Comprehensive technical information sessions were held this spring. They were held downtown in the movie theatre, for those of you who were there. The purpose of those information sessions was for people to ask questions and clarify issues in the environmental assessment. Since then, there have been five rounds of information requests that have gone to the board which De Beers has provided responses to. Those sessions started in May and have continued through until just before these technical sessions.

While the information requests were going on, the environmental assessment was

being reviewed to determine if it met the terms of reference and in September of this year the decision was made that the environmental assessment did conform with those terms of reference. Today, the technical sessions are the environmental impact review board. As we've already said, we're almost at the end of these technical sessions. They've been going on and we're getting close to the end of the second week. Following these sessions, people will have an opportunity to develop technical reports which they will have to submit to the board by February, and I think it's Valentine's Day. Those will be followed by public hearings at the end of March.

That's where we are in the process. Now, a bit about where we are geographically. Obviously we are here in Yellowknife today. I think most of you know the Snap Lake project is located about 210 kilometres northeast of Yellowknife and it's here. The other two diamond mines that we will mention are located up here in the Lac de Gras area, which is about 100 kilometres northeast of the Snap Lake Project. That would be the Diavik Project and the Ekati Project.

For the purposes of the socioeconomic impact assessment, four types of study areas were looked at. The first were the primary communities. Those are noted in red here on the map. They were also communities that were called the employment catchment area. They're located more to the south here and they're noted in green. Also for the purposes of the environmental impact assessment, a study area was designated for the whole Northwest Territories and the fourth area that was considered was Canada as a country.

Now I'm going to turn you back to John, who will talk about the socioeconomic overview. Oh, well, this is John here. He's doing the overview. And he'll be followed by Peter and John Simpson, who will discuss these other issues related to today's agenda. And we'll follow up with cumulative effects for socioeconomics tomorrow.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Thanks, Betty. As I said earlier, I've been asked to provide an overview on socioeconomic impact assessment. I guess just a little bit of background on our process. Most of these presentations we put together a couple weeks ago. We've been working on them and refining them in the evenings and generally the night before we get together just for a bit of a dry run. So, when we were set up last night I said, So, okay, who's giving the overview? And they all pointed to me. So, which I found kind of ironic because two years ago, when we started this process, I had no idea what socioeconomic impact assessment was. So, I figure either I've been set up here or they figure I've learned something. By that I mean that in terms of being set up they're hoping that I'll embarrass myself and stumble through this completely and never again step foot in what I consider quite a black box science and approach to things. Anyway, here goes.

This in terms of socioeconomic analysis, one of the key areas that is looked at is, What are the benefits? And certainly with a project like Snap Lake the key benefits are employment, job training, skills and capacity development, community development, the opportunities for local businesses to develop and, finally, tax

revenues and royalties. These benefits are shared by a number of groups. Certainly the primary communities benefit from employment and training and business opportunities. Employment catchment communities, similar types of benefits. The Northwest Territories government, new residents to the Northwest Territories has an economic effect. And the Government of Canada, we all know, benefits very greatly as a result of royalties from diamond mines.

So the key questions addressed in our socioeconomic analysis are:

1. What are community members and stakeholder groups' socioeconomic and cultural issues and concerns with respect to the project?
2. What are the potential impacts of the project on the economic conditions of individuals, families, communities in the Northwest Territories and Canada as a whole?
3. What are the potential impacts on social and cultural sustainability and well-being of individuals, families and communities in the Northwest Territories?
4. What measures must be taken to optimize the potential positive socioeconomic impacts and minimize the potential negative socioeconomic impacts on the individuals and communities of the Northwest Territories?

In our environmental assessment we've made a number of commitments related to socioeconomic benefits and opportunities. Some of those include maximizing hiring of aboriginal northerners and northerners. Purchase of services and supplies from northern firms where possible. Support of business development. Provision of training and skill development to maximize aboriginal northerners and northern employment. Support, we support on-site education and training and we hope to partner with government and communities to provide skills training and upgrading in the communities. We provide family support services in the communities. We support traditional activities in aboriginal cultures.

In the environmental assessment, the major components of our socioeconomic impact assessment are covered in Section 5. In particular, Section 5.1 covers the scope of the assessment. Section 5.2 is the baseline data. Section 5.3 is the impact assessment and Section 5.4 is our summary and conclusions.

Before I turn it over to Peter to talk about the impacts, what we're going to do today is discuss our approach or methodology. That'll be covered this morning. This afternoon we're going to actually get into some of the mitigation measures that we've already put in place or are planning. We've a couple of fairly lengthy presentations this afternoon, but this morning's are a little shorter. So, I'll turn it over to you now, Peter.

**MR. PETER HOMANA (IER Terriplan):** Thanks, John. Peter Homana from IER Terriplan. I'm going to take a few minutes to talk to the approach that we used in doing the socioeconomic analysis for the Snap Lake Project. The purpose of

structuring this presentation is to respond to some of the questions that were raised in the information requests about methodology and the study areas for this project. We, just for your reference, the methodology is addressed in Section 5.1.3 in the report and in addition we've responded to a number of information requests that raised issues of methodological nature.

The presentation that I'm going to do this morning is not very lengthy, but it's covering four areas. Betty's already mentioned some of the study areas. I'm going to spend some time on the approach, the five step approach that we used for socioeconomic impact assessment. The information used, information we gather and use in our analysis. Then what our impact predictions were or how we do the impact predictions and then the conclusions.

Now, to do a social impact or a socioeconomic impact assessment, the rationale is to examine a proposed project and to see the extent to which there will be an effect on people's quality of life. What will be the measurable or identifiable difference that it will make to people in terms of individuals, families and communities. Those differences or the effect on people's quality of life can obviously be positive and they can also have some negative effects. It's a matter of being able to identify them, understand them and be able to explain them and how to deal with them.

You already saw a map which showed the study areas and I just mentioned, I think, see the primary communities. These are the communities that are closest to the Snap Lake Project. Communities that have used the area for traditional pursuits. You can see Lutselk'e, Dettah, Gameti, N'Dilo, Yellowknife, Wha Ti, Rae Edzo, Wekweti and the North Slave Metis Alliance. These are the primary communities that we focused on in the socioeconomic work. There are, however, other communities primarily south of the lake. The employment catchment communities. Fort Resolution, Hay River, Hay River Reserve, Fort Smith, Fort Providence and Enterprise. These are communities from which it's expected that individuals and/or businesses may have some employment opportunity or business opportunities with the De Beers project. Third is the Northwest Territories itself as a political jurisdiction and, of course, Canada.

Now, the reason we try to identify the different study areas is that there are some differences in the impacts that one would see and the intensity of impacts and the range of impacts, depending on which area you're looking at. Clearly if you're looking at the Government of Canada it's primarily financial or economic. When you're dealing with the primary communities it's economic, it's social, it's environmental. I saw that map before. Just to re-emphasis that the primary communities are shown in red, the employment catchment communities are shown in green.

It's a five step approach that is conventionally used in social impact assessment and socioeconomic impact assessment. There are five steps and I'll deal with each of them individually, but the identification of issues, profiling of communities, the

prediction of impacts, identification of impact management measures and, finally, the evaluation leading to a conclusion.

As was noted, I think, in one of the slides that Betty showed, work on this project began at least three years ago and in our case it did begin three years ago with the issue identification stage. This stage is carried out by having meetings with communities, government officials, key leaders in communities, Elders and so on to identify what people feel are issues and concerns that they have about the proposed project. Those issues and concerns can be based on their experience, past experiences, something that might be somewhat different than has been experienced, wanting to know more about particular aspects of what's proposed.

Through that issues identification, we ourselves have scores of meetings in the communities and with organizations and government officials, as well as a large number

of one-on-one interviews. I think from that we developed a very good understanding of a broad range of issues and concerns that need to be examined and have attention paid to them in doing this socioeconomic work.

Second step is the profiling and that is ensuring you develop as good an understanding as you can of the communities that will be affected. In this case we concentrated our efforts, although not solely on the primary communities, that's where the bulk of our work occurred. Again, the information to develop the profiles of the communities comes from available secondary source information. Obviously from whatever government statistics are available. From information that each of the communities had of an aggregate nature that they were able to provide to us. And, of course, from interviews with community leaders, Elders and so on.

Once we have the list of issues and concerns and a good understanding of the communities and their characteristics it becomes necessary to say what might one expect from this project. The first step of predicting the impacts. And in the prediction of impacts you rely on a number of different methods and techniques. You're relying on case studies of similar projects. You're relying on people's experiences with broad resource development activities and those kind of activities primarily in the north, which has its own special characteristics. You use some modeling, input/output modeling to get at some of the economic aspects of the prediction.

In De Beers case, I think they're lucky to an extent in that BHP and Diavik preceded and so the communities, and the primary communities were largely the same, the communities have had some very recent experience with mining and diamond mining in particular. So, that meant that we had the benefit of recent experience from individuals, families and communities that becomes part of our database and, in fact, allows us to ground our analysis in the actual experience of people in these communities.



Once we have the impacts prediction, which we'll talk about a little bit more, but there are always some very positive things that can be identified and some things that are negative. So the next step is to say, What impact measures or impact management measures can one put in place to maximize those things that are positive and to minimize, reduce or eliminate those things that people see as being negative? As a result of that, we've identified a range of impact management measures which will be the basis of this afternoon's discussion.

Once we have those impact management measures we would go through a systematic reasoning of, if the impact management measures are developed and implemented, what do we think the end results would be and how do we ground that in other experience? So our evaluation is based on the way that the issues can be addressed, as happened in other cases with similar impact management measures and any accumulated research that there is that's relevant to the particular geographic area and the communities.

To that end, I think it would be important to note that a very recent study carried out for the Northwest Territories Chamber of Mines in which we played a role has actually documented at least the economic benefits of aboriginal participation in mining in the past decade and there's considerable information there that, I think from an economic perspective, gives a very good news picture.

Now, it says at the bottom, Socioeconomic impact assessment is ?iterative?, adaptive and on-going. What that means is that, as we went through this process, as we did our review and evaluation, we went back and forth to government agencies, to community leaders, back into communities, for review and verification. We went back to review the issues, to make sure that we had the issues, to see if there were any new ones that needed to be addressed or that had not previously been identified. We went back with our suggestions about how impacts can be managed and asked for response, opinion, input as to whether or not we were moving in the right direction to address the issues and concerns that were being raised. That process doesn't end with the completion of the EA and the submission of the EA. It's an on-going process and we are in fact, have been back in communities talking about how some of these impact management measures can be implemented. Again, you'll hear more about that in the session this afternoon.

Just very briefly, two more slides. In terms of the information that we use, as much primary source information or data as we can get the better. The more we get from the communities and the individuals who potentially are going to be affected by this project, the better it is in terms of the robustness of the analysis. So we do, the in person interviews, which I've mentioned, meetings with communities, government, industry and also we've had cross-sectional community meetings in the communities.

The secondary source data, literature, documents, the policy reviews of government, the statistical data kept by a wide variety of organizations and then the case studies. The case studies not only being those related to diamond mining in

the north, but also other relevant major resource development activities in other parts of the country. Our predictions are then based on the community issues and concerns and the extent to which we feel that they have been addressed or can be addressed. What we've learned from other case studies, not just BHP and Diavik, but other resource development projects. If you've gone through the environmental assessment you'll see that we have done a type of scenario development that would say if these measures are taken, these are the benefits that we expect to see. If there are negative impacts then there are things that we think need to be done. And it was, on the one hand this is what can occur; on the other hand if you don't do these things here are some things that might occur. The word triangulation there really refers double checking and verification and the interive of discussions with officials and government officials in the community.

Ultimately, in some cases, our professional judgment which is rooted in the experience of 30 years with a wide range of similar projects brought to bear, to the extent that we can say that this has been tried or carried out in other circumstances. What's happened? What's been the benefit? What are some of the negative things that occurred in some cases that we now know can be dealt with in a particular manner?

From this we draw our conclusions and the end results that we think will occur. In our view, this project is generally a good news story in that there can be some very positive effects and we need to see if those positive effects need to be maximized. That doesn't mean that there aren't some negative effects or the potential for negative effects, so steps have to be taken to ensure that those can be mitigated, prevented and eliminated.

In conclusion, if the impact management measures that we've discussed in the environmental assessment in sort of broad terms are fully developed and implemented then we believe that the benefits to individuals, families, communities, the Northwest Territories and De Beers and Canada as a whole are very positive. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Thanks, Peter. I guess that's the end of our presentation, Mike, so it's back to you.

**MR. MIKE BELL (Facilitator):** Okay. Mike Bell. Are there questions or requests for clarification on the material that's been presented up to this point? Before we get into areas of concern. Okay. No questions or requests for information. What we would now like to do is have a listing of the areas of concern. Just a word about this. We've found in the past doing these hearings that sometimes people are not sure whether there's an issue there or not. Often times they need more discussion to determine whether there is an issue. So, we're at that point in the process where people express their concerns and they do this by simply saying, I have a concern about this area, they tell us what it is and we make a list. Then, after everybody and these things are related to this presentation and the issues that were dealt with in the presentation. Then after this we go back one-by-one- by-one and start, as much

as possible, a free flowing discussion around the issues. So we need that list now of people that may have areas of concern. Could we start? Ed.

**MR. ED WEICK (Consillium/Gartner Lee):** I've re-read the fifth chapter of the EIA and I don't disagree with the methodology that was used, but in general there's a lot of positives balanced by negatives and a lot of conditional statements. What I found, what I felt was that it, it really come down very hard on things at times or it doesn't come down as hard as it could. That is a concern, I think.

**MR. MIKE BELL (Facilitator):** Okay. Good. Thank you. Other concerns. David.

**MR. DAVID GILDAY (ECE):** David Gilday. I just, in reading the documentation it's evident that De Beers is very interest in partnership with various government organizations. The documents that have been provided today are fairly scant on detail and give us a great deal of concern that there's a reliance on a public purse that has constraints upon it and the documentation we have received seems to, it's a recent publication developed in human resources for Snap Lake diamond project seems to finish the document off with an escape clause that minimizes investment if the government can't partner up on all things. I'm sure you'll want to discuss that.

**MR. MIKE BELL (Facilitator):** Okay. Good. Andy Langford.

**MR. JOHN MCCONNELL (De Beers Canada):** Mike, John McConnell.

**MR. MIKE BELL (Facilitator):** Oh, sorry, John.

**MR. JOHN MCCONNELL (De Beers Canada):** I think that's probably an issue for this afternoon. I think we discussing the approach and methodology this morning as opposed to impact measures.

**MR. MIKE BELL (Facilitator):** I'll deal with that this afternoon then. You'll have to mention it again, David, this afternoon, okay? Andy Langford.

**MR. ANDY LANGFORD (HSS):** Andy Langford. I'm not sure if this is a concern or simply a need for some clarification, but I would like at some stage to return to the slide on impact prediction where there were, I think, five elements, Peter, that you indicated. There they are right there. I'm wondering whether there is any weighting that is given to each of those five elements.

**MR. MIKE BELL (Facilitator):** Okay. Roy and then Ed.

**MR. ROY ELLIS (Ellis Consulting):** Roy Ellis, Ellis Consulting Services. I have one issue relating to the prediction of commitments to northern benefits and I have three, basically statistical and information issues. One is dealing with the estimation of GDP and other operating surplus. One is to do with labour income and employment induced estimates. And the third has to do with the estimation of tax benefits.

**MR. MIKE BELL (Facilitator):** Okay. Ed.

**MR. ED WEICK (Consillium/Gartner Lee):** Yeah, just, I'm not quite sure how to phrase this, but it has to do with the sort of dynamic nature of interaction between, say the project and the people that are affected. I gather from the EIA that it's assumed to be quite dynamic. Things happen and people sort of react and you sort of do something about that. But I would suggest may be some thresholds in all of this that once you do something, up to a certain point things become quite irreversible and it's no longer dynamic. People have either gained or they've lost or something has happened that changes things forever and I wonder about the extent to which that has been taken into account.

**MR. MIKE BELL (Facilitator):** Okay. Thank you. Other concerns.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison.

**MR. MIKE BELL (Facilitator):** There's another one down here. Just a second, Janet. Rachel. Please.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** The slide, the primary source data slide, please. And the one before that. Okay, back then. Thank you. Rachel Crapeau, Yellowknives Dene. Down, please. You mentioned that information was gotten from in-person interviews with communities, individuals, government, industry and the communities. If you did those types of interviews is there a study paper or a survey results information from doing these types of interviews?

**MR. MIKE BELL (Facilitator):** Okay. We'll deal with that question. Janet.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. A couple of issues. In terms of use of baseline information there are just some concerns about updating additional information, updating the impact prediction and other aspects of the socioeconomic assessment to include more recent baseline information.

**MR. MIKE BELL (Facilitator):** Okay.

**MS. JANET HUTCHISON (NSMA):** As well, some concerns or discussions about, I guess, methodology and how it might or might not take into account possible changes to the total production rates.

**MR. MIKE BELL (Facilitator):** Okay. David Gilday.

**MR. DAVID GILDAY (ECE):** David Gilday. You see me following up on Rachel's comments. We are concerned to find out more about the consultation process and to determine the contacts with the GNWT respecting employment training programs. Recognizing that there was consultation at the community level, we're interested what was done with government officers.

**MR. MIKE BELL (Facilitator):** Okay.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. Also a concern about methodology in terms of impact prediction apparently being based on treating the primary aboriginal communities as a homogenous group. We'd like to have a discussion about better methodology involving individual communities and impact assessments on individual communities.

**MR. MIKE BELL (Facilitator):** Okay. Okay. That do it for the time being. Okay. Let's start. What I like to start to do is, Ed started first with, look at my list, Ed started with methodology. We'll try and have a free-flowing discussion once Ed talks about his concerns about methodology and we'll try and get the response each time back to De Beers. Ed. Go ahead, Ed.

**MR. ED WEICK (Consillium/Gartner Lee):** Yes, well, it's a very well written document, but I found a lot of it quite conditional. Like, if this happens and that may happen or that may not happen. If there are positives, well, of course, there are negatives, but you are never quite sure of how big the positives really are or how big the negatives really are. It sort of seems to walk about or float about in a plus/minus sort of space that you're never quite sure of, you know, it doesn't seem to come down hard and that is a problem. In anything like this people are going to benefit, there's no question. Other people are going to lose. There's no question of that either. We're all quite familiar with frontier development. Now, it doesn't quite, in my opinion, and this is my opinion, get to where the hard places are.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I guess that's a comment. I didn't hear a question in that, Ed.

**MR. ED WEICK (Consillium/Gartner Lee):** The question is, yeah, are you going to address the really hard places at any point or are we done with all of that now? Might I add to that, just, you have liaison people, you have mine management advisory committees, how will they deal with these things?

**MR. MIKE BELL (Facilitator):** Can I ask for clarification, Ed? Could you give several examples of the hard things that were not addressed?

**MR. ED WEICK (Consillium/Gartner Lee):** Well, I can give them from other projects. Like, I did a study on uranium mining in northern Saskatchewan about ten years ago and yes, indeed, people were benefiting, but the families were hurting, there were all kinds of problems, people were moving out of the communities to get out of the kind of social situations that money sort of brought along. That kind of thing could happen and I don't see it addressed thoroughly enough here.

**MR. PETER HOMANA (IER Terriplan):** Peter Homana. I think that you're right in the sense that we have possibly been conditional in some places, but I think the issue that one needs to consider is that we're looking at a project that has a 25 year or more life. We're dealing with communities that have had both positive and negative experiences to date. We've been told that very clearly by people in the

communities, by people who are currently working at the existing mines and we've tried to identify all those issues and how they might be addressed. Now, in identifying impact management measures, whether they be around community wellness or education and training, what have you, we can identify the measures, they can be developed, they can be put in place. De Beers can put some in place. Some have to be put in place with partnerships, so that brings in an element of having to be conditional because we aren't in the position to commit partners. We only in the position to identify the need to work together and to explore how, collectively, some of these things can be addressed. Whether the partners be the communities or government agencies.

In addition, individuals make decisions and choices. Communities make decisions and choices. That's very difficult, if not impossible, to say community will benefit in exactly this kind of way and community will benefit in this kind of way and community will have more problems than. Because there are individual and community decision points and that's why, I think, we, you can put on a harder edge to it. I think our attitude is we would rather be approximately correct than precisely wrong. We want to be as honest as anybody can be about what the implications are, what kinds of things people are going to have to deal with and those choices will be made and over time those choices will change because as they increased in education and training people will have, again, different sets of expectations and a decision that might get made in a community today, those same conditions might lead to a different decision five years later.

In addition, there are a range of other variables at play. Variables about changes in government policy around programming and things of that nature where one can predict what those might be. So, to sum up, I think we've tried to outline it as clearly as we can about the challenges that are there, both positive and negative, and what the impacts can be. But we have to recognize that there are a lot of players here that have a role to play and that includes the individuals, the communities, De Beers and government agencies.

**MR. ED WEICK (Consillium/Gartner Lee):** I think we can let this one go for the moment. I recognize all of that and yet I still do read chapter five as being rather conditional and I'd like a little more vigor there, but that's my personal preference. Thanks.

**MR. MIKE BELL (Facilitator):** Going down, Andy, you had questions on impact predictions and waiting.

**MR. ANDY LANGFORD (HSS):** Yes, but could I just, Andy Langford, sorry. Could I just follow up on something that Peter said?

**MR. MIKE BELL (Facilitator):** Go ahead.

**MR. ANDY LANGFORD (HSS):** Assuming for the moment that we were to accept the difficulty in making strong and accurate predictions, would it be fair to say then

that over a 25-year life span, is that not close enough? Sorry. Is that better? Peter, assuming for the moment that we were to accept your proposition that it is difficult to predict impacts in any definitive way, would it then be fair to expect that over a 25-year life span, one of the things that De Beers would propose would be to enhance its monitoring activities so that those impacts could be caught early, when they happen?

**MR. PETER HOMANA (IER Terriplan):** Monitoring is clearly a key to know what changes are occurring. I think that there will have to be very effective monitoring at the community level with community involvement and with government involvement and with corporate involvement.

**MR. MIKE BELL (Facilitator):** Okay.

**MR. PETER HOMANA (IER Terriplan):** I forgot to state my name, Mike. It's Peter Homana.

**MR. MIKE BELL (Facilitator):** Go ahead. Good.

**MR. PETER HOMANA (IER Terriplan):** State it at the end.

**MR. MIKE BELL (Facilitator):** The only person around here who doesn't have to state their name is me. Roy, you had a number of, I'm following, Andy, you're satisfied. Did you want to respond again?

**MR. ANDY LANGFORD (HSS):** I don't want to take up too much time, but I would like to get back to the one concern that I did have.

**MR. MIKE BELL (Facilitator):** Yes, go ahead.

**MR. ANDY LANGFORD (HSS):** Peter again, if you could put up that slide that speaks to impact prediction. Right. With those five factors, I guess you would call them, that you take into account in deriving your predictions, I'm just wondering whether or not you would give any relative weightings to those. I guess what I'm particularly interested in is whether there's relative weighting between the experience that communities have had and professional judgment, for instance.

**MR. PETER HOMANA (IER Terriplan):** There is no waiting amongst those elements. However, clearly the experience, recent experience in the communities is looked upon as having a high value to the analysis. Likewise, the case studies that are relevant and recent clearly get more consideration than those that are more dated.

**MR. MIKE BELL (Facilitator):** Roy, I guess you're next. You had a number of questions around, that this afternoon, you had a number of questions around statistical issues and a question about commitments. I don't know if they all fit in here, but why don't you go ahead.

**MR. ROY ELLIS (Ellis Consulting):** Roy Ellis, Ellis Consulting Services. If I can just introduce the issue and I'll have a couple questions. So, if I could go into it a little bit first. The first issue relates to what, I mean, we generally agree that, everybody is in agreement that there be positive economic impacts from the project on the territories and Canada and it's not really the issue. The issue that I'm trying to refine is, what the board really needs to know is the level of those impacts and how much the mine will impact on the economy of the north and how much of the income earned will stay in the north and how much of the benefits will flow to the north. Really, that's the information that's critical to the analysis.

One of the major concerns that I have is that I like everything that's being said. There's a commitment to employment training, to all kinds of mitigation measures and so on. But what I'm really concerned with is what really hasn't been said and that's that there hasn't been a specific commitment to an employment target or a business purchase target for the north. Basically, the company's saying, you're going to employ as many people as possible and that's not really a target, that's a goal. I mean, that's your goal, but what is your best estimate of what you actually think you're going to be able to achieve. Really, in order to do the impact assessment and to do a quantitative impact analysis on the territories, you need to know that question. I know that there you've used 60 percent for operations and 40 percent for construction and 60 percent for closure for employment, for example, to do your economic modeling, but you haven't committed to those numbers as being a target for the north.

Probably the issue is summed up best by your statement on one of the pages in the cumulative impact assessments where you, it's on page 1226, I believe, let me put these on, 1225. Basically it says, The proposed Snap Lake Project would create so

many jobs and so many jobs. De Beers has committed to hiring as many northern aboriginal employees as possible. And then it says, Currently, the Diavik Mine employs so and so and Diavik's intentions of 66 percent of the employees will be comprised of northerners and aboriginal people. Then it says, The Ekati diamond project is currently employing so many. The target for northern resident employment is 62 percent of total employment. Then it says, It is estimated that the Tahera Jericho diamond project will employ so and so, the mine company aims to ensure that approximately 60 percent of these workers are northern.

The statement isn't made by De Beers and really, so really two questions relating to that. One is that, what target or what level was used for your impact assessment? I know the modeling work to do the work that Peter talked about, the impact assessment on the primary communities, the catchment communities and so on, what level of employment was assumed for that?

Then my second question is, will De Beers commit to their best target? As with all the other three diamond companies, the two that are in operation or the one that starting to operate and the Jericho diamond company. That's my first issue.



**MR. MIKE BELL:** For those that are new, we had some short conferences with De Beers because the questions are complicated. So, that's why we have a bit of a pause once in a while.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. I think Roy has a number of questions related to this issue and I know we're moving close to the coffee break time. So, what I'd suggest is that if Roy could put all of his questions on the table, give us a couple of minutes to caucus and then following the caucus we'll come back with a response.

**MR. MIKE BELL:** That sounds good to me. Roy, would you continue and list the questions that you, or concerns that you've got.

**MR. ROY ELLIS (Ellis Consulting):** Okay. Roy Ellis, again, Ellis Consulting Services. The second question relates to the estimate of GDP that was presented in the EA and basically the reason why the estimate of GDP is important is that when we are trying to measure the impact of the project on the territory we need to know the wealth created by the project and basically try and see how much of that wealth is going to be retained in the north. So, basically, we need to know the size of the pie in order to see what slice the north is getting and so on. So it's important to have that measure.

Now, I still can't quite understand why you haven't provided it because all the base information needed to produce the estimate has been given out in the EA, but the only estimate of, only a portion of the estimate of GDP has been produced and that labour income portion. The other operating surplus portion has not been and that bulk of the GDP. So that's something I would like to ask De Beers to produce an estimate of complete GDP for the territories and Canada over the life of the project.

The third issue is more to do with the technical issue related to the modeling and that the, and I'll just file this information because I don't expect to get, this is not really a De Beers issue because it relates back to the model that was used. Again, I'm concerned that the employment numbers that are presented, now this was strictly the employment numbers presented as a result of the modeling exercise, so you haven't committed to these numbers so I don't know whether, but, the numbers that were given, the induced impacts for employment and labour income, they were inconsistent. I asked that back in the methodology, but the methodology still doesn't explain those numbers. It's not consistent. Either the labour income appears to be too high and the induced impacts or the employment impacts are too low. Either way, the labour income is used to estimate the tax impacts and the employment is obviously an important number. So, either one appears to be out and we'd like to clear that up. So, the question I have for you is, to try and resolve the inconsistencies in the numbers and I have a table I can give you that explains the issue in more detail.

The last issue is the tax issue and we have had some discussions and I got a letter back from Dave Mizoli, your chief financial officer, which was very helpful, but the

concern we have with the tax issues is that the estimate resource income that was filed as an erratum (sp) with the, I believe it was at erratum (sp), with the EA gave an estimate I believe of \$3.9 billion for the revenues of the project. We tested the tax impacts against that value and they were inconsistent. The estimate of tax royalties was far too high given that value of output, so we pursued that. Now, Dave has written back and said that at the time that the tax impacts were done, I believe the estimated value of the project was \$5.1 billion. So, really my question is, what is your, I realize that, before I get to the question, I realize the value has changed, you know, as more exploration and work continues on the project and market conditions change. But what is your best long term estimate of the value of the project?

Then, secondly, if it is \$5.1 billion then the tax revenues are fine because they're consistent with that number. We checked them and we're certainly within by range. But if the project has fallen to \$3.9 billion then I believe the tax and royalty estimates have to be lowered to reflect that value.

**MR. MIKE BELL:** Does De Beers need any clarifications on the questions they're being asked to respond to? Just to clarifications on the questions and we'll deal with them after break.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. No, I think they're clear. Roy did indicate he had a table he thought would help us understand his question, so we would like that. Otherwise, that's fine.

**MR. MIKE BELL:** We'll now have a break and come back at 10:30, please.

—BREAK

**MR. MIKE BELL:** Okay. We were discussing the issues and questions that Roy Ellis raised.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. We're going to attempt to answer some of your questions and I realize that we'll probably generate a few more questions. I think first we'll go to your questions for Andy to answer. Those are the kind of easy ones. The other ones are more like Ed discussed earlier today. They're kind of wishy-washy type things. I'll turn it over to you, Andy.

**MR. ANDY SWIDERSKI (Terriplan Consultants):** Thank you. Andy Swiderski, Terriplan Consultants. I was the individual who took the lead on the work for the economic modeling. I just want to make a couple of opening observations, if I can, Mike. First, with respect to the decision to take this approach by using the most accurate generally recognized official models that exist, both within the territorial government and the federal government. I think in general, that approach has proved to be worthwhile for all parties involved whereby the discussion is focusing on the key assumptions and also on some of the factors that shape those assumptions rather than on the mathematical formulas behind the models. These are very complex, cumbersome models and certainly Mr. Ellis is very

knowledgeable about this. I will try and focus in on the core of the questions, responding to what I can.

I'll start with the issue of the input/output model assumptions. Essentially, the challenge is, as Mr. Ellis pointed out, to bring forward the most reliable, accurate information possible for the regulatory authorities to base their review and decisions on. The methodology from economics and the world of finance includes essentially asking a few simple questions. What is the effect of this type of expenditure and what is the ripple effect to the economy? Mr. Ellis eloquently outlined the relationship between those. So, essentially what exists as a tool for modeling purposes and for regulatory authorities are a number of models, and I'll separate them simply for simplicity. One is called the input/output model, which essentially shows the relationship between and across industries. What happens for expenditure by one industry? What is the effect on others?

All the industries are at times both either providers of goods and services or purchasers of goods and services. The second sort of package of models that were used to relate to tax and fiscal impacts. Both of those are the Department of Finance models and a nod of appreciation to those good folks for their good humour and cooperation. It's essentially is a multi-stage process modeling. First you essentially do the engineering work or the pre-feasibility study. You get a sense as to what the mine planning design operations requirements are. You take a look at how that translates into expenditures, wages, different skill sets which are required. You run the input/output models based on those results. You then take it and you run it through the tax and fiscal models.

The key assumptions that were document in section five of the environmental assessment report, and I refer specifically starting on page 5-108. A number of key modeling assumptions were made and are essentially required for the model to run. The assumptions are based on an analysis of the initial estimates of labour force requirements, potential labour force supply in the project labour market area, as well as the experience of other operating mines. Not just in the Northwest Territories, but in others.

The sequence by which the assumptions and the actual modeling were done I think does require a moment of explanation, if I may. The initial submission to the Mackenzie Valley Land and Water Board for the land use permits and water licence applications occurred in February 2001, as was explained earlier. Working backwards from that, essentially we had to complete our work by the fall of 2001, specifically October 2001. What drove the analysis and the work was really that the data that was available and used in the assessments was the most current that was available at that time. When the assessment was required and completed it was based on an understanding of the initial engineering and mine feasibility work, the size of the resource, the potential mining technologies and approach an underground operation required. It also looked at labour force dynamics in the Northwest Territories and certainly in the employment catchment area. It looked at employment/unemployment rates, participation rates right now in the primary

communities and in the employment catchment communities. It dealt with and utilized the taxation and royalty regimes in place at the time. It also made an estimate of the market value of the resource, again something that Mr. Ellis pointed out.

Since October of 2001, the engineering and geotechnical design work has continued. There have been a number of supplementary data sets which have become available, updated labour force numbers, community profiles, all of which are continually unfolding. I'm sure by the time we conclude and proceed on to the next phase of the environmental assessment there will likely be new and updated information sets. That is an inherent limitation of the process. At some point, for modeling purposes, you need to say we need to run the model and take your best guess and you very clearly document the assumptions.\*

So, with that, the percentage of workers who will actually reside in the Northwest Territories, referred to as local labourers, was assumed to be 40 percent during the construction phase, 60 percent during operations and 60 percent during the mine closure phase. The primary issue for the lower number during the construction is essentially the short term nature of the work, the highly specialized short duration of construction equipment installation which is only required essentially to build the mine. The operating and closure phases, from experience again, certainly the situation with the existing mine operations would indicate that it is very possible to raise those numbers. For modeling purposes we used 60. Resident workers, for purposes of clarity, were defined as those who currently live in the Northwest Territories and those who will take up residency in the Northwest Territories and work at the mine. Of the 60 percent local labour during operations and closure over the life of the mine it was assumed that initially about half of those, half of that 60 percent or in total about 150 workers, would relocate on a permanent basis to the Northwest Territories.

Based on very credible and detailed data provided through labour force profiles by the GNWT, the household structure of mining households is about 2.2 persons per household. Slightly less than the typical household. When you translate that, there's approximately 330 people that would be involved. One hundred and fifty workers and their families, so about 330 folks it was assumed would move into the Northwest Territories. That 50 percent estimate applied only to the operations and mine closure phase of the project, as I said. These figures are generally consistent with experience, certainly with the two existing operations. All the dollar values expressed in the analysis is in 2001 dollars. So, again, essentially a limitation of it. It could be updated and will continue to be monitored in 2002 dollars and subsequently, but you need a point in time from which to flow. The demographic multiplier, as I mentioned, of 2.2 persons per household was based on the most current comprehensive labour force survey which was in 1999 conducted by the Bureau of Statistics.

Compensation for labour factors of production were also identified. I think it's, without belaboring the point, I think the issue is that some of the numbers which are

included are not meant to be representative average wages or typical wages. The model runs on a different approach. I'm not going to elaborate on that. Importantly, looking towards an energy efficiency and maximizing mine operations, there were also estimates used for the ratio of fuel of 80 percent diesel and 20 percent propane as it did have at least a nominal effect on transportation shipping. Construction was assumed to start over a two year period in 2004 through to 2005 and then it had average expenditures based on an annual basis over that period would also in mine closure estimates of some \$25 million, which was a very preliminary figure. Just by way of some of those modeling assumptions, it was followed through and with respect to the key table in section five, which is table 5.3-1, the requisite call in the terms of reference was to provide an estimate at the Canada level and the Northwest Territories level that spoke to employment impacts - that is the number of jobs, gross domestic product - GDP, and also labour income. Again, just by way of context, those were some of the key assumptions.

I'll hand it over to De Beers to address the first issue and then send it back to me in subsequent questions.

**MR. MIKE BELL:** Okay, just a clarification, please. Louis, did you want to say something?

**MR. LOUIS AZZOLINI (MVEIRB):** Louis Azzolini here with the review board. I appreciate the context and

the information, but I think it's very important for the people that are taking time out of their busy days and the Elders that are here as well if we can address the substance of the questions, as well. Thank you.

**MR. ANDY SWIDERSKI (Terriplan Consultants):** Well, with all due respect, I think in order for the substance of the question to make sense there needs to be a basic understanding of the key assumptions. It is fundamental to the responses.

**MR. MIKE BELL:** Okay. De Beers, the first question.

**UNIDENTIFIED SPEAKER:** I think Roy's first question was, would we commit to employment targets during construction and operations. I guess the answer there is, no.

We feel the more appropriate means is to address mitigation and we'd like to go through that this afternoon as part of the presentation. The areas that we will, or the things that we will put into effect to address employment.

**MR. MIKE BELL:** Roy, why don't we just go through the questions first and then come back and I'll let you respond to all of these, okay? The second question. It was an estimate of GDP impacts, I guess.

**MR. ANDY SWIDERSKI (Terriplan Consultants):** Andy Swiderski. With respect to the question that was asked about GDP impacts and whether it included other

operating surplus, that was responded to in at least two information requests. Clearly it hasn't satisfied the request from Mr. Ellis on behalf of the board. I can only offer to take one more opportunity at it by going through the numbers in detail and make that commitment, but I'm not sure that I can add any more to that as far as whether the labour income is too high or too low.

**MR. MIKE BELL:** Just a comment on that. Rather than going through all the numbers we might have a little side-bar where the two of you can get together and discuss it this way and then basically come back. One of the conditions of these side-bar sessions is that these conversations are taking place outside the room. We really want to make sure that there's a report back to this committee in terms of what the issue was and what the resolution was. But rather than get involved in intensive discussion about statistics on this point, I think it would be best to try and move on to the third question. I realize this, we're not going to be able to respond directly, but at least we have some mechanism for dealing with it, Roy. Okay? The third question was dealing with labour income.

**MR. ANDY SWIDERSKI (Terriplan Consultants):** Andy Swiderski again. I think that third question is largely tied up with the previous one. I would suggest as per your suggestion that if we can handle it the same way.

**MR. MIKE BELL:** Okay. The fourth question was about tax benefits, was the estimate too high.

**MR. ANDY SWIDERSKI (Terriplan Consultants):** Andy Swiderski again. If I can just initially begin and then I'll it over to De Beers. Certainly the point that Mr. Ellis raises is a very valid one and a very good one. The reason I took a moment to lay out the context is that the estimate of the value of the project, including the update, was the estimate given market and commodity prices at that time. Since the engineering work has been going on, market changes, that figure has been adjusted and from a modeling perspective it's absolutely fair and understandable that at some point the board would like to see a revised set of numbers with the most current figures. It's a perfectly reasonable request.

**MR. MIKE BELL:** Roy.

**MR. ROY ELLIS (Ellis Consulting):** Just a couple quick, just a follow up on the commitment, Mike. Actually, I had two questions. The first one related to what level of impacts were used for the socioeconomic assessment in terms of the impacts on the communities. I'm assuming that's a 60 percent for operations and so on. So I assume that's the answer to that question.

The second one, you did respond that no, you won't make a specific commitment to employment, but my question also included business spending. I assume it's no to that as well in terms of a percentage of total expenditure.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. We haven't made a percentage commitment. I guess we've kept it general that we're committed to

working in the north and spending as much as we can in the north where it's economically appropriate.

**MR. ROY ELLIS (Ellis Consulting):** So, that's a no to the business spending, as well?

**MR. JOHN MCCONNELL (De Beers Canada):** That's correct.

**MR. ROY ELLIS (Ellis Consulting):** Okay. I wasn't 100 percent clear, but I think Andy said no to producing a GDP estimate. A total GDP estimate. I wasn't 100 percent clear. He said he was going to review it, but there's really nothing he could add. So to confirm that, I assume that no to the complete GDP estimate?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Just to clarify that, Roy. I have a piece of paper here. The estimate of GDP provided really represents the portion of the GDP that will accrue to the Northwest Territories. The other operating surplus that you're questioning us about is company profit. So, for proprietary purposes we don't include that.

**MR. MIKE BELL:** Roy.

**MR. ROY ELLIS (Ellis Consulting):** I guess that takes me to the last questions, which is the tax estimate. What is the value of the project? Is it the \$3.1 billion or is it the \$5.1 billion and which, I hadn't heard an answer to which. Are you to continue with the tax estimates that are in the EA? Because if that's the case then I think you have to revise the value of the project upwards to the \$5.1 billion. If you're not, then I think you have to revise the tax numbers downwards. I wasn't clear in getting a response to that.

**MR. MIKE BELL:** Okay. De Beers.

**MR. ANDY SWIDERSKI (Terriplan Consultants):** Andy Swiderski. I think, again, to come back to the request for updated value of the project and the impacts that may have on the tax and royalty calculations. I certainly understand that De Beers, to make a commitment to tie in the latest work from the engineering and optimization study and rerun those numbers accordingly on an updated tax and fiscal impact based on not only that work but the change in corporate tax structure that was brought in July of 2002. Which saw the corporate tax decline from 14 percent to 12 percent.

**MR. MIKE BELL:** Roy.

**MR. ROY ELLIS (Ellis Consulting):** We're committing to revise the tax numbers and produce a new set of tax estimates?

**MR. JOHN MCCONNELL (De Beers Canada):** That's correct.

**MR. ROY ELLIS (Ellis Consulting):** Thank you.

**MR. MIKE BELL:** Okay. Just a summary, which two issues are the two of you going to discuss and report back to us? The estimate of the GDP and the labour income? What's your understanding, Roy?

**MR. ROY ELLIS (Ellis Consulting):** It's my understanding you've said you're not going to produce the GDP estimate. So that's not really an issue that's up for discussion. The labour income is really a modeling and structural technical issue. But it does have an impact in the sense that we want to make sure that the indirect and induced numbers, in this case the induced numbers for employment, are not too high or too low. Really, it relates to that. I don't think that'll be solved today or tomorrow. I think that's an issue that'll probably be followed up.

**MR. MIKE BELL:** Okay. We'll tag it as an issue that has to be resolved then move along.

**MR. ROY ELLIS (Ellis Consulting):** Yes.

**MR. MIKE BELL:** I'd just like to pop along here and try and find out who has questions about methodology because these numbers have been dealing with methodology, so I'm trying to interpret here. Ed, you had a question about the interaction between people and project and threshold. Is this a methodological problem?

**MR. ED WEICK (Consillium/Gartner Lee):** Yes. Ed Weick, Consillium Gartner Lee. I think it is. It's a methodological question in the sense that you're dealing with a limited labour force, small communities, a different lifestyle and so on. You've got two mining projects, two diamond mines right now. A third one coming on stream. There's a possibility of other major projects as well. Limited capacity and you're drawing people out of these communities by offering very high wages. At what point do their traditions, do their lifestyle, do the kinds of things they are into now begin to change irreversibly. That's the nature of the question. I don't know. I think it's methodological. I would say that the irreversibility of impacts have not been considered carefully enough in the EIA.

**MR. MIKE BELL:** Comments from De Beers.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I heard a personal comment there, not a question. So, I mean, if there's a question we can try and answer it, but I feel that was a personal comment on Ed's part.

**MR. MIKE BELL:** Ed, do you want to make a question out of it?

**MR. ED WEICK (Consillium/Gartner Lee):** Yes, I do want to make a question out of it. Is De Beers going to consider the irreversibility of impacts? Is it going to consider what kinds of thresholds must not be crossed in order to change the nature and traditions and current economic practices of the catchment, not the catchment communities, the primary communities. Perhaps also the catchment communities?



Is De Beers going to do that? If I can just add, Ed Weick, there is a requirement for that kind of thing in the terms of reference.

**MR. PETER HOMANA (IER Terriplan):** A couple parts to my answer. The issue of thresholds is something that, in a social context, is very difficult to establish. Thresholds are something that a concept that comes out of biophysical work, primarily, where you can deal with care and capacity and so on. People are adaptable and make adjustments and the thresholds that one might be able to identify, if at all, would be on a community basis at a particular point in time. Those also change over time. Communities are not only, a threshold is not only affected by, for example, a wage employment project like De Beers. Thresholds are affected by a whole range of other factors. There are a range of government policies that can affect thresholds. There's broader global communication issues that can affect thresholds. Ed raised the issue of traditional and cultural pursuits and when those might be endangered and I think we fully recognize that that is an issue and that's why some of the impact management measures have been identified to provide the opportunity to provide support for traditional and cultural pursuits while people may choose to take advantage of the economic opportunity that comes from a project like this.

The extent to which each primary community is able to take advantage of the opportunities and when they may feel pressure will vary by impact. A specific kind of impact. It will vary with their size. It'll vary with how they make individual and community decisions around responding to the opportunities that are there. So, part of the way that we've attempted to deal with that and recognizing, and I think Ed recognizes it, it is an issue and it's a very difficult one. It's like trying to put your hands around a cloud to try and really get a good handle on it. The approach is that we think community impacts have to be monitored at the community level. They've got to be, impact management is adaptive. There's got to be processes put in place so that adjustments can be made as required community by community. Some adjustments may be necessary in one community and not another. It's not something that one can predict with any certainty at a stage like this, but one can anticipate that there may be those circumstances and, therefore, prepare on how one would respond to them.

**MR. MIKE BELL:** Ed.

**MR. ED WEICK (Consillium/Gartner Lee):** Yes, I just want to refer to the Voisey's Bay environmental assessment review report which used something called the precautionary principle and told Voisey's Bay Mining that they could go ahead provided that they did not do the following things. Now, I don't quite recall what the following things are, but if there was no, sort of, disturbance to existing patterns, wildlife and whatnot. And that is really, that was, in my opinion, the use of a threshold. If you can do these things without crossing the threshold, you go ahead. If you cross the threshold and these various negative things that the panel listed happen, then you can't go ahead. At least not on sort of socioeconomic grounds. So, I don't think thresholds are quite as wooly and mysterious as we like to think.

Like, when it comes to a small community I think that pulling key labour out of a small community could create some irreversible changes in that community and so on. And I don't see quite enough discussion of that in the EIA. But that's all I have to say on the matter.

**MR. MIKE BELL:** Okay. I want to note that two people have added their names to the list wanting to speak and I think it's around areas of methodology and we'll put them on the list after we've dealt with other people. They're Hiam Evans-Owen and Kevin O'Reilly. So, I'll just go down through the list of the people I've already had that want to speak about the methodology in particular and we'll add the two of your names to the list. I want to make sure that you see that we've noted you. Okay? Rachel, you raised questions about primary source data, in person interviews, study paper and survey results. Would you like to talk about those?

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** The information gathered, you mentioned that you talked to Elders, people in the communities. Do you have a list of names of how many Elders you talked to and who you talked to, like leaders? Was there survey questions that were filled or is it just by having a conversation? For leaders, is it talking to just one chief and not a group of people from the communities or did you talk to people in a group like health and social committee of a community? I just want to find out if that's what you did. Thank you.

**MR. PETER HOMANA (IER Terriplan):** Yes, we did. In terms, oh, sorry, Peter Homenuck. In terms of our visits in communities, and when I say our visits I'm talking about not only myself, but other staff that went to some of the communities. We talked with key administrative people in the communities. We talked with Elders in many of the communities. Some communities we had meetings with chief and council. In most communities we had full or open community meetings. In many instances this was not just a one-time event. We're going back into those communities on more than one occasion. In addition, and we do have lists of dates and places and people that we talked with.

I would also point out that when I say meetings in communities, when people went from other consulting firms or De Beers and had meetings in communities, when they brought back summarized reports and so on we had access to that as well to add to or reinforce the information that was being generated by us. So, it was aggregating not only our own information, but other information that was coming from those visits. For example, Elders were taken on site visits to Snap Lake. Their concerns and issues were identified there. That became also part of our database. So, while in that particular instance I wouldn't have been talking with them, someone else did and that information was fed into our discussions.

Oh, sorry, you also asked about questions. The interviews that we held were really very, I guess the technical phrase would be semi-structured. We would have a few questions that we'd want to ask about, for example, issues and concerns or past experience. Then by starting the topic the discussion went in the direction that the people we were talking to wanted to take it.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Rachel for the Yellowknives Dene. If you took Elders up to your mine site to take a look at caribou movement and while they were doing the site visit and were supposed to be observing the movement of caribou during the spring or fall migration and you took the chance to ask one or two of them questions and this is considered part of consultation. Not really consultation, but you used that information. Is that what you're saying?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Thanks for your question, Rachel. If concerns were expressed we recorded them. Because it's certainly part of our feedback process on what the project is, how we're doing. But you should note that that is different from considering that as input representative of a community or of traditional knowledge. That the process by which traditional knowledge related to caribou movement has been restricted to documents already in existence, like the West Kitikmeot Slave Studies, some of those studies, or through the likes of the Lutselk'e traditional knowledge assessment of the Snap Lake Diamond Project, which basically relied on that verification by community members before we were provided with that input.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Rachel, again. So, in that case, did you meet with the Yellowknives Dene First Nation chief and council and do a presentation on your project and explain your project to the chief and council?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. We've had a number of meetings, both informal and formal, with representatives of the Yellowknives Dene. Made many attempts to have formal presentations with chief and council and the communities, but unfortunately we have not been able to make the necessary arrangements to have those formal sessions. We assume due to capacity problems in the community. But certainly there has been a number of informal sessions and formal sessions with people representing the Yellowknives Dene.

**MR. MIKE BELL:** Rachel.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** One more question. Is it Peter? You mentioned that you had access to information from study or surveys that were done by other consultants. If you used that information did you make it part of the environmental assessment report? Where can we see this kind of information?

**MR. PETER HOMANA (IER Terriplan):** Yes, the information that I referred to that were from other consultants or from De Beers would be issues and concerns that were raised in sessions that they attended. So that information in most respects was reinforcing what we already had. But if something new came out as an issue or a concern that was relevant to socioeconomic it would have been added to our list in the report.

**MR. MIKE BELL:** Okay. Rachel.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** But this information is somewhere that we can go and find and take a look for? Where are they?

**MR. PETER HOMANA (IER Terriplan):** Information is in the environmental assessment. It's listed, issues and concerns are listed by primary community and they're also summarized by issues and concerns of all the communities together. It's there. I'm going to say it's chapter five.

**MR. MIKE BELL:** Okay.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Thank you.

**MR. MIKE BELL:** To the question of methodology. Janet. Janet has some questions. She's not quite ready. Do you want me to tell some jokes? No, no, just kidding.

**MS. JANET HUTCHISON (NSMA):** No, no.

**MR. MIKE BELL:** Well, you know, you gotta move in on the openings when you see them here. Okay. Janet, you had questions about the use of baseline information.

**MR. BOB TURNER (NSMA):** I changed my name. Bob Turner, North Slave Metis Alliance. Just before I continue on into my comments, we had a consultant assist us in developing our issues to be presented to the board and we've submitted, I guess, nine issues and just for the record they're still outstanding and hopefully we'll be dealing with them, Janet and I will deal with them as best we can. I guess continue to raise them and hopefully they'll be addressed meaningfully.

But first of all, considering the schedule we have to break them up into this morning, this afternoon and tomorrow. So, I'll just deal with a couple of issues right now and the first issue would be on the existing baseline data. We had provided De Beers with some information on NSMA's baseline data. We do not feel it was incorporated adequately to build a foundation for impact predictions on monitoring and mitigation. Our question would be to De Beers, will they commit to developing more extensive baseline data information bank to adequately address the predictions of monitoring and mitigation.

The second issue is that communities are listed and seem to be assessed at an equal level and they're lumped together to develop a position that they're all at an equal level. But we have always stated that not only this assessment, but previous assessments, that all of the communities are not, I guess, at an equal level in socio-economics and some of those differences are geographic. But the Metis have been treated a little differently than bands, in particular, and we have not, I guess, had access to the same benefits that come to having a land-based status as a band. We haven't had the same housing privileges. We haven't had access to, I guess,

employment opportunities, even with the government. Never been a priority in our won community for employment with the, well, for an example, with the GNWT. Affirmative action has never, I don't think, adequately benefited aboriginal people as a whole. In particular the Metis in Yellowknife.

So, I'm just wondering if De Beers is willing to assess each individual community individually to determine impact predictions. That will conclude my comments. I'll pass it over to Janet.

**MS. JANET HUTCHISON (NSMA):** A further issue that I understand...

**MR. MIKE BELL:** Just one second. I want to make sure we've got the issues. The first issue is a question of mitigation. It might be more appropriately dealt with this afternoon when we're dealing about mitigation, but that's up to you folks. I think the second question basically is clear in terms of dealing with the individual communities. There's more coming. Janet.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. Our consultant, Michael Thoms, had also raised a concern about the triangulation method that was used in the socioeconomic assessment. As I understand the concern particularly, he was identifying the fact that there had not been a complete record of consultation and it did not appear that all of the public concerns raised had necessarily been acted on or looked into. Furthermore, a concern about whether or not the results of public consultation had actually been verified with the producers of the concerns and that was just an overall potential problem with the methodology to ensure that the public consultation process was pursued properly.

I would just note that at this point in the EA we're not raising issues about duty to consult in terms of duty to consult with aboriginal peoples, or at least we're not doing it in the technical sessions. We certainly have those concerns. I'm sure that they're issues you will be hearing from us on in the public hearing, but Mr. Thoms' issue relates completely to this triangulation methodology issue.

I have one more, Mike. The last concern relates to, again relates to methodology. What I was trying to understand or what the NSMA is trying to understand was whether or not, in your methodology, there is any attempt to factor in uncertainty on total production rates. Just to give some background on why that's potentially a concern, there's nothing in the legislation that controls the intensity of your use or the development. So, although I do understand that De Beers has committed to a 3,000 tonnes per day production rate, there's not much to stop you from changing that and certainly that has been experienced with other diamond mining projects in the region.

So, our question is whether or not the socioeconomic analysis factors in the possibility for a change in total production rates and if it does not, is it in fact De Beers intention to commit to that total production rate for the life of the mine? If De Beers is not willing to commit to that total production rate for the life of the mine, at

what point or how would De Beers intend to address uncertainty about socioeconomic impacts based on a change in total production rates?

**MR. PETER HOMANA (IER Terriplan):** Peter Homenuck. A couple of those questions I guess are intended for me, so I'll take mine.

**MR. MIKE BELL:** Live it up.

**MR. PETER HOMANA (IER Terriplan):** Sorry?

**MR. MIKE BELL:** Go right ahead.

**MR. PETER HOMANA (IER Terriplan):** Okay. In terms of the issue on triangulation. That is a technique that's used when you're dealing with qualitative information. When you're getting information from individuals or organizations out of meetings that are stated in qualitative terms and you use that information as part of your analysis. You periodically want to check back to ensure that you're being consistent in what people have said. That you are not in any way deviating from the emphasis that they wanted to give to issues and concerns. That's why we go back and we verify. Sometimes the verification is in person, sometimes the verification was sending back minutes of meetings and getting comments. We went through that a number of times. A different number of times in some communities than others, depending on the number of meetings that we actually had with people in those communities. It's a way of validating the information you're getting and how you're using it and how you're analysing it. I have no problem in saying I'm totally comfortable that we applied it correctly, properly and it is a valid way of validating your qualitative information.

Now, I think there was another issue about...

**MR. MIKE BELL:** Why don't we just take that one first?

**MR. PETER HOMANA (IER Terriplan):** Sorry.

**MR. MIKE BELL:** Triangulation. Do you have any further questions for him?

**MS. JANET HUTCHISON (NSMA):** No further questions on that, Mike.

**MR. MIKE BELL:** Okay. Next one, Peter.

**MS. JANET HUTCHISON (NSMA):** Sorry, Janet Hutchison, NSMA.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. Thanks for your question, Bob and Janet, regarding baseline information. Bob, you asked whether De Beers would consider essentially redoing the impact assessment with baseline or reflecting attributing impacts to individual communities. At this point of the environmental assessment, De Beers will not go back to address concerns on a community specific basis. Individuals, families and

communities may vary in response to the development of the Snap Lake Diamond Mine. The approach to the environmental assessment realizes that there will be a spectrum of responses among those. However, as just outlined in the environmental assessment and will be discussed extensively this afternoon, it's De Beers' intent to certainly ensure that mitigation and monitoring methods are appropriate to communities, including the North Slave Metis.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. Robin, am I to understand then that the specific communities' specific information will be incorporated into the mitigation and monitoring planning?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada. That's a yes.

**MR. MIKE BELL:** Okay. Next question. We were dealing with factoring uncertainty on production rates.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I guess production rates, you know, it isn't just as simple as pressing a button and production rates double or increase. The production rate of 3,000 tonnes per day is an engineered design which we feel is appropriate considering the type of deposit we'll be mining and its dimensions. As a matter of fact, I've been arguing with our design team that 3,000 tonnes per day is probably at the upper end of possibilities considering the dimensions of the deposit.

That said, in the EA we did say that if we were going to significantly increase production because of an expansion of our knowledge of the resource or increase reserves we would make the necessary applications to the land and water board to make that significant increase.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. Sorry, John, if I missed that, but how are you defining "significant increase?"

**MR. JOHN MCCONNELL (De Beers Canada):** Three thousand tonnes per day would be an average. If we were to, say, double that to 6,000 tonnes per day I would consider that a significant increase because it would require both a very significant infrastructure change on surface. If we were to increase to an average of, say, 3,200 tonnes per day with no change in the surface infrastructure or the underground development as presently planned, I wouldn't consider that a significant change.

**MS. JANET HUTCHISON (NSMA):** Does De Beers have any idea of what percentage increase there could be in the tonnes per day production without any significant change the infrastructure on site?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I think engineers and metallurgists always give themselves a little wiggle room. From my experience at Nanisivik, the plant was designed for 575,000 tonnes per year and eventually they got operating after about a ten year period at about 610,000 tonnes. But it's

different from project to project. So, I can't say that we have a percentage, but certainly there's some safety factor in that production rate.

**MR. MIKE BELL:** Okay. I take it that the question that you have about mitigation will be put off to this afternoon along with the other questions, or am I incorrect here?

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. We'll pursue that this afternoon.

**MR. MIKE BELL:** Okay. David, you had a couple of questions. I don't know if they're dealing specifically with methodology. Are they?

**MR. DAVID GILDAY (ECE):** The earlier ones weren't. We're going to leave those over to this afternoon. Pardon me. David Gilday. But there were questions about the consultation and methodology.

**MR. MIKE BELL:** Okay.

**MR. DAVID GILDAY (ECE):** And if I might follow up, before going on, on Rachel's comments. I'm wondering when you've done your consultations, were the consultations you're referring to just with the primary communities or were they with the catchment communities?

**UNIDENTIFIED SPEAKER:** From the social impact team, our consultations were with the primary communities.

**MR. MIKE BELL:** David.

**MR. DAVID GILDAY (ECE):** David Gilday, again. So perhaps when we're talking about mitigation we might want to bring this up a little later. Further on the consultations then, and Janet mentioned verification, we're a little concerned with the level of consultation that's gone on in the informant training side of the project with government officers. Some of us are wondering with whom you've consulted. References to certainly partnering with the government training bodies, which would be our Department of Education, Culture and Employment. There are references to partnering with Aurora College. Our meetings recently with them have them questioning the level of involvement they've had so far in assisting you in reaching this. And also there are references to partnering with Skills Canada and those people also have asked why is De Beers making an assumption this will happen without working closely on it and putting these statements forward at this stage.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I think some of those questions are for this afternoon, but I think it's wrong to say that in the environmental assessment we make assumptions. We put forward these as mitigation measures. We haven't assumed anything. We've suggested that these are ways of trying to mitigate a concern about the levels of education and skills in the Northwest Territories.



**MR. MIKE BELL:** Just one second. Whenever Louis wants to speak it's usually a matter of clarification for the process, so I'll go to Louis and then back to David.

**MR. LOUIS AZZOLINI (MVEIRB):** Point of clarification with respect, Louis Azzolini speaking. A point of clarification with respect to land use permitting and triggering. Land use permitting process, unlike a lease, manages activities that can occur on the surface of land. Generally, once De Beers receives its land use permit it will permit a certain level of activity upon the surfaces. So, it would be quite unusual within the context of the land use permit, should production increase, to secure another land use permit. So that may be an inappropriate trigger to consider at this time.

**MR. MIKE BELL:** Okay. David.

**MR. DAVID GILDAY (ECE):** David Gilday. What I would like to ask John is if the company will commit to consulting with the department, with the college and with Skills Canada prior to going forward with some of the mitigative proposals.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Absolutely. We're in that process now and we have had meetings with some of the GNWT departments, some of the federal departments and we look forward to moving forward on partnerships.

**MR. MIKE BELL:** Anything more? Are you finished? I'm trying to lip read here and it's not working too well. Hiam.

**MR. HYME BENZOHAR:** Thank you, Mr. Chairman. If I may..

**MR. MIKE BELL:** You're name, please, Hyme, and your organization.

**MR. HYME BENZOHAR:** I'm Hyme Benzohar on behalf of the Government of the Northwest Territories. I would like, sir, for the first remark made by Janet on the production of rates issue just a follow up question and then I would like to make my own observation. You've asked John about production increases. In the past, De Beers have reduced production from their various mines in times of reduced demands for diamond internationally. To De Beers, Snap Lake is only part of a larger part of mines. If in the future, if it becomes necessary for De Beers to reduce overall mine production, can you explain how reductions will be organized and what its impact on the Snap Lake operation might be? Would you consider the fact that your production costs are rather high here in comparison to other mines? Would that make Snap Lake the first company or the first mine you want to reduce to? How would you go about that? Would it be in process of consultation before you reduce or will significant reduce, if I can use that term?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I think your economic conditions change. Diamonds are a commodity, just like gold or copper or zinc. Those commodity prices change over time and can result in the need for production changes, decreases. I think those are economic decisions. They're not

decisions requiring consultation. It certainly, you know, De Beers has invested a great deal of money in this deposit and will be investing a further great deal of money to bring it into production. As we showed during some earlier slides last week, this is not, as my South African referred to projects, a dripping roast in terms of profitability. This project must run full time, 3,000 tonnes per day to maintain economics. So, I think in terms of downsizing or reducing production it's highly unlikely. But I guess from a socio-economic impact side, if we did downsize the upside of that is there's a longer mine life.

**MR. MIKE BELL:** Hyme.

**MR. HYME BENZO HAR:** So if your upside if longer mining then you do consider the possibility that you may reduce and the question was, if you do reduce production here how will there be an overall conflicts of your world-wide activity? Can you assure us that this will be the last place you would reduce? Would it be the first place? How would the decision-making process work? You are in a different situation than, say, BHP or one of the other players who are not such a major player as you are. Of course, you have a great stake in a certain supply and demand equilibrium in the market.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I think where you're going, Hiam, and I know that you're probably not totally familiar with the environmental assessment, but you're way, way outside the terms of reference for this environmental assessment with that question. So, we're going to decline to answer.

**MR. HYME BENZO HAR:** As a guest, I humbly stand corrected. I was following up on the questions by Janet and the only thing that was considered in her question was consultation and increases in production. I just wanted to get you on the record that there will be no decreases and in terms of the impact. That is one of my original questions and I will go back with your permission to my original question on disability.

We have seen in your slide presentation the extensive data, source data, primary and secondary source data which are using for impact prediction. What I found was missing, and I don't know if it was intentionally or by omission, is your past experience. You have been mining for over 100 years in communities around the world. People are people everywhere. There has been a lot of concern here about cultural and irreversibility. Isn't it really important on all of us to have the maximum research available to make the predictions? Can you tell us, John or one of your colleagues, if you have reviewed the history of your experiences with communities in other places? Whether it's Botswana, Namibia, South Africa in your great experience? Can you say, if you have done a review, can you say what effect or what are the conclusions to draw from the review of the other situations? If you haven't done a review of other experiences, would you want to do that and come back and use that data for your impact predictions? It's kind of odd, when I saw the list of all your sources, that no mention was made of all the fantastic data sources

that you have as an organization at your disposal.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Thanks, Hiam. You know, I think we're very proud of De Beers reputation and the work that's gone on in the Southern African context. However, again, the terms of reference restricted us to dealing with Canadian operations in the Canadian context. I think there's, you know, where there's, we're very proud of what we've done in Southern Africa. There are a lot of differences culturally from South Africa, Canada and the Northwest Territories in particular, so we've restricted our comments to the terms of reference and applied it to the Canadian context.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA.

**MR. MIKE BELL:** Louis.

**MR. LOUIS AZZOLINI (MVEIRB):** Point of clarification. Terms of reference 2.14, corporate compliance requires De Beers, "De Beers shall describe its relevant experience over the last ten years in mining operations in Canada and in other countries with similar regulatory and social policy regimes concerning the following" and there's a series of bullets there. So, depending on the nature of the questions, the terms of reference do permit questioning and answers with respect to similar operations outside of Canada.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA.

**MR. MIKE BELL:** Just a second.

**MS. JANET HUTCHISON (NSMA):** It's just to add to that, Mike. I just would also support what Louis' saying. There's also a very clear indication in the legislation that record and other projects, regardless of whether they're in Canada or outside of Canada is well within evidence at the public hearing.

**MR. MIKE BELL:** Thank you for that, Janet. De Beers.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnstone. The terms of reference discuss the idea of similar regulatory scenarios and the fundamental issue is that there are large differences in regulatory scenarios between Canada and Southern Africa which restricts us in terms of providing a culturally appropriate environmental assessment. So, the impact assessment has discussed the Canadian operations and our corporate experience here. The key thing is, we're using our experience gained in Southern Africa where we can see the pieces fit into the cultural scenario and the cultural background of the Northwest Territories. But we consider that we have met with the terms of reference in basically providing our background.

**MR. MIKE BELL:** Hyme.

**MR. HYME BENZO HAR:** Thank you and, as always, I appreciate the candidness of

De Beers as much as I'm unhappy with the reply. But let it go for this point and I may come back to this in the afternoon.

**MR. MIKE BELL:** Okay.

**MS. JANET HUTCHISON (NSMA):** Mike, Janet Hutchison, NSMA. There was just one comment I wanted to clarify. There was a comment by De Beers that decisions about production changes up or down were not decisions that would require consultation. I just wanted to make it clear on the record that on behalf of an aboriginal community we would not adopt that as an accurate statement of the law in Canada. In fact, it's the appellate courts that have made it quite clear that there is now an on-going duty to consult as day-to-day operational decisions are made.

**MR. MIKE BELL:** Okay. I don't think that was a question, but a comment. Okay. Kevin O'Reilly.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks, Mike. I'm here for Community and Arctic Resources Committee. I wanted to follow up on the responses that De Beers gave to a question from Mr. Ellis for commitments for employment, businesses and purchasing and so on in the Northwest Territories. I'm not sure if this is more appropriately addressed for the afternoon session, but I'll go ahead.

I guess my first question is whether De Beers has made these kind of commitments in other parts of the world where it operates? Have they made clear commitments for local employment, for purchasing, for contracting in other parts of the world where they operate? And if they have made those commitments, how were they formalized? In the form of agreements, MOUs, with national governments, with communities? How were those actually formalized?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I think that would be more appropriately answered this afternoon.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Okay. I'd like to get a couple other points onto the record now so that maybe they'll get addressed this afternoon. I understood De Beers to say that they were not prepared to make any commitments in the areas that I outlined earlier on employment, on perhaps training, purchasing, business opportunities in the Northwest Territories and if they're not prepared to make those sort of commitments as part of this environmental assessment are they prepared to make them as part of a socio-economic agreement or indeed impact and benefit agreements? It's my understanding that the place where those sort of commitments are made is in socio-economic agreements and perhaps impact and benefit agreements. That certainly has been the experience with BHP and with Diavik. Those agreements also set out a process for doing some monitoring so that there can be some reporting and following up on whether those commitments are actually met in one way or another.

So, I guess I want to understand whether De Beers is prepared or whether they

think a socio-economic agreement is necessary as a management measure. This may, again, have to be addressed this afternoon. I also want to understand clearly what position the Government of the Northwest Territories is in with regards to the need for a socio-economic agreement for this project. Thank you.

**MR. MIKE BELL:** Okay.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with De Beers. Kevin brings up a couple of good questions and I think he answered them. It's our feeling as well that some of the issues, such as employment and business opportunities, are covered off in socio-economic agreements with the GNWT and in IBAs with the local communities. We have begun those discussions with both the GNWT and the local aboriginal groups and I'm sure we'll reach agreement over the course of the next short time period.

**MR. MIKE BELL:** Okay. Kevin, we'll give you the opportunity this afternoon to be more direct in terms of, that's a signal that we're moving on. I just want to make sure that I've covered the people on my list because there's one more gentleman who wishes to speak and then I'm going to do a summary. David, you had an issue, but it was moved up to this afternoon, right? Did we miss anybody at this point, without anything new coming in? Just one sec, okay. We have Frank McDonald from the catering company who's got a question and he's catering at the same time. So, he wanted the clarification to ask a question. So, we'll have his question and then we'll do a summary.

**MR. FRANK MCDONALD:** Thank you. I'm Frank McDonald and I was wondering, like, everything we get is from the Creator, is how we believe, and at ten percent, you must be getting ten percent because you got so much, eh? Are you going to be spending the ten percent here or take it all to Europe?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. You're going to have to clarify your question or make it a little more specific.

**MR. FRANK MCDONALD:** Diamond policy, I think they're going to pull out some of the diamonds and some day you're going to take everything out of here and do everything right away.

**MR. JOHN MCCONNELL (De Beers Canada):** Again, I think, Mike, that's probably a question better for this afternoon. It doesn't sound like it's about socioeconomic approach.

**MR. MIKE BELL:** Okay. You can raise the question again this afternoon if you wish, Frank. Okay. I'd like to go around, oh, sorry. Two more questions. Rachel first and then Tim.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I had a question on ...(inaudible)... Is that for this afternoon? Is this the opportunity for questions?

**MR. JOHN MCCONNELL (De Beers Canada):** I would say that's more appropriate for this afternoon.

**MR. MIKE BELL:** Okay.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Okay. And the other question I had was, some follow up there on Janet's comment about the appellant court, that would be this afternoon, too? Regarding increases and reductions.

**MR. MIKE BELL:** I don't think Janet asked a question. She made an observation at that particular point. Did you want to ask a question in relationship to that, Rachel?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Yeah, I did and I was just wondering if that's for this afternoon.

**MR. MIKE BELL:** Okay. Louis.

**MR. LOUIS AZZOLINI (MVEIRB):** Point of clarification with respect to the terms of reference and the issues or questions that are arising with regard to the methodological questions this afternoon on IBAs or other agreements, side-bar agreements. The board in the terms of reference, item 2.12, asks that De Beers should provide, should provide, key elements of its policy on individual compensation or on compensation agreements, contracts or other forms of compensation that they have or will negotiate within the confines of confidentiality. The reasons for doing that is that the board is interested in understanding what the impacts are and how they are being mitigated. To the extent that within the confidentiality permits, they'd like to know what agreements for mitigation are being negotiated or considered so that they can appreciate that within the context of the impacts that are being identified in the project.

**MR. MIKE BELL:** Okay. Tim.

**MR. TIM BYERS (Yellowknives Dene):** Tim Byers for the Yellowknives Dene. In looking through your section of the EA on corporate history and De Beers' relationship with local and aboriginal communities, I guess the thing I was looking for was local and aboriginal concerns with De Beers' operations and how De Beers was able or unable to mitigate those and to address those. I guess I see that as a weakness. To what I understand, the local people of Kimberly in South Africa who were basically doing the mining were disappointed that their young people were left out of the high end part of the diamond processing, that all the diamond processing and all the training that went with it went to Johannesburg. So they did not reap any of the local economic benefits, as an example. So, I see that as a weakness of that part of your EAR and I'm wondering if you would agree with that assessment.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Again, I think we're moving into mitigation and, you know, we'd be quite pleased to discuss that this afternoon. We have a presentation which I think addresses some of these concerns, so it's probably best left until after the presentation.

**MR. MIKE BELL:** Okay. At this point, could I just go through briefly and have a summary. Now, the purpose of the summary is not to continue the discussion. The purpose of the summary is to find out if the concerns that people raised have been addressed or if indeed they have moved into the area of issues or they are issues that you wish to put on the record and flag for the benefit of De Beers and for the benefit of the board. We tend to suggest and expect that issues you raised will also appear again in your technical reports after this hearing. Okay? So, Ed, you raised a couple of issues. Just a brief comment on what the issues were and the response.

**MR. ED WEICK (Consillium/Gartner Lee):** Well, the first issue was the sort of lack of hardness in the socioeconomic chapter. I don't think that's really an issue that needs further discussion. The second one was irreversibility of impacts, especially in small communities where you're drawing people out and so on. I think that is an issue.

**MR. MIKE BELL:** Okay. Good. Andy, impact predictions and weighting.

**MR. ANDY LANGFORD (HSS):** I think at this point the question was more for clarification. I'm going to have to take it back and think about it before I can say whether it is or is not an issue.

**MR. MIKE BELL:** Okay. Roy.

**MR. ROY ELLIS (Ellis Consulting):** Roy Ellis. I guess there were four issues. The first one is the prediction or commitment to impacts. That's still an outstanding issue. The second one was the, I believe, the estimate of GDP and that's still an outstanding issue. The third one was the estimate of reduced impacts and that's an on-going issue as well. The last one, on the terms of the tax impacts, I understand you're going to be filing a re-estimate and I guess that one's been resolved.

**MR. MIKE BELL:** Okay. Rachel. Around resource data, information, study papers, survey results.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** The information that I wanted to look at and see, that's still an issue with me.

**MR. MIKE BELL:** Okay. Janet, the issues involved the issues that you raised. Were they and were they satisfactorily resolved or were they pushed forward to an issue?

**MS. JANET HUTCHISON (NSMA):** Mike, Janet Hutchison, NSMA. Without going through each individual one and taking a lot of time, we'll certainly consider some of the information we were given, however, for the moment they do remain issues that we anticipate will be going forward.

**MR. MIKE BELL:** Okay. David, we've got things about the consultation process, contact with the GNWT.

**MR. DAVID GILDAY (ECE):** Yes. David Gilday. We expressed concern with the

fairness of the consultation. John said, yes, indeed they'll carry on and do more. Then we do have issues with mitigative measures, but those are of course for this afternoon.

**MR. MIKE BELL:** Okay. Hyme, some summary of what you raised and the response and whether it's still an issue.

**MR. Hyme BENZO HAR:** We raised the issue of methodology and the omission of sources in the past experience of De Beers world-wide. It has been confirmed and on the table that this was in the term of references. As that has been established, I don't think we have a further issue in it and we just hope that De Beers takes notice. The reduction rates we will come back in the afternoon.

**MR. MIKE BELL:** Okay. Kevin.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** The issues I raised were around commitments that De Beers has made or may have made in other countries around the world with regard to employment, training, business opportunities, contracting and so on and whether De Beers is prepared to enter into a socioeconomic agreement to deal with those issues with the Government of the Northwest Territories. I want to know what the position of the Government of the Northwest Territories is with regard to a, whether they will require a socioeconomic agreement for this project. It's probably best dealt with this afternoon, I guess.

**MR. MIKE BELL:** Okay. So, that's left to this afternoon. And Frank McDonald, you're issue was on this afternoon also?

**MR. FRANK MCDONALD:** Yes, this afternoon and I like the way, I like the way they do diamonds. I mean, we should treat our air and our water and everything like we treat diamonds. You know, with great, that's a, I think that's a great thing that we've got here and let's change the South African story and do something in the territories where the big things are happening. You guys got a chance.

**MR. MIKE BELL:** Okey-dokey. Thank you very much. Thanks for the morale boost at the end of the morning, we needed it. We'll see you at 1:30. Thank you.

—BREAK

**MR. MIKE BELL:** All right. Thank you for your attention to that. There's one thing I did want to mention. I sometimes find at this time of the day people start to flag a little and they get a little tired and sometimes they get tired of talking and I just wanted to stress, as a group animator, the importance of gesturing. If all you can do is gesture, just gesture. It reminds me of a true story...

—Laughter

...of this...



—Laughter

This family has this pet orangutan. They're going on vacation and they don't want to take the orangutan because the orangutan is just very difficult in the car. So they try and take the orangutan to the dog pound and the dog pound says, "No. We take dogs, we don't take orangutans."

So they try and give it to the family members and they don't want this thing in the house because it's hard to house proof a house against orangutans. So they gotta take the orangutan.

So they leave from Toronto and they're heading down to Detroit and unfortunately there's an accident and the car goes over in the ditch in the median and the whole family is taken away to the hospital. The two provincial police show up. They're looking at this scene and the only thing they see is an overturned car with an orangutan sitting on top of it.

So the one cop says to the other one, he says, "Well, we're not going to get much information here. There's nobody left except that damn monkey."

The other guy says, "That's not a monkey. That's an orangutan. I've been taking some zoology courses at night and they're very intelligent animals. I bet you if I walk up there and ask him some questions he'll give me some answers."

So his buddy says, "Well, go ahead. We've got nothing to lose."

So he walks up to this orangutan and he says to the orangutan, "Did you see what happened here?" The orangutan goes like this.

"Look," he says, "if I ask you some questions will you give me the answers?" He goes like this.

He says, "Well, look, okay," he says, "tell me, what were the kids in the back seat doing?" The orangutan goes like this and he says, "Oh, they were fighting, huh?" He says, "Yeah."

"What was the mother in the front seat doing?" The orangutan goes like this. He says, "Oh, she was talking, huh?" He says, "Yeah."

"So what was the father doing?" The orangutan goes like this. He says to his buddy, "Oh, he was drinking." He says, "Now we know what happened."

So he said to the orangutan, well he says, "Well, thank you very much." He's walking away and he has a thought and he turns around and he says to the orangutan, he says, "By the way, what were you doing?" The orangutan goes like this.

—Laughter

Geez, I get a better response in Inuktitut with this.

—Laughter

Anyway. We'll continue on. From this morning we have David Gilday, Kevin, North Slave Metis Association, Frank McDonald, Rachel has a question about catering. We'll start with the presentation and then we'll add to our list; okay?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I think because Janet was late she should have to tell a joke.

**MS. JANET HUTCHISON (NSMA):** I don't know any that I can tell in present company, John.

**MR. JOHN MCCONNELL (De Beers Canada):** Oh. Ooooh. Okay. We have a couple of presentations this afternoon. The first one will be by Peter Homana, who was introduced earlier. The second one will be by John Simpson with The Genesis Group, a local Yellowknife-based company that's owned and operated by John and his wife, Deb, who are I think 30 plus year educators here in the north. So, they have some idea about what it takes to produce relevant training programs in the Northwest Territories and make them a success. Before we move on to John, we'll hand it over to Peter.

**MR. PETER HOMANA (IER Terriplan):** Thank you. Peter Homana. I'm going to take a little bit of time to talk about impact management measures and also sustainable economic development before turning it over to John. The purpose of the socio-economic impact management measures presentation is to respond to some of the questions that were raised about implementation of the impact management measures. Just identified some of the places where the topic's been addressed, as well as responses to information requests and non-conformity items.

The outline of what I'm going to cover deals with the purpose of impact management measures. De Beers' commitment to socioeconomic impact management measures. The role of partnerships and what's been done to date.

Now, impact management measures, as I'm sure most of you know, are developed for a number of reasons. One is wanting to maximize the positive effects that come as a result of a project. Secondly, to minimize any negative effects that are identified. Thirdly, to show that you can address community concerns that have been stated. And fourthly, to build on positive achievements that have been experienced to date. I mention that last part because there has been considerable achievement in the last decade with respect to the mining activity and the role for northern aboriginal peoples and northern aboriginal communities. The implementation of impact management measures also lead to substantial social and economic benefits to individuals, families and communities.

The environmental assessment report details 14 impact management measure areas. They address key issues and concerns that were raised in the discussions

with communities and government organizations. The 14 measures have been grouped into three categories: recruitment training and employment, and you'll hear a lot more about that when John Simpson is presenting; health and wellness; and economic development. While we can take each of these 14 and deal with them one at a time, in fact most of them don't exist in isolation. They have to be considered as operating together because they build on one another, they feed on one another, they reinforce one another.

The implementation of impact management measures is on-going. On-going in the sense of what appears on the environmental assessment was at a point in time beginning early this year. There's been work on-going to further develop how they might be implemented. There's still additional work required to develop them. I also, as referenced back to some of the things mentioned this morning, they have to be adaptive because we are talking about impact management measures being in place for 25 plus years. Things are going to change. It's necessary to effectively monitor and adapt as may be required.

Under the category of recruitment, training and employment there are a number of specific measures proposed. They relate to not only hiring priorities, but recruitment and employment strategies which include retention strategies. A number of things around literacy, on-site learning and a number of opportunities related to employment training programs.

Health and wellness, also extremely important. Clearly you need healthy individuals to be working in the various activities at the mine site. We want healthy families and healthy communities. These are important for the social and economic development of communities and these are areas that are not solely a De Beers responsibility, but clearly a shared responsibility. A responsibility shared with the communities, government agencies and industry. You see a number of points there, clearly substance abuse prevention and treatment. This is an issue that was raised many times in discussions. There are clearly programs in place now. Maybe they can be enhanced, can be improved.

Community liaison personnel that would operate throughout the operation of the mine to ensure that there's flow of communication and information. A range of family support services, money management training. The issue of transportation of workers to site is something raised many times and I think that has been addressed earlier in the past week. Cultural awareness programs, aboriginal traditional practice support. The support and reinforcement of traditional culture and traditional lifestyle.

The third category of economic development, business development support. For De Beers to provide assistance, guidance or advice to individuals and communities that may want to be developing particular businesses. That could be providing services to support the mine activity. Opening up access to contracts, joint ventures and the like.

Now, in order to make the impact management measure work most efficiently and

most effectively it does require partnerships. Partnerships are something that various governments have moved toward. Many of the documents from the GNWT in the past few years stress the importance of partnerships. Federal government documents stress the importance of partnerships and we think that they are key to the implementation of a number of the impact management measures that we have identified in the environmental assessment report.

We've found in our discussions with communities and government agencies that there's strong support from all quarters for developing and implementing partnerships, or at least beginning the first stages of discussions to see how far these partnerships can be developed. I don't think we've talked to anyone who says they don't think it's a good idea to build partnerships. It's recognized by most people that we've talked to that this is the way to go. A way to make things more effective, more efficient, so it benefits individuals, families and communities in the Northwest Territories. Partnerships need to be developed between the government, De Beers, various government departments and agencies, communities, local learning institutions, businesses and so on. You'll hear more from John about the partnership on apprenticeship training materials that was developed and implemented during this past year.

De Beers is now working actively to develop further the impact management measures, as well as having some on-going efforts to put partnerships in place. Currently, there's still more work to be done.

I want to spend just a couple of moments on sustainable economic development. There were some questions asked about economic development and questions about sustainability related to mining and other kinds of activities that might build from the mining activity. It's been addressed in the environmental assessment report and again some of the information requests on non-conformity items.

It's defined in the environmental assessment report as the creation of long term employment as well as the support for economic diversification. To support communities in the event of an economic downturn. Economic sustainability, particularly in the sense of diversification, contributes to on-going community capacity and it's linked as well to the social sustainability of communities. I don't want to leave environmental sustainability unmentioned because that, too, in terms of the resource use and traditional use, is important.

Now, how do we contribute to sustainable economic development? We work with partners to achieve healthier communities. We need healthy individuals and healthy families. We can increase social capacity in communities through a range of the impact management measures that we've talked about.

Employment and training. There's a range of direct jobs, those specifically in the mine, but there'll be a number of indirect jobs. There'll be spin-off jobs, jobs that may be in retailing or service provision and what have you. Then induced jobs. Those that emerge as a result of the whole range of activities and they may be

social support or counselling kinds of activities.

Along with the training for the mining jobs you'll hear more about the development of career paths and career training activities, potentially, and we think developing of human resources really meaning transferable skills and knowledge. Things that give people a set of abilities that they can use either in De Beers, in other mining activities, other kinds of employment in the north.

Under business opportunities, contracts, clearly there will be direct service contracts and the other business opportunity in the category of business support means advice to individuals, to communities, existing businesses, to encourage joint ventures, to encourage the development of services that may not be currently available in the north.

So, what's De Beers going to do? Well, these are some of the things. They're clearly going to hire about 500 employees directly. Over a 20 or 25 year period this injects an awful lot of money into the economy. Develop people in the sense of providing these education, training and skills assistance so people can develop their careers and their abilities at various job levels. Buying northern services and goods. There's a clear commitment there. Creating opportunities. In terms of induced employment and the secondary support initiatives, I think it's important to recognize that there's a 20, 25 year period here in which communities and individuals through joint ventures can develop other kinds of economic activity using the Snap Lake project as a catalyst to try and develop other industry that will help diversify what may exist in some communities. Finally, it's helping to create choices. Providing support for education, skills development, developing transferable skills, as I mentioned earlier, so people do have a broader range of opportunity. So, for example, if someone gets trained as a bookkeeper or heavy equipment operator, they clearly have some job mobility. Can move from one employer to another. Can move from one geographic location to another.

De Beers has been active since the submission of the EA. The environmental assessment report was submitted in February of this year. Since that time a number of activities have been undertaken. These are just some of them and I think you know that De Beers has hired a full-time business development coordinator, Mike Padula, who is available to assist with the development of joint ventures or to provide people with the device. The development of the Northwest Territories apprenticeship support materials, which John will talk about. There are IBA negotiations on-going in the primary communities. Finally, there's been the development of a human resources development plan, which, oops, I see a typo there. Okay. Developing a human resources development plan and that's something that John Simpson's going to go through in some detail, so I will now turn the microphone over to John.

**MR. JOHN SIMPSON (Genesis Group):** I don't like to sit when I talk, so I'll just stand. My name's John Simpson. I'm with The Genesis Group. I know some of you.

**MR. MIKE BELL:** Just a sec. We have to have your name through the microphone so it will show up in the transcripts. And to everybody else, particularly the new people, before you speak please mention your name and organization.

**MR. JOHN SIMPSON (Genesis Group):** My name's John Simpson. I'm with The Genesis Group and I must say this, I hadn't expected to present and it's a little intimidating and I do get nervous. Public speaking as a matter of course, so if my hands shake or if my voice quakes just ignore it, please. But you can still ask me tough questions, I suppose.

Our part of this, and as John alluded to a little bit, John McConnell, our company has ten employees and we have a little office above Shopper's Drug Mart here in town on the second floor. You might have visited our career centre there. We have a career centre and we specialize in education and training. We've done that in our little company since 1996. Before that I was director of policy and programs for Aurora College and developed many, many programs for Aurora College, including, I'm quite proud to say, the nursing program which is getting very good reviews these days. It's a good example, the nursing program, because when we started to talk to people about that, people said, people at the hospital, people in the Department of Health back then said, well, you can't do that in the north. It took us a long time, but everybody eventually got on side and a great partnership evolved with the Department of Health, the college and education and it's a tremendous success.

So that's an example, I think, of what we're facing here. We're facing a tremendous challenge and some people think we're not going to make a difference. Whether it's De Beers or whether it's me as an adult educator or whether it's communities or the Department of Education or Health or whoever. I tend to look at this as a tremendous opportunity. I worked as an adult educator in small communities in the eastern arctic where, and as a teacher in northern Saskatchewan and we didn't have jobs as a character people. Here we were doing all this training and doing literature training and upgrading and trades orientations and all this and sometimes I kind of got frustrated because there were no jobs to send people to.

So, now, at this stage in my career, I'm excited about the opportunities that when I look at the Dogrib region and Lutselk'e and other communities in the north and the entire Northwest Territories, I see not only De Beers but all the diamond mines as a real opportunity for positive change. I also know that because we happen to be delivering across the street there a child protection worker training program this week and I know there's lots of issues still out there. There's lots of challenges and so forth.

So, with that introduction, and I do tend to ramble a bit, I'll talk to you about the approach that, I'm hoping I'm going the right way here. Okay. Human resource development. What we have here is a little book called, "Developing Human Resources for the Snap Lake Diamond Project" and this was available at the Snap Lake office. We kind of had a quiet launch, I guess, at the geoscience forum and I was up there at the De Beers booth and talked to people quite a bit. People that I

talked to were pretty excited about this approach. Actually, people from across Canada who were at that forum were pretty excited about the approach. I had the opportunity this morning at the Linx Conference, which is a conference for career development professionals and adult educators and the like, up at The Explorer Hotel. I had a group there that I talked to about this presentation or did this presentation this morning. People are really excited about the opportunities.

So, what we did to come up with this plan and this basically represents De Beers' position on human resource development in and around the primary communities and in the Northwest Territories. But what we did when we were asked to get involved, and we're very excited to be involved, actually. I'll put my hands in my pockets so I don't shake. Travel, am I talking too fast for the interpreters, Mike? Okay. We travelled to the communities and we talked to administrators and students. We specifically didn't talk to leaders. That wasn't our company's job. Our company's job was to go in and talk to the people who were managing human resource development or who were directly affected by it. I did have the opportunity a few years earlier when we did the Dogrib Community Services Board human resource development strategy to go to all the communities and talk to leadership at that time, in those communities, anyway.

But what we did, we went in and we talked to people and I said, I'm here, my company's The Genesis Group. We want you to tell us what to tell De Beers to do so that things will work better for you as administrators or for you as students. We listened and people told us lots of stuff. The idea was we wanted them to tell us what we can do to prepare people for employment. What we could do to, how can we hire people. We know there's some people who are ready, willing and able to work right now. They don't need any preparation. So we wanted them to tell us how we can be the employer of choice. Diavik and BHP have a head start. De Beers has to do a lot more to be able to hire northerners and hire aboriginal people. So, we said that and we asked for advice and guidance on that.

Beyond that, we asked them to tell us as employees and as a mining company or as any employee, what would you want your employer to do to help you develop? We heard lots about people starting at low end jobs. So we said, Okay, fine. What can we do then to make sure that doesn't happen? How can we or what can we tell De Beers to do to make sure that people are hired at higher level jobs or move through the system to higher level jobs? So we developed, we think, a pretty good strategy to do that.

I only have 100 slides, so we'll be done by 5:00. No, just, that's a joke. Mike, maybe you can tell a joke where people laugh. Oh, no, they don't laugh at yours either.

**MR. MIKE BELL:** It's a tough room.

**MR. JOHN SIMPSON (Genesis Group):** I know. Okay. This won't be any surprise. This is what people told us. You know this. Low levels of education and literacy in the communities. Inappropriate training opportunities, sometimes. What people

meant there was that people told us, well, people have been taking training or people in our communities have been taking training. They finish the training and they're ready to go to the job. And there's no job right then. So they're told, Well, go home and we'll call you. Then they go and they finally get a job later on at one of the mines, but it's not the job that they were trained for and they're confused about that. Also the gaps. They wondered why, if they take training, okay, we're done, let's get the job. So, kind of a seamless approach was identified that it didn't exist and it was a problem.

Minimal career development support at the community level. There's lots of efforts for community development, for career development at the community level, but people said there needed to be more. People were confused about career opportunities at the mine. They were confused about how then to, what training should I take, how do I get those jobs? It's kind of an expectation by some people, well, the jobs are there, I'll take them. Well, no. It's not that easy. So there has to be a lot of work to assist people to figure out their own personal career path to achieve those results.

We also know there's learning disabilities. Lots of learning disabilities. If you talk to any of the teachers in the schools, adult educators or in the elementary or high schools, they're talking at length about learning disabilities and their talking about literacy as being, even in high school, they're saying literacy is still a major challenge. So, it's kind of sad when you hear that from Grade 12 teachers, but it's a problem. So we have specific things that we're going to do, I'll talk a little bit about them later, for people with learning disabilities.

One of the critical areas that cause learning disabilities, a specific one about learning disabilities, is Fetal Alcohol Syndrome. We want to do something as a company. In fact, this was not my idea nor did it come from the communities, this one did in fact come from De Beers. Officials said they wanted to do something specific for FAS or Fetal Alcohol Syndrome. So we have some strategies in place to support initiatives that are on-going by the Department of Health and Social Services, as well, and other non-profit groups in town and a group of organized parents around this.

Mobility issues. People talked about those. That's a tough one. Mines are fly-in, fly-out. People say it's tough. My wife goes away to work at the mine and I'm here looking after the kids or vice-versa. It's a problem. So, it's a hard problem to fix, but we think we've got a few solutions to that, as well.

Lack of local control of human resource planning. That was kind of a concern that many of the administrators expressed. They said often times they feel like these decisions about what training is provided in their community or in their region are decisions that are not theirs. They're made by, and I don't mean to be offensive to anybody, but this is what people told us, that oftentimes it seems like they're parachuted in. Maybe by private companies, maybe by governments, maybe by non-profit organizations. That they don't really have control over the planning of



their human resource planning at the local level. We have to be very cautious in our planning that we don't make the same mistake. That we go in and listen to communities and actually respond to what they want.

Social issues we know. Substance abuse, crime, family violence. Poor job skills. It's not enough for people just to get jobs, they have to keep jobs. And they have to have the skills to be able to access those jobs in the first place.

Limited labour market information as a baseline for decision-making purposes. We have some. We need more. We think that the private sector, including De Beers, can add to that pool. Can add to that information base by, one of the things we're doing, I'll jump ahead to one of the ideas is, as you'll see, we have at least 100 initiatives that we want to talk to prospective partners about implementing. What we want to do, which is really important, I think, is I saw this not done effectively in the past, we're developing right now, our company's developing an information system. By the way, we develop databases and, can I put in plugs for my company or not? No. We're developing a database right now to track all of our projects. Okay. So, it's 100 projects, so we have information in there that we're tracking on the participants, where the participants are from, when the program started, what their phone numbers are, tombstone data, where they're from, all the participants, who are the partners in the project, how much did each partner contribute to the project, where are the participants from, where was it delivered, when did it start, when did it end. All that kind of stuff. Because we know that the people in this room, maybe not in this same forum, but they are going to want to know that information. How successful were your finds? You said this is what you wanted to do. Did you do it? Well, we're going to have a system starting right away to track all of this information so we can report back to anybody who asks and say, This is what we're doing. We, with our partners, are doing. This is a success. We had this many people take this program, this many people pass, this many people failed and so forth. We'll probably have a few failures, but hopefully a lot more successes.

Where am I? Poor coordination of human resource development initiatives and programs due to lack of funding in the communities. Historically, funding for adult education, and people in the communities know this, adult education and career development projects and other projects as well are oftentimes funded on an annual basis or not even annual. Six months, four months, ten months. People don't know in the communities, well, fine, I'll take this course, but what's happening next year? Is there a follow-up course to this? Can I take low-level literacy this year, mid-level literacy next year, then it's trade skills the year after that? They don't know. It's poorly, it's, I can't say, well, I got it out there, I'll have to say it. It's been, it's not poorly coordinated so much as it's the way government funding works. A year at a time. So, we've been arguing, before we got involved with De Beers, actually, we'd been arguing for some time for continuity of funding. Three to five year funding projects for the communities. When we did our project for the Dogrib, their human resource development strategy that's what we told them to do. Go back to government and tell them, when they give you money for projects give it to you in a longer period so you can do some community planning instead of one year at a

time. The problem with the one year at a time is, who's going to take that job as the adult educator for a ten-month program? Are they going to be there next year? So, the students go, they take this program, they get to know their instructor, develop a rapport with them, maybe they go back the next year or the year after, it's a different instructor who doesn't know them or their achievements, there's a lack of continuity. It's a bad thing. So, we have to work and we think that De Beers has a role to play in this. To help provide some funding and other resources to provide continuity to the communities.

We're still in challenges here. Diverse labour force that will require substantial cross-cultural training. We hear stories about, from the communities and from other people, about problems with cultural interaction at the mines. We know we have to address that issue and we have some specific things that we want to do to address that.

So, based on commitments in the environmental assessment report and on the results of our interviews we've developed a draft comprehensive development strategy or we're in the process of developing that. It's not this book. This is the overview of the strategy. It has the principles and so forth. It also has at the back, if you get a copy of this. I was kind of hoping they'd be here today, but, in the back I can just show you are all of the initiatives that we have planned under this program. In the strategy what we have is those initiatives planned and costed over five years. But, we don't have our partners yet.

So the next stage is to go, to work with, our first partner will be the Department of Education because a lot of this has to do with education and training. They're critical partners, but there are other partners. DIAND, Department of Health and Social Services, federal Department of Health, Skills Canada, Native Women's, there's lots of other partners that we're planning to work with. So we need to develop a plan that includes these partnerships. It needs to have people to implement this plan.

It also needs to have facilities. We're talking about human resource development. We're talking about training. We're talking about career development. We need facilities in the communities to be able to do that effectively. Currently, the communities are inadequate to do that. They're not warm. The adult education centres are often not warm, friendly, comfortable places that, where you walk in and you just get a feeling that this is where you go as an adult, for example, to achieve your personal goals. Okay. So we have a plan to four facilities in the primary communities. One of the communities I went into, talked to the adult educator who was on a ten-month term and happened to be the Co-op manager's wife, which is often what happens. You can only get to hire the people who are there who don't have a job already as adult educators and so forth.

So, we want to do more than that. Adult education is a huge problem because nobody is finishing high school. Nobody is finishing high school with an advanced Grade 12 in the Dogrib communities. We do have some graduates from Rae and from Wha Ti and so forth and that's good. But we don't have enough. Most people

have not finished high school and still in the schools we don't have a majority of people completing high school graduation. So what that says is there's a huge demand for adult education. In fact, it's even bigger than what's in the schools. It's never been effectively resourced comparable to the school side.

You'll see I talk more about adult education than just De Beers chunk and this is how I've talked to them over the last year so to get them to come on-side with this process. So, they've committed to build facilities in communities, in the primary communities. Those facilities will be warm, pleasant, effective, efficient places for adult education.

We also need systems to keep track of what we're doing and to report on what we're doing and how much money we're spending and who the partners are and all that stuff. And we need money to do all this. I would argue money's not a problem. Money's not an issue. There's enough money being spent out there now. It has to be spent more effectively, more efficiently on education and training. De Beers is going to add new money to this pool of money. Diavik and BHP and other mining companies and other sources of funding are always being added to this. Money is not a problem. Of course, I always say that, don't I? That's how we got the nursing program. I only wrote the proposal for it, I can't take all the credit for the nursing program. Develop a plan that includes partnerships. Budgeted funds to implement our part of this plan for the next ??? So, we already know what De Beers' commitment is to this plan.

What we want to do is sit down with our partners, starting with education, and the other partners help, DIAND and so forth and the communities, to figure out what their part is going to be. Notwithstanding, you know, if we didn't get any partnerships there's still a bunch of stuff they're going to do, but that's not going to happen. Everybody is talking about partnerships. I took this strategy and I talked to MLAs, I talked to the Minister of Education, I talked to the deputy minister of Education, the ADM of Education. I talked to the past deputy minister of Health about this. Everybody that I talked to is excited about this. And so am I.

So, other, not just people told us things. There's been lots of reports that have told us things as well. North Slave Metis Alliance can't live without work. A huge document that talks about the things that we're talking about here. Legislative Assembly of the Northwest Territories. To reach our full potential we need to build upon a common vision and work in partnership. Steven Kakfwi, we're encouraging new partnerships with southern businesses. The national round table on the environment and the economy, which is a wonderful report on the Northwest Territories and the situation of social, economic and employment situations that we have here and education. They said, Aboriginal people remain disadvantaged in terms of education, employment and incomes. Something is not working.

That's basically the approach we took. That we weren't going to do the same old thing that was done. We're going to do something different. So, it's based on what people told us. It's based on my 20 years of experience working in northern

communities in adult education. Caring about communities. Caring about people. So, it's kind of based on all that rolled into one.

National round table also said, Women can be trained, recruited and employed in the minerals, oils and gas sectors. I know for a fact that De Beers is very keen to have special programs to employ women and they can talk about that. We want to be more than just chambermaids. This is my favourite quote and this comes from when I went into Rae-Edzo into the high school and talked to all the teachers in one group, but I rounded up all the Grade 12 students and put them in a room and I walked in and I'm taking my coat off and I said, Okay, I'm here and I'm with The Genesis Group and I want you to tell me what I can tell De Beers. I didn't even get my coat off and this one girl says, We don't want to be chambermaids. And I said, okay, okay. Well, what do you want to be. She said, I don't know, but not chambermaids. So, we had a great discussion. It was fantastic and if you ever, I encourage you if you ever get a chance to go talk to those kids in Rae, take it. It's an awesome experience. You'll be very impressed. I guarantee you. And the other communities, as well.

So, what that idea gave us though, was one of our first initiatives that we've already completed and that is, we knew that they didn't know what the jobs were. I didn't know what the jobs were. I couldn't tell them. So, what we did is we developed a little book called, and these are available at the De Beers office as well, it's called, "De Beers' Careers." Catchy little phrase. You won't forget that, will you? What it does is it lets, every page has each job at De Beers. Every single job is itemized in here and it says, it describes the job. It says what skills and experience you will need to do this job and what education and training you will need to achieve this job. To get this job. It has a caveat at the bottom of many pages that says, If you're hired with education lower than this, that's okay. We will do that on occasion. Hire people without these requirements. But you will enter a personal development plan to get you up to the required skill level for that position. But that's not unusual because every single person at De Beers will have the opportunity to have a personal development plan where we can sit down with them, with career counsellors and so forth, and ask them, What do you want to be? Here's what you're hired at, but we want to have a long term potential. This is our way of getting people into the mid-level and senior jobs at De Beers. At Snap Lake. There's already examples of that happening with the staff in the Yellowknife office of De Beers now.

So, that's the plan and what we want to do with some of the initiatives will be to pay all their tuition. Whatever tuition, whatever course they want to take, De Beers is going to pay for that. That's not going to be a partnership one. That's going to be one that they pay for directly. So, there are some initiatives that they'll do directly, like this book, and some that they'll do in partnership.

The goals are to develop a competent workforce that is ready, willing and able to work at Snap Lake. To hire as many aboriginal northerners as possible and to hire as many northern residents as possible. To support each employee in their efforts to

reach their maximum employment potential. To assist and support employees and their families to live happily and well. It's sort of a bit repeating what Peter talked about, but to live happily and well. That's critical.

While we talked about living happily and well, we're talking about community wellness pretty much. When I went to visit, I went to interview a social worker in Wha Ti. She made the point, she said we spend far too much time talking about the difficulty, the people in trouble, the families in trouble. Who celebrates the successful families? Who's talking about the families that are thriving, that are doing well? Nobody. We never hear about them. So, it gave us the idea to create a program called, well, to create an award to, now I forget the name of it, but...It's celebrating successful families. It's not just successful families, it's families that are succeeding in both worlds. We took from Chief Jimmy Bruneau School and a quote from Chief Jimmy Bruneau about developing people with strength in, strong like two people and we said, well, that makes a lot of sense.

So, what we've created is a series of initiatives and, as I said, there's a tonne of them listed in the back here, but some of them are what we call two world initiatives. Those initiatives are, for example, one to celebrate the healthy family. So one of the things we're doing this year with the budget this year is to recognize families that are working in the wage economy and succeeding. Good employees. You know, a person or family, good employees doing very well, succeeding in the wage economy. But also, on their time off, if it's a rotation or whatever, on their time off they're still living and practising and learning more of the traditional values. Okay? And going back and learning some of the skills that they'd forgotten in the communities. People told us that, right. Well, you gotta help us with some of the traditional skills because we're losing those. So, several of our initiatives actually are called that. Two worlds initiatives where we celebrate, encourage, develop, support, sponsor people to succeed in both worlds.

The challenges. This is sort of a summary chart. The challenges, I'll start on this side. Uncertainty about mining career opportunities. Communities losing traditional knowledge and skills. Communications between minds in the communities related to training. Not always that effective. That's what people told us. People were fired, sent home and I talked to the outreach worker and she's goes, I don't know why they're sent back. I have no idea. Were they just laid off because there was no work? Did they do something that was inappropriate? Did they lack the education? They had no idea. So the communication was lacking. I think that's improved since that conversation I had, but we want to make sure that we have opened a lot of communication between career development people and adult educators and other leaders and so forth in the community so that we're not missing out. That there's no missed gaps in information, but that we know and they know exactly what's going on.

Inadequate adult education facilities. Community social ills. Educationally underdeveloped communities. So, that's low levels of education, literacy and so forth. Few potential northern recruits is a challenge for De Beers. A lot of the people

are already working, so we have to attract some of them, but we know we're not going to steal them all or get them all, so part of our concentration again this year, our big strategy is the stay in school initiatives. Because, unfortunately, I guess, or for whatever reason, we have a couple of years here to get ready for this. So, we're going to the high schools and we're saying, look, pick a job. Look at the education requirements. Stay in school to get that job and how can we help you do that. So there's quite a bit of sponsorship now for kids to stay in school, but we can do more to that.

One of the things that we're going to do is support trips for high school kids, specifically, to travel and broaden their perspective. Because right now in small communities oftentimes they don't have a worldly perspective. They can't even imagine what opportunities are out there for them. So, one of the things we're going to do is sponsor as many trips as we can and in that case we will go, we will have partnership certainly and we'll do our fair share to encourage people to travel.

Where was I? Poor labour market information. As I said, we're going to add whatever information we can collect to that pool so we can improve that as we go in the north. Worry about accessing only low-end jobs. I told you about that. It is a worry that communities have and we certainly don't want to make that a reality. Inadequate mining-related training. We're going to do lots of mining related training. At site we're going to have a mine training centre. Initially we were thinking actually of a mine training school, but since that discussion the mine training committee, in town under the Chamber of Mines, has kind of taken on that role of trying to develop a mine training school. I can't speak for them, but I know they're looking at several options. De Beers has sort of shifted to say, Well, fine. If the committee's going to do that we'll go work with them in partnership on that idea, but we'll still have our training centre on site.

I'll go a little quicker probably, right? This is an example still of the challenges. Unemployment rates as of 1999. These have changed since then, but I think the problem still exists. Yellowknife, if you're ready, willing and able to work you can have a job. Our company runs a little career centre. We see people coming through there getting jobs every day. Rae-Edzo, 46 percent unemployment. Forty-two, 28, 32, those are high numbers. There's still lots of people out there who aren't working. Not everybody who wants a job has a job. They may not be ready for a job, that could be the problem for a variety of reasons. So, we have some strategies to work with them. Whether it's treatment programs. Whether it's upgrading programs. Whether it's life skills programs or whatever. We're going to do that. But we're not going to go in, and I have to be careful the way I say that because we're not going to go in and say, Okay, well here, communities, here's what we're doing for you. We're going to do this in your community, we're going to do that in your community and so forth. Not going to happen. It's going to be, Communities, we want to help you deliver some things. Here's some of our ideas, what do you guys want? To be honest, I haven't figured out exactly how we bring them in as partners in the five year strategy. I know, I think, also I've miss-stepped many times, how to work with government departments in building partnerships, but it's going to be a broad

challenge, a big challenge to work with communities, but we will succeed.

The plan and all our initiatives in this book, again, I just repeat, are categorized in five areas. Pre-employment initiatives. So that's all the stay in school initiatives, the trips, our FAS educational program, De Beers' Careers booklet, scholarship program, part time jobs we're going to have for high school students and university summer students. We're going to have mine project kits, mine kits to teach them what a mine is about and so forth. I'll let you read it when you get a copy, but things like that. Another thing is, we're going to have, some of you may know about Scholastic book order programs. Your kids in school, they come home and they say, Mom, give me \$100 or buy me a bunch of books and you buy them. Well, those programs aren't offered in the communities, so what we're going to do is we're going to create with a Yellowknife business here, we'll create a little book order form because we want to promote literacy. So we're going to do a little book order form where each kid can order \$25 worth of books. In Yellowknife we'll donate to the libraries and stuff because there are too many kids here and they already have that Scholastic thing happening here. But projects like that. We'll probably look for partners with the Literacy Council or the Department of Education for that project.

New mother's literacy kit. This was done a few years ago by the Literacy Council where it was just from the outset, from people having babies to encourage them to read right away. Well, De Beers sort of said, well, they're too young when they're newborns to read, so the idea was when they go into the nursing station for their first inoculation, I think that's at year isn't it? Cathy, you could tell me. So, what we want to do is work with the Department of Health and Social Services to have kits available so the nurse will actually hand them out and things like that.

Lots of community programs initiatives, as I said. One of them is to build adult learning centres in those communities. The problem with, remember I talked about the problem with you have to hire the Co-op manager's wife to be the adult educator? Well, De Beers, and I can't take credit, but De Beers thought of a solution to that to build apartments onto the learning centre for the adult educator who can come and stay there. That will provide us with the continuity of programming.

Wellness initiatives. There's lots of other community programs, but wellness initiatives, that's where we have traditional skills workshops, healthy living workshops, personal finances is very important. People are making more money, but not necessarily managing it effectively. Retirement savings. Mortgages savings. Interest. What is all that? How does all that work? We're going to help figure out a way to teach that.

I also talked about FAS prevention. A mine training centre, and that's where we're going to have at site a centre where all employees are encouraged to come and we'll have literacy programming as BHP and Diavik both do. One of the key things we'll be delivering in there, because there's a great shortage of journeymen in the Northwest Territories, especially aboriginal journeymen. Actually, you'll notice in here if you get a chance to read this, the very first initiative we thought of was the

trades entrance exam study materials.

The reason we thought of that was that aboriginal people have not been successful for a long time in passing the trades entrance exam. So, you can't be a journeyman electrician, a plumber or anything else, a millwright or anything unless you pass that exam. Our office happens to sit right beside the local North Slave office and we see a lot of people write the exam and come out. One woman came out one day and she was crying outside her office. I said, why is that woman crying, and they said, Well, she wrote the exam. It was an aboriginal lady and she had failed. So, I went in and I asked them, I said, Well, do you give her materials to study so she can pass it next time? And they said, Well, we really don't have any. We have some from ADC in Alberta and so forth.

So we thought that it would be a good idea to develop support materials written for the north at a level the northerners can understand. So we went to the Department of Education and asked them to be our primary sponsor with this. They graciously agreed to be the sponsor and they and De Beers are together the prime sponsors of this initiative, although there are other partners. Aurora College, DIAND, HRDC, Skills Canada and, actually, The Genesis Group is contributing funds to this project, as well.

What it will do is, it's going to be on trades entrance, it's actually going to help people through all four years of their apprenticeship. This is just a few pages, but it's actually 2,000 pages. It's math, science and reading comprehension. All northern examples. If you get a chance to look at it you can come up here. But that was an example of, I guess, why we took this holistic approach to a five year strategy.

If you just bear with me for one more minute, I just have to explain this. When I ran around to all these departments, and this wasn't hard to sell. This is an easy sell. I went to David Gilday and he got on-side right away and said, Yes, we'll partner on that. That's a great idea. We were thinking about doing that ourselves. So, right away we got them on-side. We got Skills Canada on. It was easy, but it took about two months of my time to get that in place. To get the funding in place and so forth. I thought, if I have to do that or anybody at De Beers, their human resource people, have to do that for 90 initiatives and get partnerships, we're doomed. It'll never work. That's what happens now. A lot of the projects that happen in the north, the partnership projects, are like that where they're one-off projects. You know, kind of ad hoc. We'll do this. We'll get some partners. We'll do this. We'll get partners. And so forth. So, our approach was, let's not do that. Let's take the time to think of a five year strategy that goes all the way from pre-employment, from pre-natal all the way to retirement planning. Let's think this through, let's plan this out, let's get the partners that we need in total to do this five year strategy. Have a committee representative of the partners that will guide the delivery of these strategies.

Okay. So, outcomes. Educate and train northern work force. Sustainable achievement of northern employment goals. Individual family and community wellness. Individualized and informed career development and training plans.



Effective communication. A partnership will be a five year partnership administered by De Beers. Quarterly meetings to address programs. If we do something right, we want to plan to do more of it. If we do something wrong, we want to scrap it and not repeat it. It includes, their strategy includes a mine training centre at Snap Lake where we're going to deliver this. We're going to do distance education. If somebody wants to work on their degree, we'll have a lab. We'll have an instructor who will help them work independently at site and when they go home, as well.

Permanent adult education facilities and educators and materials will be public. The partners will include communities, first and foremost, aboriginal groups, HRDC, BCNE, DIAND, Aurora College. We have Skills Canada already as a partner and we'll have lots of other partners. It'll take some time to develop those partnerships and we're planning to start actually with the meeting with the Minister of Education and the deputy minister of Education on the 27<sup>th</sup> of January is our first meeting to get that rolling.

Pre-employment projects. I'll quickly go over this because I talked a lot about them. But this is just a summary at the end. Pre-employment projects, ABE, Stay in School, school achievement awards, trades training programs, summer student employment, construct the adult education centres, De Beers' careers information, high school and elementary science fairs. We also thought of one I didn't get on here, but we're going to do this year, are competitions for math and science. A lot of the jobs in the De Beers' careers book require math and science. So we're going to push that.

Women in industry in our community programs, literacy, ABE, advanced independent study. Some people are high fliers in the communities and they want to get going and they don't want to sit in a class of 15 people trudging along with the adult educator at this pace of the slowest person in the class. They want to get going. So we're going to add individualized independent study support programs.

Community education development initiatives. That one is, basically it's worded like that because it's anything the communities want. When I was an adult educator in Broughton Island I had a committee that told me what to deliver and I went and I said, okay. I can organize anything. What do you want to deliver? One of the ladies said, Chinese cooking classes. So that's what we organized. Chinese cooking classes. But we had on the land courses, we had 35 courses in our little adult education centre in Broughton Island.

We're going to have career counselling support as well. New mother's literacy kits in the wellness area. Introduction to De Beers' Careers we're doing now. Alcohol awareness. We want to do some of that. Teen pregnancy, the issue of. It's a big issue. Women have a hard time working when they have little babies at home. Especially if they're young women just starting their careers. Personal finances, retirement planning, strong like two people, recognition of healthy families and traditional skills workshops. Apprenticeship support materials, which are now, yes. This is at our mine training centre. ABE. Equipment profile certification. So what I'm

going to do here is all our equipment...I won't even take five, Mike. One minute. All our equipment will give certifications on equipment so people can develop their resumes while they're at site. Trades programs.

So, that's my presentation. Anything I forgot.

—Laughter

Thanks for bearing with me. I saw a few people's eyes nodding off there, but I kind of get passionate about this stuff. So, thanks again.

**MR. MIKE BELL:** We have about ten minutes until the break for coffee break. Could we see if there are any questions or clarifications? We're not into concerns yet, we just want to make sure that people may have some concerns or questions? Florence.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Lutselk'e Dene First Nation, Florence Catholique. Question in regards to The Genesis Group. I want to know who and when you came to Lutselk'e and met with who and how often that was. If there was any documentation of those meetings or communications.

**MR. JOHN SIMPSON (Genesis Group):** Kirsty Knutsen and Trevor Walsh went to Lutselk'e on, I think it was January 21<sup>st</sup> and 22<sup>nd</sup>, 2002. They met with people at the school and I'm not sure who else they met with there, but know there was some confusion about people being prepared for the meeting. John Simpson said that, by the way.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Mahsi. Florence Catholique, Lutselk'e Dene First Nation. The confusion usually comes about when there is lack of accurate information. And the confusion that you're talking to was talking to the wrong person that was not in the capacity to talk on behalf of the community. Therefore, the discussion that was required at that level did not continue. We did write some letters to De Beers addressing that issue and requesting that something be done about it. Whether that has happened to this date, I'm not sure, but I know that that was the situation at that time.

In another instance where another group, another consultant group came to the community under the socio-economic, we were told then at that time that no discussion was to be carried out until an issue that was going on in regards to the AIB was to be confirmed or completed. So, the consultation in regards to the socio-economics in our community did not carry out to any extent that we were happy with it. So, I just wanted to bring that and to have that on record.

**MR. MIKE BELL:** Thank you, Florence. Cathy.

**MS. CATHY PRAAMSMA (HSS):** Thank you. My name is Cathy Praamsma and I'm with the Department of Health and Social Services.

**MR. MIKE BELL:** Cathy, pull the microphone.

**MS. CATHY PRAAMSMA (HSS):** Pull it closer? Okay. Do you want my name again?

**MR. MIKE BELL:** Yes.

**MS. CATHY PRAAMSMA (HSS):** Okay. Cathy Praamsma with the Department of Health and Social Services.

**MR. MIKE BELL:** Cathy, these questions we have for a few minutes are for clarification purposes or additional information, okay?

**MS. CATHY PRAAMSMA (HSS):** Absolutely. I'd just like some clarification on the wellness and treatment support program that's been identified and what exactly that does entail.

**MR. JOHN SIMPSON (Genesis Group):** John Simpson, Genesis Group. I don't know. We don't know yet. All we know is that we have to address the issue and we have to do some things in partnership and I would suspect we'd bow to the expertise of your organization or other organizations to say, How can we help? But we know we have a responsibility in that area.

**MR. MIKE BELL:** David. Oh, sorry, Cathy.

**MS. CATHY PRAAMSMA (HSS):** My name again?

**MR. MIKE BELL:** Yes, please.

**MS. CATHY PRAAMSMA (HSS):** Cathy Praamsma, Health and Social Services. There's also mention of a drug and alcohol awareness program on-site. In addition it talks to having a program in the primary communities. Could you explain that a bit more? You didn't hear it? Okay, there is reference to a drug and alcohol awareness program on-site and, in addition, there is reference to a drug and alcohol program in the primary communities. I'm just wondering if you can give us some more clarification on what that means.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Was it Cathy? It's hard with this post here. I think it's essentially the same answer. We recognize that there are a need for these things and we want to do our part. Again, John talks about this guide. But it's a start and we've identified a number of areas where we want to start talking to other partners about joining up to do things. But, you know, you guys are clearly the experts in that area and maybe what you need is more funding. Maybe you need some assistance with administration. But we're going to be looking to you for advice in what we put in place.

**MR. MIKE BELL:** We have a number of more questions, but it's time for the break. What I would like to do is suggest that we take the break. Then immediately after

the break I've got Kevin and Janet to start with. We'll take more concerns or clarifications and we'll move right through it. Then we'll get the gentlemen down here. Okay?

—BREAK

**MR. MIKE BELL:** Okey-dokey, please. Before we get the issues, we're going to set a record here. Somebody came up and said to me that Andy said that Roy and I would like to make 30-second presentations. I've never heard a 30-second presentation before, but they've had some side-bars and they're going to report out and then we'll collect the rest of the issues. Andy.

**MR. ANDY SWIDERSKI (Terriplan Consultants):** Andy Swiderski. I just wanted to report back. Roy and I did have a follow up conversation and I'll get Roy to confirm that also for the record. We did resolve a couple of elements of two of the outstanding issues. There's more work to be done at a detailed table. I just wanted to share that with you. Roy, if you'd care to comment, please.

**MR. ROY ELLIS (Ellis Consulting):** Roy Ellis, Ellis Consulting Services. That's correct. I guess I have 28-seconds left in my 30. I'm not going to try a joke, so.

**MR. MIKE BELL:** Good for you, gentlemen. You did a good job. We have until 5:00 or if people would like to stay longer we have longer. But I was cut to the quick at the break before David Gilday suggested I try to ignore him totally. He knows me, so he would probably think I would try to do that based upon our past relationship, but Ed down there has never met me before and he thought I was doing the same thing. So anyway, what we're going to do is make sure we're not ignoring anybody. We'll give you our list and we would like people just briefly to tell us what the issue are that they're dealing with. So we'll just collect the issues and then go back.

David wants to talk about partnerships. The next one from this morning is Kevin and, Kevin, what are your concerns or issues? Just list them.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Sorry, I still wanted to ask some questions about this presentation that we just saw.

**MR. MIKE BELL:** Yes, you can, okay.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** And then I had some issues around socioeconomic agreements and a number of other issues that I wanted to raise with regard to implementation, but I first wanted to get some questions in around this presentation.

**MR. MIKE BELL:** Okay. And can you summarize it?

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** What my questions now are?

**MR. MIKE BELL:** Yes, what your question is.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Well, I want to know whether this plan has been submitted to the board. This is the first time I ever heard about it. And whether everybody's had a chance to review this. I think that raises some procedural issues. I want to know how much it costs to implement this and how much De Beers is prepared to commit towards it.

**MR. MIKE BELL:** Okay. Next we had Rachel, you had a question that you were going to raise in catering. Is that right? I just want to list, was that the issue. No, Rachel, please.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** The questions this morning that I had issues with was with community consultation.

**MR. MIKE BELL:** Okay. Janet, there were a number of issues left over from this morning. What were they please? Do you want me to come back to you, Janet? Okay. Greg Empson.

**MR. GREG EMPSON (Yellowknives Dene):** Greg Empson, Yellowknives Dene. I had about five specific questions. It would be difficult to summarize. Maybe I could just ask those quickly.

**MR. MIKE BELL:** ut I just, can you give us some idea of what they're about?

**MR. GREG EMPSON:** They have to do with economic initiatives and some of the educational initiatives and the specifics of programs.

**MR. MIKE BELL:** Okay. Ed, now, just the issue.

**MR. ED WEICK (Consillium/Gartner Lee):** The issue is both the education program and sustainability.

**MR. MIKE BELL:** Okay. Hiam.

**MR. Hyme BENZO HAR:** Thank you. I have a couple of questions. The broad subjects are, one subject from this morning. The production rates. Then on sustainable development. Questions on sorting and valuation. Questions on branding. Questions on local requirements for secondary industries.

**MR. MIKE BELL:** Okay. And secondary industries. Cathy.

**MS. CATHY PRAAMSMA (HSS):** Yes, I have two questions. One of them would be on 24/7 medical coverage on-site. The second one would be a definition of the regional medical services groups.

**MR. MIKE BELL:** Okay. David.

**MR. DAVID GILDAY (ECE):** David Gilday. Mike, we've got a series of questions on cultural impacts, training, hiring, advisory committee, contractor responsibilities, spacial areas, direct flights...

-- Break in Recording

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. So I think there was a leftover issue from this morning about predicting social, cultural and economic impacts for the specific community, and also how that relates to impact mitigation and monitoring.

The one other question that I had was just a clarification from this afternoon's presentation. Just a question very similar to Rachel's, to find out who the De Beers consultant met with from NSMA, when that meeting occurred, or meetings occurred, and whether or not the content of those meetings were summarized in a document that was given to NSMA to comment on its accuracy. So it is just a point of clarification.

**MR. MIKE BELL:** Okay. David, why don't we deal with this morning's question first, and then later on we will deal with the rest of the issues that you had. Is there anybody else, Kevin?

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Well, I thought we were going to deal with questions on the presentation first, for clarification, rather than get into the issues that we dealt with this morning.

**MR. MIKE BELL:** Well, what we are trying to do, because we are trying to collapse things and we've got some time. You'll have some time to speak about the presentation -- there is no issue around that -- and be able to deal with it. We just put them together, as we've had to do in past presentations.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Well, I guess earlier before the break we had a number of questions around clarification around the presentation. I think we need to finish that off first before we get into the issues, with all due respect. Because some people had opportunity to ask questions of clarification on the presentation and some people haven't had a chance. My preference is to finish those off first, and then we can get into the specific issues that people need to raise.

**MR. MIKE BELL:** Okay, clarification purposes only. Kevin.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. I guess I'd like to ask De Beers: has this document, and any supplementary materials with this, has this been submitted to the board?

**MR. ROBIN JOHNSTONE (De Beers Canada):** No, it has not.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Okay. What is the

relationship of this, plus whatever other supplementary information you have, what is the relationship of this to this environmental assessment proceeding?

**MR. ROBIN JOHNSTONE (De Beers Canada):** The environmental assessment outlines 14 areas of impact management measures. So, the human resources development is identified as covering off many of those areas. This is a continuation of the work that is being done by De Beers. Work doesn't stop at the submission of the environmental assessment. We are continuing in our development of mitigation measures.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. Has this information been submitted or provided to any of the directly affected parties or the interveners to this proceedings.

**MR. ROBIN JOHNSTONE (De Beers Canada):** The document that you have in your hand was basically finalized in time for the Geosciences Forum. That was the first release of that information, but the information will be circulated to interveners and it will be placed on the public record.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you. I guess I want to register a procedural objection here. This is brand new information, it hasn't been reviewed by anyone other than the proponent. It is very difficult for any of the directly affected parties, the interveners, to actually have much of a say in it. It has never been subjected to any sort of scrutiny or examination and I think that is cause for great concern and I want that registered on the record.

I do have a couple of other questions...

**MR. MIKE BELL:** Just on this one first...

**MR. LOUIS AZZOLINI (MVEIRB):** I have to admit, Kevin, that you are putting me a bit on the spot and I don't have what I would probably say is the most intelligent answer. We did have a pre-hearing conference and we knew that we were going to be discussing social economic issues. I was unaware that this information was going to be presented.

Having said that, we recognize that the VA process doesn't stop when the environmental assessment report is submitted. If there is some concern by the attendees, I would like to let you know that there are two other venues where concerns or views regarding the specific documents can also be put forward.

The first is at the submission of the technical reports which is scheduled for mid-February. And then you could bring your concerns forward directly to the review board in March.

I really at this point can't provide you legal advice because I am not a lawyer, but if I had my druthers I'd prefer to hear what people have to say in open, frank discussions and encourage that kind of debate and discussion rather than forking it

or inhibiting it. But at least making the board aware of your concerns and the ramifications it may have caused you in terms of your ability to prepare or engage into a constructive discussion.

**MR. MIKE BELL:** Okay. Kevin.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. Well I will add a couple of further points. I can't speak on behalf of any of the directly affected parties or other interveners, but people may want to reserve the right to submit information requests regarding this additional information that the proponent has in hand to support what's in here. I understand there is a three volume -- this is a summary and that there is some sort of three volume document that goes along with this. Louie...

**MR. LOUIS AZZOLINI (MVEIRB):** The period for information requests has completed. The information request was specific to the environmental assessment reports submitted by De Beers and the purpose was essentially to garner or to get additional information as was necessary by the directly affected parties and interveners.

Certainly, people can put anything they want on the public registry at any time. If you want to put a flower on the public registry you can do that. In other words, there are really no limits to what you can put on there. If De Beers chooses to put additional information on the public registry later to supplement or augment what they have in their environmental assessment report they are at liberty to do that.

If people wish to submit anything on the public registry contrary or to provide an opposing viewpoint or to illuminate any particular issue, they are free to do that as well. The important aspect in this process is that there is an exchange of information and it does improve the overall project design so that environmental impacts are mitigated to the extent possible and feasible.

**MR. MIKE BELL:** Kevin, for clarification.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Well, I don't agree with everything that Mr. Azzolini said, but I just want the procedural concern on the record. I did want to ask De Beers, how much would it actually cost to implement the measures that they have outlined in here? Do they have a figure for that, and how much are they prepared to contribute towards the cost of implementing the measures that they've outlined in this document?

**MR. MIKE BELL:** How about if I let you ask that question in a minute when I just get a clarification, because it's a concern and I think we should all -- we will come right back to you. There is one other concern related to...

**MS. JANET HUTCHISON (NSMA):** I just would like to comment on Mr. Azzolini suggestion that IRs are not a possibility at this stage in the process. Just in fairness to everybody around the table, although the board's procedures are murky at best



sometimes, my reading of their documents are that IRs are a possibility throughout the technical phase of this process. The technical phase does not conclude until February 14<sup>th</sup>, and certainly it would be a discretionary decision that the board would have to make, but if parties feel that additional IRs should be submitted on new technical information, I would say that the board has discretion to issue those IRs. I don't think that everyone should be miffed, or I don't want anybody to feel that there is no option for that in the process.

**MR. MIKE BELL:** Louie.

**MR. LOUIS AZZOLINI (MVEIRB):** Thank you very much, Janet, that's an excellent point. I am remiss in not having said that, but then again I am not a lawyer. The board can, at any time, amend its procedures or rules if it believes it is necessary and contributes to the environmental assessment. So if the board believes that -- if you make a case to the board and the board says, "good idea" then we should receive these specific information requests.

The board will entertain them and issue them under its authority, or at least entertain them and then decide whether it wants to issue them under its authority. So thank you, Janet, for that. That is an important point.

**MR. MIKE BELL:** Thank you. Questions for clarification purposes only during the presentation.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Just in regard to that, the question is not to De Beers but to Louis. I am not exactly sure if I understand this. In regard to information requests, those information requests that you are talking about is information requests from De Beers. I understand that can be done throughout this whole process up to February 14<sup>th</sup>? Is that first part right? Do I understand that right?

**MR. LOUIS AZZOLINI (MVEIRB):** Yes, 80 percent right. You can ask information requests not only of De Beers, but any party to the environmental assessment. You can ask Kevin an information request. So your authority as a directly affected party extends beyond just asking De Beers questions.

With respect to February 14<sup>th</sup> at the conclusion of the technical component of the EA, there is opportunities to ask information requests up until that point, but officially the structured period, if you want to call it, to ask questions, finished about a month and a half ago.

So if you do want to ask more questions, you can certainly do that, but you've got to ask essentially the board. You have to say, "Board, I want to put these questions out, and I am asking your permission to do that." And if they say "Yes, you have very good reason for doing that, we will do that" then your questions will go out.

When they fall under the board's authority they carry a certain amount of weight in terms of requiring a response to them.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Yes, I understand that part. The other part that I want to ask is this: In regard to the documents that are being discussed which are not very good or good news for me, because I am the one who has to read those darn things and then have it translated and then have it analyzed and then have it workshopped into the community -- then going through it, and going back and forth on it...

That kind of document which is being discussed here, is there a time that they must be presented to us so we can review it before it is brought to a discussion phase? Or is that not to happen? Because it seems like this is exactly what has happened, and if that's the case, we are going to have a duty to consult.

**MR. LOUIS AZZOLINI (MVEIRB):** With respect to the documents that De Beers is preparing, they are doing good advanced planning preparation for a mine. So I think we have to recognize that. Now the fact that they have done this advanced work or are attempting to do it can't be ignored. They are trying to bring it forward as a point of information to assist the decision makers. We recognize that.

The information isn't on the public registry. Technically and legally, the only thing the board can make its decision on is what is on the public registry. But, as Gordon Wray said at the beginning of this session, don't get bogged down by the law, so to speak, just because of the quasi-judicial process. Engage in constructive discussion where you can.

So, I am not a lawyer. I don't have direct assistance at this point to legal counsel who can help me, and in some respects it's kind of good because I think it allows us some flexibility. Janet may not concur.

Having said that, I recognize that it is not -- it poses a challenge for you as well, and I think you have to use your own conscience and your own best judgment as to how you want to engage in this process at this point. I also recognize that attempts are being made to bring forward information that may assist you as individuals, as directly affected parties, interveners and public. But also, in your responsibilities that you may have to your respected communities of interest.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Mahsi, Louie. Then I just want to put on the record that Lutselk'e did not see those documents and did not go through them and we can't really talk about it. I just want to put that on the record.

**MR. MIKE BELL:** For clarification purposes only, Hyme and then David.

**MR. Hyme BENZO HAR:** Just a short comment, we'd like to note that this group like we have seen does not reflect any job opportunities or careers in secondary facilities. I don't see sorting or sorters in those jobs and I would strongly recommend and hope that De Beers does see itself as being a (inaudible) then just the mine and that in the planning of personnel and careers it would give also some manifestation of those intentions. Otherwise, it looks like a nice booklet. But I want it on the record

that this is missing.

**MR. MIKE BELL:** Okay. David.

**MR. DAVID GILDAY (ECE):** Mr. O'Reilly mentioned that there is perhaps a three volume series of publications to back this up. Will those be released or are they proprietary documents?

**MR. MIKE BELL:** John.

**MR. JOHN MCCONNELL (De Beers Canada):** I am not sure where he got that information. This is it. In his presentation, John talked about these volumes that have been prepared as part of the apprenticeship program. They are for people. To be made available to people so they can pass the trades training exam. But that's the only place I can see where the confusion has come from. There are no three volumes to back this up.

**MR. MIKE BELL:** Okay. Can we move to concerns now? Can we move to concerns? David. I am taking notes, this is audience participation time. Give me some kind of a lead here. David, we are on partnerships.

**MR. DAVID GILDAY (ECE):** We have to keep it going so he doesn't tell anymore jokes. From the booklet, I did mention this earlier but I'd like to raise it now, because it seems to be a fairly important piece and if I can read from the booklet about partnerships, it says "In the event that De Beers fails to secure assistance from government, we will still be in a position to offer employment for those who possess these qualifications in the employment fields that we need. The scope of our employment developments strategies would be reduced, however, and our focus would narrow to meeting our higher end requirements without providing many capacity building components to communities that we would like to see."

It goes on to say that De Beers believes that partnerships will work. I am very confident too that the GNWT will partner just about everywhere we possibly can. The dilemma is that the booklet -- the presentation, and it is basically what is in the booklet -- contains some terrific ideas, and very progressive training and development proposals, but as others have asked, what is the cost? Incredible costs. Things like the construction of community learning centres, huge costs. A variety of things.

The Government of the NWT has a financial issue of its own. We have a debt level that's nearing our maximum allowable by law. We do have a deficit issue. I am concerned that this statement at the close of the book is perhaps closing down the commitments before we even get into the game, just because of public financial situations.

Could you clarify for me, what is plan "B" if government can only come up with 50 percent of the contribution anticipated, has De Beers a 50 percent plan? If we can come up with 25, do you have your 25 percent plan? Because it is so important at

the beginning when we are talking about good corporate citizenship, which I believe De Beers is, that we can quantify where we will be in different scenarios.

**MR. MIKE BELL:** John.

**MR. JOHN MCCONNELL (De Beers Canada):** I think John pointed out a number of times in the presentation that this is a guide and it's a first step. Now we think that with partners we can make this a heck of a lot better program. That is not to say that we are not going to initiate many parts of it on our own. We realize there is a shortage of skilled people in the area and we are going to have to initiate programs, whether government assists or not.

The discussions we've had already with NWT, some of the federal government departments, they are quite excited about it. As John indicated, money is not the problem. It's getting these programs going and having some long-term commitment that is generated by them.

**MR. MIKE BELL:** David.

**MR. DAVID GILDAY (ECE):** As we've discuss in greater detail then, through the afternoon, perhaps the corporation would be prepared to speak to the initiatives that it will undertake alone then. Recognizing that there will be some need for people to go along.

You know, referring back to the comments this morning where there was suggestion that there was some softening out there, difficulty getting a handle on some of the items. That's what I would like to do in further discussion this afternoon. Get a very clear idea of the things that De Beers will do on its own and other things that will supplement the initiative as well.

**MR. MIKE BELL:** John.

**MR. JOHN MCCONNELL (De Beers Canada):** I don't think you are going to end up with a very clear idea at the end of the day today. I think that, you know, the commitment is to some longer term discussions, seeing how we can work better together and how the funding can be best spent, what both of us can bring to the table; Arcan can bring to the table; DIAND can bring to the table.

I don't think at the end of the day today you are going to have a clear picture of what De Beers is going to do and what the GNWT is going to do.

**MR. MIKE BELL:** Okay. Kevin. Concerns.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. First off, I guess I did make a statement earlier about there being a three volume back up to this. I got that from De Beers employee Judy Langford. I asked her if there was something more to this than this. She told me that there were three volumes.

Now, I note on page 22 of this document the following statement. It says, "The following plan is a summary of a comprehensive HRD plan that has been developed specifically for the Snap Lake Diamond Project." On page 47 of this document it says, "De Beers has documented a comprehensive human resource development plan."

I am just trying to sort out -- is this... I have heard Mr. McConnell now refer to -- that this is it. This document itself talks about how there is something more that has been prepared. What else is there?

**MR. MIKE BELL:** John.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess -- I think we are getting mixed up on programs and work that has gone on. I think as Louie mentioned, we are getting ready to have a mine at Snap Lake. So it's been in our best interests to start putting HR, human resource -- I wouldn't say plans together, but we do have volumes with job descriptions, for example. Work profiles.

I am sure you can go out to the Con Mine and you will find the same volumes. If you go to Ekati you will find the same volume. So there is a lot of work being done in the human resources area, but this is the resource, the guide that we have put forward for human resource development. Something that we can now take to the communities, take to the government agencies, take to the other private sector groups and start talking about partnerships.

**MR. MIKE BELL:** Okay. Kevin.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. I don't think I actually had a response to my question. This is a summary. Where is the full document? It says right in here that "The following plan is a summary of a comprehensive HRD plan that has been developed specifically for the Snap Lake Diamond Project." Where is the comprehensive HRD plan?

**MR. MIKE BELL:** John.

**MR. JOHN SIMPSON (Genesis Group):** There are no other parts, but there are other documents that relate to this. There is another document that we did that sort of is the -- that gives some background to this. Summary, maybe that is misworded in there. But there is another document that talked at length about the issues and so forth that we found in our consultations in the communities. It talks at length about the different approaches that could be... It is a document from Genesis Group to De Beers. It is not a public document, it is an internal document from us telling them, here is what we think you should do.

It goes on further and talks about -- it costs out some of the initiatives in here and it suggests that we should be able to negotiate partnerships and funding arrangements with a variety of other organizations. It wouldn't be a document -- I mean it's a flawed document, it is not a complete document. Not that we don't do

good work, but it is our internal document to De Beers. I think that is what we were referring to.

**MR. MIKE BELL:** John.

**MR. JOHN MCCONNELL (De Beers Canada):** If I could add to that. You know, we talked yesterday about our environmental management system. You know, that is being put in place to take us through construction and into production. We are also working on a safety management system that will encompass safety procedures for an operating mine. There are many of those types of things that are required for an operating mine that we have begun to work on, and I don't think that they have any real effect on assessing the impact of this project on the environment.

**MR. MIKE BELL:** Let me just try and summarize at this point what I am hearing. There is a lot of data that has been developed in terms of developing these types of things. There have been some internal documents, basically, that have been developed so there is a good deal of work that has been going on. But there is no human resource plan as such in terms of some other document that this document summarizes, because basically this is a work in progress. Is that what you are basically saying?

**MR. JOHN MCCONNELL (De Beers Canada):** I don't think it is quite that simple. I mean, there are a lot of documents. You know, we contracted Genesis for I think six or seven various projects that are all related to human resources. There would be a volume that is three inches thick that will be on policies and procedures for the mine operation related to human resources. Things like how many days before they put in their application for vacation. All those kinds of operating policies that all mines have, all businesses have. Those are the types of volumes that we are talking about.

**MR. MIKE BELL:** Okay. Kevin.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks, Mike. I guess I need to preface what I am going to say. I don't -- I think there is some value to what De Beers has generated here. I think there are some good ideas. I am not trying to trash them on any of those accounts and I want it understood very clearly that I think there is some value in this and I think there are some good ideas in here.

I guess I am more confused than ever now. Right in this document it says that it is a summary, that they have developed a comprehensive HRD plan, and then I have heard the response now that there is no such thing as a comprehensive HRD plan that they've developed. There are some other background materials that might contribute to whether it might be evolving in some way or whatever.

Then I guess I would submit that you may wish to go back and correct the statement that's in here, because someone like me who reads this obviously comes to a different conclusion. If this is not the case, you probably will need to go back and correct this.

I want to move on to one other question that I had asked previously. Has DeBeers costed out the initiatives that they propose under this document?

**MR. MIKE BELL:** John.

**MR. JOHN MCCONNELL (De Beers Canada):** Some of the initiatives we have costed out and some of the initiatives like the apprenticeship one, certainly that is almost complete now. Some of the programs we plan to initiate next year we've costed out just because we needed to for budgeting purposes.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you. Can DeBeers undertake then to provide the board with information on costs that they have put together on programs that they have outlined here?

**MR. JOHN MCCONNELL (De Beers Canada):** To what benefit in assessing the environmental impact?

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Well if DeBeers wishes to put this forward as a way of mitigating socioeconomic effects or impact from its project, I think the board and the parties to this proceeding deserve to know how much these programs are going to cost.

Then of course, my next question is what is De Beers prepared to contribute to those programs? I heard Mr. Gilday, a representative of the GNWT talk about how their government is stressed, they don't perhaps have the financial capability to carry out some of these things, so I think the board needs to understand what the potential success is going to be of some of the programs that are being put forward in here as mitigative measures.

So, can De Beers provide the information on the costs of these programs to the boards and to the parties in this proceeding?

**MR. JOHN MCCONNELL (De Beers Canada):** I guess we will take that under consideration.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** I guess my next question, of course, was what portion of this or what is DeBeers prepared to commit to to carry out these programs, but if we don't know how much they are going to cost in the first place it is very hard to know what DeBeers commitment may be, but I'll ask the question anyways. What is DeBeers commitment to actually carry through on any of the programs that are outlined here? What are their financial commitments to do that?

**MR. JOHN MCCONNELL (De Beers Canada):** We haven't identified the total financial commitment. As I've said, we've budgeted some of the items in detail. Then, the next step is to talk to government. They certainly have a much better idea of cost in some of these areas than we do, and we'll be partnering and working together with them to come up with programs and the funding to go along with those

programs.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks, I had one other specific question around this document and then I think I need to pass it off to somebody else, because I want to go back to some of the issues that I raised this morning and perhaps some new ones as well.

On page 6 of this document, in the second column there at the bottom of the page, I will just read this out quickly. "De Beers also balances its commercial success with social responsibility. Since the early 1970's, the company has administered a fund to direct social investment spending in South Africa. Since 1998 this has been known as the De Beers fund. Each year this fund supports more than 500 ventures including practical skills training, small business incentives, job creation, youth development, environmental conservation and community welfare projects."

Has De Beers contemplated setting up a similar fund for its projects here in the Northwest Territories?

**MR. JOHN MCCONNELL (De Beers Canada):** Yes, it is contemplated that once we have operating mines in Canada making a profit that we will set up a similar fund here.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Can De Beers provide any detail on what this fund -- how much is going to be in there, what sort of programs it may support, how soon it will be set up and so on?

**MR. JOHN MCCONNELL (De Beers Canada):** I guess not a lot of thought has been put into that. We would foresee it being something similar to what is being done in South Africa in terms of the money that goes in and the programs that are supported. I think we all know there is certainly the NWT has some different characteristics than South Africa, so the programs would be similar but be different.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. That's it for now, Mike.

**MR. MIKE BELL:** Rachel, please.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** My concern, the issue that I had this morning was the consultation with community people. We have people who live in N'Dilo and in Dettah and we also have some people who live in **Enodah**. If there was 11 times De Beers went to our people and talked with them, either at the site visits or with individuals, my issue would be that there were 11 times those kinds of talks that were held is not enough.

What would have been ideal is De Beers to come to the communities to meet with the seven groups of people that we have that work for our community. We met with De Beers on November the 20<sup>th</sup> and that was with just the Land Environment Committee members. We asked for information on the development of the mine and



that was the first time we saw those booklets, but we never had a chance to go through it or read it.

We have had the social committee, a youth and recreation committee, a housing committee, an elders committee, we have the chief and council, we have also an education committee. It would be nice for people -- say for example the housing committee -- to know about the information on how they are going to develop this mine and how it's going to run, and when it is going to get going. That way if they know that a member is working there and they've got a full-time job, they can kind of foresee in the future what housing needs we would need.

So consultation was not complete. That was my issue. Thank you.

**MR. JOHN MCCONNELL (De Beers Canada):** Rachel is right. We would like to have had many more meetings with the Yellowknives Dene. As I said this morning we had informal meetings with some of the leadership and we've made many requests to meet and to have community meetings with the Yellowknives Dene, but we can only assume due to capacity problems the Yellowknives Dene have not been able to accommodate us until we had a very good meeting with Rachel and the Land and Environment Committee two weeks ago.

**MR. MIKE BELL:** Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I will accept that answer for now. I just think that we could get some more information going a little bit further. I was just wondering also if we could foresee maybe another meeting again with other committees. I was just wondering if that was possible.

**MR. JOHN MCCONNELL (De Beers Canada):** We would welcome the opportunity.

**MR. MIKE BELL:** Okay. David, you had a comment. Is it to this issue? And Bob had a comment. Is it to this issue? David.

**MR. DAVID GILDAY (ECE):** It is a follow up to the De Beers fund issue. We do note that the De Beer's fund in South Africa, it states somewhere is just over \$3 million. I am making an assumption that is on an annual basis. Can De Beers inform the group, what percentage of gross annual resource take this represents? What does this represent in terms of a per capita investment by the company? I see in the book -- I hadn't noted that before -- that there is a list of projects that you undertake. I am wondering if the per capita rate in South Africa would be reflected here or would De Beers be contemplating a different rate?

**MR. RICHARD MOLYNEUX (De Beers Canada):** The usual method of calculating this type of social investment is related to the percentage of dividends. When De Beers was a publicly listed company we were certainly running at well above -- I think it was close to double -- what the internationally accepted guidelines are for investing a percentage of dividends into this type of fund.

In terms of answering the rest of your question, relating that investment level to per capita, that information could obviously be calculated but we certainly don't have it available at the moment.

**MR. MIKE BELL:** Okay.

**MR. DAVID GILDAY (ECE):** Will De Beers, will the company be implementing it on the same basis, on a dividend basis for Northern Canada? Will that be against De Beers Canada? I am assuming it is a different company, I don't know your corporate structure.

**MR. RICHARD MOLYNEUX (De Beers Canada):** I am pretty sure that we would be aiming at the same investment levels as we are elsewhere. Although elsewhere is looking at dividends and we would not be declaring dividends at this stage -- we are not a listed company -- but the investment would certainly be of the same order of magnitude relating to things like profits.

**MR. MIKE BELL:** Okay, to this question, Bob.

**MR. BOB TURNER (NSMA):** This is comment towards the presentation, I guess in particular to the comments on partnerships and the listing of the priority as they were listed. They were listed as communities and then aboriginal groups. I guess in conjunction with the concerns from Florence and Rachel, I think as far as we, the NSMA are concerned, the priorities should be going to the aboriginal groups that are directly affected with regard to training opportunities and educational opportunities. We did not see much of that opportunity in the first diamond mine where they aren't very open in determining the success rate of how the aboriginal groups are benefiting or whether or not they are being negatively impacted.

We worked a little harder to try to have the success in the Diavik project as far as tracking success of benefits towards the aboriginal groups and I don't think we've determined whether or not that is really working there yet.

I think we would like to see some sort of a process where you are going to have the aboriginal groups as a priority and be able to track the individual groups as to whether or not there is a success rate or not? Will that be able to be incorporated into that training program?

**MR. JOHN SIMPSON (Genesis Group):** Yes, Robert, I think that is the priority as well, the aboriginal groups in the primary communities including the North Slave Metis. As far as tracking, I talked about and I have here actually just the draft of our information system to track all of these projects and all of the participants and where they are from and success and cost and partnerships as I alluded to.

The social impact costs in the communities, we've talked about information systems. Perhaps there is a lack of information out there right now. I know that government is working on having better information systems and as well the other mines are doing that. So I would hope that all together our information systems and theirs will be

able to tell you and everybody else specific successes and rates of success and that kind of stuff for aboriginal people as well as northerners and others.

**MR. MIKE BELL:** Okay. We had another question dealing with consultation with the North Slave Metis Association and how it was done. I don't know which one I am talking about, but it doesn't matter. Janet.

**MS. JANET HUTCHISON (NSMA):** Are you referring to the question where we were just asking who the consultant had met with in the NSMA? When those meetings occurred, and were the meetings documented and documentation provided to the North Slave Metis Alliance for review for accuracy?

**MR. PETER HOMANA (IER Terriplan):** I presume that question is intended for me. We had several meetings with North Slave Metis, I can go to my notes but just going back in my memory: In 2000 we met with Bob Dowdall and Rick Anderson I believe it was. At that time they were doing a study of the North Slave Metis Membership and basically a community profile. We were told that when that study was available it would be provided to us. We haven't received as of this point.

We have met several times, either myself with someone from De Beers or previously Winspear, or Tim Rochon -- we have met on four or five occasions that I can recall. We met with Clem Paul at least two or three times. I think we met with Bob a couple of times. Information that we identified in terms of issues and concerns were sent back and comments provided to us.

Once we were developing broadly impact development measures, Paul and myself went through the structure of the measures that we were proposing and got some comments and feedback from him. That is going from memory, there may be one or two other meetings that we may have had that I can identify from going back through the records.

**MR. MIKE BELL:** Okay. Janet, my notes were a bit confused. There were a number of things that were coming from that side of the table. Did we cover the concerns that you've got?

**MS. JANET HUTCHISON (NSMA):** Mike, I think Bob still has a couple of outstanding matters for the afternoon.

**MR. MIKE BELL:** Bob.

**MR. BOB DOWDALL (NSMA):** I believe they were in regard to monitoring, and monitoring the effects on the different aboriginal groups, I guess. And the impacts, predicted impacts. We don't believe, I guess, that it was done adequately.

**MR. MIKE BELL:** De Beers.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess I am a bit confused. Those impacts from the mine, the proposed mine, or what we've done to date, or what's

been done in relation to Ekati and Diavik?

**MR. MIKE BELL:** Would you clarify the question or concern, please?

**MS. JANET HUTCHISON (NSMA):** The concern relates to the fact that in the socioeconomic analysis there hasn't been any prediction of specific impacts on the NSMA community. Accordingly, we are wondering how De Beers can provide some assurance that their mitigation, their proposed mitigation programs or procedures are going to actually deal with the impacts on the North Slave Metis community if they haven't assessed the specific impacts to the community.

**MR. PETER HOMANA (IER Terriplan):** In the environmental assessment, the social impact part of the EA, we do have a section on each primary community in terms of issues and concerns, including the North Slave Metis. We have summarized and aggregated those into one common set for purposes of the analysis. As part of our review of issues and concerns, we reviewed "We Can't Live Without Work" which I think has about 80 recommendations or suggestions. I am cross-checking that. I think the impact management measures that we proposed and the analysis has in fact addressed over 50 of those.

The concerns that we got from the communities, there is a fair amount of consistency or similarity in the concerns. Obviously there are some things that are different in each community. There will be differences depending on the individual community locations and their issues and concerns.

The approach to the impact management measures to address community concerns was to identify the range of things that DeBeers could do to provide opportunities to try and address issues. Those we discussed with individuals and in some cases larger groups within the communities. I mentioned the general structure of the impact management measures we proposed that I personally did discuss with Mr. Paul when we were developing that material.

**MR. MIKE BELL:** Supplementary. Robert, do you have another issue?

**MR. BOB DOWDALL (NSMA):** Not right now, we will have some more tomorrow.

**MR. MIKE BELL:** Greg Empson.

**MR. GREG EMPSON:** Some specific questions, initially for DeBeers and second for Genesis if we could. Is DeBeers presented to enter into any agreements providing for specific targets for employment rates for aboriginals in the north?

**De Beers:** As we discussed this morning, we don't want to enter into specific targets for employment but they are being discussed in socioeconomic agreements with the GNWT in partnership with the aboriginal communities. They are also being discussed in IBA negotiations.

**MR. GREG EMPSON:** So that's a maybe. Is DeBeers prepared to commit to the

development of the secondary diamond industry related to diamond processing in the North?

**MR. JOHN MCCONNELL (De Beers Canada):** I am not sure what you are looking for in terms of commit. We certainly support the GNWT's efforts in building the secondary diamond industry. Efforts in that direction on that part will be part of socioeconomic discussions over the course of the next few months.

**MR. GREG EMPSON:** Have there been any programs discussed or looked at regarding compensation for hunting or fishing that may be affected by the location of the mine and any lost opportunities that may result as a result of a disruption of the normal migration patterns?

**MR. JOHN MCCONNELL (De Beers Canada):** No there have not.

**MR. GREG EMPSON:** Is it anticipated that there will be?

**MR. JOHN MCCONNELL (De Beers Canada):** I would suggest that it would certainly be considered if it was brought up as part of IBA negotiations.

**MR. GREG EMPSON:** Lastly, if I could ask, what repercussions or consequences does DeBeers anticipate or predict should DeBeers be unable to meet their commitments or any of the targets that they have set out in the submission?

**MR. JOHN MCCONNELL (De Beers Canada):** I think we need a little more clarification on that, Greg.

**MR. GREG EMPSON:** Well what I am suggesting is that DeBeers is making certain commitments before these hearings, and my question is whether they anticipate if they are unable to meet those commitments over a five-year period, do they anticipate that there will be consequences flowing from their inability to meet those commitments?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Can you provide an example, Greg?

**MR. GREG EMPSON:** Well is DeBeers Canada prepared to enter into bonding agreements where they would be penalized should they be not able to meet their commitments?

**MR. ROBIN JOHNSTONE (De Beers Canada):** An example of one of the commitments you are discussing?

**MR. GREG EMPSON:** Hiring targets, training targets, training commitments, educational commitments.

**MR. ROBIN JOHNSTONE (De Beers Canada):** This is why I asked for examples, because in both cases we comment in the environmental assessment that we are

committing to hire as many northerners and aboriginals as possible, so there is the commitment. So I guess further clarification is necessary, because our target is as many people as is possible.

**MR. GREG EMPSON:** So in the absence of specific targets, you are asking us to believe that we should accept your commitment "as many as possible" without any penalty or any sanction being imposed should that commitment not be up to what might be reasonable under the circumstances? And if I can be more specific, we are suggesting -- or you are suggesting that if northern hiring commitments constitutes five people over the space of five years, that that may very well be reasonable under your definition.

-- Portion Not Recorded

I suppose this does imply a presentation of periodic progress reports, perhaps to the board and certainly the general public beyond that on just how this is all going. Probably also, it might also sort of require the identification of real obstacles.

Like, what if some of the partners don't cooperate and aren't appropriately resourced, and so on. You are into a very big undertaking here. What it suggests is that a year from now, maybe even less, saying "We've done this and this" Maybe three or four years down the line... sort of a commitment to periodic reporting. Not necessarily by DeBeers, but by this thing you sort of have to call an emerging partnership that works to the betterment of young people and elders and so one. Everybody in the NWT because of the mining here.

I think that bears on the other thing I was going to raise: sustainability. What do you do -- you are dealing with finite resources here. They run out. Maybe they don't. Maybe 50 years from now we will still be mining diamonds, but you are tying a whole lot of development, a whole lot of human capacity, human resource development to a rather limited resource. At least that's how people that aren't familiar with the resource see it. Do you have anything to say about that?

**MR. MIKE BELL:** John.

**MR. JOHN MCCONNELL (De Beers Canada):** Was that a question?

**MR. ED WEICK (Consillium/Gartner Lee):** It was both a question and a comment. There was a question implicit in the comment, I suppose.

**MR. MIKE BELL:** Would you unravel it a little and answer the question part that was inside the comment there, John?

**MR. JOHN MCCONNELL (De Beers Canada):** I think we might have a better discussion over beer on that one. I am not sure there was really a question there, Ed.

**MR. ED WEICK (Consillium/Gartner Lee):** I am not sure it was really a question

either, but when one looks at a tremendous plan, a document like this, and ties it to a finite resource of limited duration, a finite operation - 20 years, 25 years even and so on. I can remember 20 years ago. I can remember 25 years ago. I was up here at the time. It was just yesterday.

Now, how is all of this going to get done, and beyond that, how is all this going to be sustained is the question.

**MR. JOHN MCCONNELL (De Beers Canada):** I don't know if I am going to answer your question. I agree with you, it is a heck of an undertaking. I am not sure of how aware you are of the work that Diavik has been doing, but they've been doing a lot of these same things.

We've talked about partnerships with government, we've focused on that today because the government people are here. But we see Diavik and BHP being a key part of those partnerships as well. We hope to piggyback on some of the programs that they have initiated and hopefully they will get on board with some of the programs that we hope to initiate, so it won't be just DeBeers leading the way here. It is quite a few groups all together.

**MR. MIKE BELL:** We have a clarification from Louie.

**MR. LOUIS AZZOLINI (MVEIRB):** No, go ahead Rick. My point will follow up on yours. It is a question, not necessarily a point of reference.

**MR. MIKE BELL:** Just a minute. I have a small problem that's arisen. Kathy has to go and she's asked a couple of questions about medical care and this type of thing. I wonder if we could just pause this conversation for just a minute, let Kathy ask the question, and then after Ed's question, both Janet and Florence have questions. So can we hear from Kathy first? Is that all right?

**MS. CATHY PRAAMSMA (HSS):** Thank you for accommodating me. I just have actually a couple of questions, maybe a comment first that the Department of Health and Social Services does welcome the opportunity to work in partnership in a number of the initiatives that you have listed in your human resources development book, are actually fairly aggressive and we are pleased to see them.

What I would like to know is on the environmental assessment document itself, it speaks to the role of medical services onsite. I would like to know, first off, if in fact there will be 24/7 medical coverage onsite, in particular if in fact the nurse is medevacing someone from the site, will there be a back up.

And additionally, you make reference in the environmental assessment to a term which I am not familiar with, but it is regional medical service groups, so I was hoping you could provide some clarity around that.

The other question is, there is also reference to something referred to as a physician assistant, which in the Northwest Territories would be an unfamiliar

profession. So I am not sure of what you are referring to. Thank you.

**MR. MIKE BELL:** Sounds like something Australian. DeBeers.

**MR. ROBIN JOHNSTONE (De Beers Canada):** This is going to be a two-stage response. Thanks very much for your comments on working in partnership, that's fantastic. With regard to medical services, they will be available 24/7 onsite. My colleague John Glennan will comment on what a physician's assistant is.

With regard to the comments on the medevac, would medical personnel stay onsite. That is the case. It is our understanding that the GNWT or the Stanton medevac policy would essentially result in a medevac being dispatched from Yellowknife with medical personnel to pick up the injured party and return to Yellowknife with that person, so there would be continual coverage in the event of a medevac.

On this issue of regional medical service groups, perhaps there's been so many reorganizations in the Health and Social Services that we are not quite sure who we are talking about. I am being facetious there. I can't comment on who is specifically being referred to, Cathy. I will get John Glennan to comment on the physician assistant.

**MR. JOHN MCCONNELL (De Beers Canada):** Cathy, the physician assistants that were referred to we have contracted through Medic North. They are ex-army medical personnel and I am not quite sure what their actual qualifications would be other than they can do everything up to giving shots and what not. You might want to follow that up with Sean from Medic North with regard to what their specific qualifications are.

**MR. MIKE BELL:** Cathy.

**MS. CATHY PRAAMSMA (HSS):** Absolutely, I will follow up. I just wanted to go on record that there is legislation around the practicing of any form of medical services in the Northwest Territories and those rules and legislative procedures must be followed and they must be duly registered. So in this particular case, something referring to as a physician assistant is not recognized under our legislative body.

**MR. JOHN MCCONNELL (De Beers Canada):** Thank you, Cathy. We will follow up on that.

**MR. MIKE BELL:** Loretta, did you have a comment on that?

**DR. LORETTA FOLEY (ECE):** First of all I'd like to say, speaking as the deputy minister of my department, I would like to say very clearly that Education feels very strongly that we want a positive relationship with DeBeers. We are excited at possibilities. We believe that DeBeers, we hope that DeBeers will see their project as a northern legacy.

One of our staff mentioned that we have severe financial challenges coming up, so



in terms of a partnership we certainly want a partnership. We want to be talking to you lots. We do though have to raise the flag of our finances. But I think you are wise in thinking and planning the human resource processes that you have in place.

Any nation or any society is only as good as its people, so you are starting with people and we commend you for that. I am sure that you are aware that our student success is relatively low in the Northwest Territories compared to the rest of the country, and indeed many parts of the world. That is a major concern for us.

We are hoping that you will partnership with us in terms of our student success. Twenty percent of our students go on to Baccalaureate degrees, and yet we have to look and we are looking at our pathways that only support that 20 percent and not the 80 percent.

So the pathways for all our students is one of our achieved goals. We also would like to mention that not only would we like support for our pathways, for our student success, but our aboriginal languages are going at 1 percent a year. That is a major concern. We would love some supports in sustaining and maintaining and revitalizing our official aboriginal languages.

Lastly, one of our concerns would be the need that we have for support for our families, particularly when one member of the family has gone to the mine. We have noticed already, we have heard feedback that families are feeling missed. So we thank you for your initiatives and we want to be a partner with you to the very best that we can. Thank you.

**MR. MIKE BELL:** Thank you, Loretta. I interrupted Ed. There was a supplementary to Ed's comment from Janet, and then there was a comment from Florence on the same areas. So if we can take it in that order please? Ed, if you would continue.

**MR. ED WEICK (Consillium/Gartner Lee):** The only thing I still want to say is that the expressions of wanting to partner are very, very good and well-worth hearing. We all know what a messy world this is and how difficult it is to actually arrange partnerships that work, that sort of flourish into something longer term and really fix things up. In health, in education or in whatever.

I guess what I'd almost like to see is a plan "B" here, something to sort of back up. Like, what if you can't somehow really develop an effective partnership in Health? What if you can't in Education? What if you can't in other areas? What then, what contingency plans might DeBeers have in situations like that.

Say the world doesn't turn out quite like this document would like to see it turn out.

**MR. JOHN MCCONNELL (De Beers Canada):** I think that's good advice, Ed. Thank you.

**MR. ED WEICK (Consillium/Gartner Lee):** John, it's a question. If I may, I don't want to put you on the spot. I know you don't have contingency plans, but I think

one should think of how messy a thing this could be, and how great a thing could be, and to try to sort of minimize the messiness and greatly increase the good side of it.

**MR. MIKE BELL:** I think you had a question and you turned it into a comment. Basically, John, do you want to quickly comment.

**MR. JOHN MCCONNELL (De Beers Canada):** I think that is the entire purpose of this.

**MR. MIKE BELL:** Janet.

**MS. JANET HUTCHISON (NSMA):** We were having a discussion around the table about timelines or possible steps in the implementation of the initiatives and programs we are discussing today. Earlier on in the technical sessions DeBeers had given us a commitment to provide basically a work plan tied into their mine plan to show the planning and implementation stages of I think it was the wildlife and fisheries monitoring and mitigation programs.

I am wondering if they would do that also, incorporate the stages of planning and implementation of the programs and initiatives we are discussing today.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess I am a little scared after today to bring anything forward.

**MR. MIKE BELL:** So what was the answer? Was it a yes, a no? Is it a maybe or a "we're thinking about it" or what?

**MR. JOHN MCCONNELL (De Beers Canada):** It's a maybe.

**MR. MIKE BELL:** Okay. Florence.

**MS. FLORENCE CATHOLIQUE (Lutselk'e Dene First Nations):** Lutselk'e Dene First Nation. Don't be afraid. In regard to partnership, I just want to talk about that briefly. Lutselk'e does believe in partnership, but it is very costly for us to do so. If we were to compare ourselves with the other groups that are closer to and are in Yellowknife.

And so partnership to us means something totally different than what it would mean here. We have had partners. We always believe that we always have had very good partners and we have been involved in agreement developments where we've had numerous partners who discuss the same sort of thing, and yet when it came to implement the same kinds of things that we wanted with our partners and industry, all of a sudden, and I liked what Ed said there: the element of the wolf seems to come in, looking for the chicken, what bigger piece can I get sort of thing. You forget that you had a partner all of a sudden who is not the same anymore. They are not in the same standards anymore.

So the whole partnership idea just sort of slowly flies away, or in this case sometimes they don't. I need to know, because partnership also deals with money and I keep hearing the reference to the socioeconomic agreements. In the socioeconomic agreements, which is a partnership also, the funding to implement those -- and I hear government saying quite loudly that they don't have the money -- in the other two agreements that we have been involved with with them, and the other partners, it hasn't gone anywhere because of the money.

And yet when there is money there, we get into this chicken/wolf thing. So the community who is the directly affected community does not get anything. I want to make that clear, that there are other ways that this could be done. Recently in the last week and a half with the monies from another mining company, we had the opportunity to visit the northern communities and look at the Northern Saskatchewan Working Group. There they have a set up that is totally different from the two that I am involved in, but the funding arrangement is done a little bit different there, and the commitment of the monies that come out of resources through the governments to the aboriginal groups are totally different.

I think my question is, how is that going to be worked out so that we don't get into that same kind of situation and that we do have a plan where we are going to implement those things and they are going to be measurable? What is the mechanism to measure those successful or non-successful things? That is a question to DeBeers.

I also have a question because of the whole discussion of partnerships. I want to know, what kind of partnerships has DeBeers gotten into with governments? And I mean the federal or territorial government. What kind of partnerships have they gotten into and how successful where they?

Everyone is assuming that once you are a partner you are supposed to be elevated to something much better, and I want to know if that has happened. And, if there was any, I want to know if they were successful and how were they implemented and measured?

**MR. MIKE BELL:** DeBeers.

**MR. JOHN MCCONNELL (De Beers Canada):** I have also heard good things about what is happening in Northern Saskatchewan, Florence. Sometime I would like to hear a little more description about how that funding works.

I guess, you know, in terms of partnerships, John mentioned the only one that has been initiated to date, and that is the apprenticeship support materials which is partnership of DeBeers, the NWT government, HRD or the federal government, DIAND, the federal government, Skills Canada, Aurora College and the Genesis Group.

I think that has been a very successful partnership. We've produced a very successful group of books that are now actually in demand here across the

Territories. There has been interest in Nunavut getting involved in it, and I think other regions of Canada have called asking about it as well.

The other initiative that has I guess paid benefits, but mostly for Diavik, is the Mine Training Committee that we talked about, that DeBeers is partnering in as well. Again, that is a partnership of private companies: BHP, Diavik, DeBeers as well as numerous government agencies. That group has put on a number of very successful training programs over the last few months, particularly their mill operator training program in conjunction with Aurora College.

**MR. MIKE BELL:** There was one other question about evaluating partnerships. How do we evaluate the success or failure of partnerships?

**MR. JOHN MCCONNELL (De Beers Canada):** Well, as John indicated in his presentation, one of the elements that we've asked Genesis to develop is a database that will track all these partnerships, track all this funding, track individuals that go through the process so that annually we can publish something that will measure us from year to year so we can talk about our successes.

**MR. MIKE BELL:** Okay. I need some guidance. It is ten minutes to five. Still on my list are Hyme, David, Kevin and I would imagine Rachel. Did you want to raise another issue? Okay, Rachel.

The choices seem to be -- we also wanted to provide a summary of some of the things we've dealt with. The choices at this point seem to be to stay after 5:00. Choice two seems to be to move some things to tomorrow morning. What is the will of the group at this particular point?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** This is going to be the first time, probably, that we have stayed quite late. We haven't done that everyday so it won't hurt to stay a little bit longer, because I hear tomorrow we are moving into another location. It might change things, the pace might change on us tomorrow.

**MR. MIKE BELL:** Okay, other comments? What do you want to do? Tim.

**MR. TIM BYERS (Yellowknives Dene):** I would also like to add that there is a carryover from yesterday that I would like to bring up.

**MR. MIKE BELL:** Other comments. What are we going to do? Kevin.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** I have to leave in about 15 minutes, I am not available this evening. I have to take my kids to Tae Kwon Do.

**MR. MIKE BELL:** My sense at this point is that we better try and move the rest of the issues to tomorrow morning. I know that this might not please everybody, but we simply have too many issues to basically get through. I think we can probably fit them into the schedule tomorrow morning.

What I would like to do, however -- so I am offering that as a suggestion. Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I think the three people you named just had questions that needed answering. I think we could finish that by 5:30.

**MR. MIKE BELL:** Well I think the question is not 5:30, the question is 5:00 at this point. It is ten to five now. Hyme, comment.

**MR. HYME BENZOCHAR:** I just wanted to remark that we have very serious issues to raise up, and we will probably need from 15 to 20 minutes. I just wanted to say that in advance.

**MR. MIKE BELL:** So I think basically we better deal with it tomorrow if we are going to deal with it, because we just don't have that time right now. That's my sense. Okay. At this point, since we still have ten minutes, my sense of the room is that people would rather to cut it at this point and continue it tomorrow morning. John.

**MR. JOHN MCCONNELL (De Beers Canada):** Could I suggest that we start at 8:30 tomorrow, and start on time?

**MR. MIKE BELL:** Your facilitator for tomorrow says that he would be quite happy to do that. Can we start at 8:30? We did that earlier in the week last week. David.

**MR. DAVID GILDAY (ECE):** I would certainly agree with John to start on time at 8:30 and perhaps we can push back into the day a little bit and not feel restricted when we have only a partial day tomorrow, assuming people aren't catching planes of course.

**MR. BILL KLASSEN:** Perhaps Louie can help us with that particular point. My impression was the day was shortened tomorrow because some people were leaving on aircraft out of here.

**MR. LOUIS AZZOLINI (MVEIRB):** I wish I could say that I had that much forethought in planning, but it just sort of happened that way. If there are people that are leaving tomorrow, I would leave it to the facilitators to accommodate their respective needs, and the needs of the group with respect to the timing tomorrow as well. If it runs later I am quite fine, but I think we have to respect people who are traveling as well.

**MR. MIKE BELL:** We will start at 8:30 tomorrow morning. I think we will terminate it at this point. It is at the Royal Canadian Legion. People can basically tell you where that is. I would just like to say a personal note. I would like to thank people very much. This is my last day. When you are doing this, I will be on a plane to Nunavut.

**MR. MIKE BELL (Facilitator):** I didn't want to add this, but I am going to a place where they enjoy my jokes, so thank you very much to everybody. Thanks.

-- ADJOURNMENT



**MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD****De Beers Snap Lake Technical Sessions****December 6, 2002****Yellowknife, Northwest Territories**

**MR. BILL KLASSEN:** ...through all of the items, and there were a few left over from yesterday. As everyone is aware, this is the last day of the technical sessions which have been going on for two weeks. My name is Bill Klassen and I'll be facilitating the session today. As has been the practice, we'll go around the table with introductions. I think everyone that's here was here yesterday, but just to refresh everyone's memory as to who is sitting where. So I'll start on my left here with Louie.

**MR. LOUIE AZZOLINI (MVEIRB):** I'm Louie Azzolini with the Mackenzie Valley Environmental Impact Review Board.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Kevin O'Reilly, Canadian Arctic Resources Committee.

**MS. HEIDI KLEIN (GARTNER LEE):** Heidi Klein with Gartner Lee, working for the Impact Review Board.

**MR. ED WEICK (CONSILLIUM/GARTNER LEE):** Ed Weick with Consillium and Gartner Lee, working for the board as well.

**MR. ROY ELLIS (ELLIS CONSULTING):** Roy Ellis, Ellis Consulting, working for the Mackenzie Valley Board.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell, DeBeers Canada.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnston, DeBeers Canada.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Richard Molyneux, DeBeers Canada.

**MR. BILL KLASSEN:** Could the other DeBeers representatives introduce themselves please?

**MR. JOHN BERGELL (Golder Associates):** John Bergell, Golder Associates, representing DeBeers Canada.

**MS. BETTY BESWEICK (Golder Associates):** Betty Beswick, Golder Associates, representing DeBeers Canada.

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**MR. PETER HOMENUCK (IER Terriplan):** Peter Homenuck, IER Terriplan, representing DeBeers.

**MR. JOHN SIMPSON (Genesis Group):** John Simpson, Genesis Group.

**MR. JOHN GOYMAN (De Beers Canada):** John Goyman, DeBeers Canada.

**MR. TIM RACHON (IER Terriplan):** Tim Rachon, IER Terriplan, representing DeBeers.

**MS. ANNA OLSON (IER Terriplan):** Anna Olson, IER Terriplan.

**MS. COLLEEN ENGLISH (De Beers Canada):** Colleen English, DeBeers Canada.

**MS. LISA BEST (GeoNorth):** Lisa Best, GeoNorth.

**MR. BILL KLASSEN:** Thank you. Tim.

**MR. TIM BYERS (Yellowknives Dene First Nation):** Tim Byers, consultant for the Yellowknives Dene Land Environment Committee. Greg Empsom is also here representing the Yellowknives. We are expecting Rachel Crapeau and members of her land environment... land and environment committee for the Yellowknives Dene to also be here later. Thanks.

**MR. DAVID ELLIOTT (GNWT):** David Elliott, consultant for the GNWT.

**MR. Hyme BENZOHAR:** Hyme Benzohar, of Taitlim Diamond Consultants, representing the Department of Resources, Wildlife and Economic Development of the Government of the NWT.

**MS. TARA NAUGLER (ECE):** Tya Naugler, GNWT, Department of Education, Culture, and Employment.

**MR. DAVID GILDAY (ECE):** David Gilday from the Department of Education, Culture, and Employment.

**MS. DEANA TWISSELL (HSS):** Dina Twissell, GNWT, Health and Social Services.

**MR. ANGUS MACKAY (HSS):** Angus MacKay, with the Department of Health and Social Services, GNWT.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, North Slave Metis Alliance.

**MR. BILL KLASSEN:** Thank you. I wonder if the people sitting in the chairs could also move forward to a microphone to introduce yourselves, just so everyone's aware of who's in the room.

**MS. KAREN BROWN (Yellowknives Dene First Nation):** Karen Brown, Yellowknives Dene First Nation.

**MR. JASON MCNEILL (RWED):** Jason McNeill, RWED, GNWT.

**MR. MARTIN IRVING (RWED):** Martin Irving, RWED, GNWT.

**MR. CARL MALMSTEN (RWED):** Carl Malmsten, RWED, GNWT.

**MS. LINDA DORINGTON (De Beers Canada):** Linda Dorington, DeBeers Canada.

**MS. LESLEY GREEN (Golder Associates):** Lesley Green, Golder Associates.

**MR. RICK SCHRYER (Golder Associates):** Rick Schryer, Golder Associates, representing DeBeers Canada.

**MR. ANGUS MARTIN (Yellowknives Dene First Nation):** Angus Martin, Yellowknives Dene First Nation.

**MR. BILL KLASSEN:** Okay. Thank you. The... the process that we'll be following today again is similar to what we've done the last two weeks. I'll give a brief recap of what transpired yesterday. Then, when we move in to today's topics after we finish with yesterday's topics, DeBeers will be providing a presentation on cumulative effects, and then we'll go around the room and identify issues or concerns that people may have with that topic. We'll then, once we have that list of issues and concerns, come back around and discuss them, and then, at the end of the discussion, try to come to some determination as to whether or not those issues have been resolved.

As far as the overall process is concerned, at the end of today, someone from the board will provide us with advice as to how the process will proceed from there, but as I understand it, these discussions, notwithstanding, there is provision to give to the board your technical papers, and that needs to be done by February the 14<sup>th</sup>, and then there will be board hearings in March.

So I don't know how many of you have played bingo down here, so in case you haven't, the washrooms are at the back. There's washrooms upstairs as well. In the interest of civility, the bar is not open today, so don't go up there during the break, please. That's right, isn't it, Louie? Okay, the bar is not open.

-- Interjection

-- Laughter

After five o'clock, I think. The discussion yesterday focused on socio-economic aspects, and we had presentations and discussion on methodology in the morning, and then in the afternoon, we had a couple of presentations on socio-

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economic impact assessment and effects mitigation. And on the methodology in the morning, the discussion resolved some of the issues. My recollection is, for example, the taxation matter seemed to be addressed, but there were also a greater number of issues left unresolved.

The effects mitigation also engendered a fairly lengthy discussion on education and training programs. There were concerns about the costs of the various programs. There seemed to me to be a general endorsement of this principal of cooperation or partnership between DeBeers and various government agencies.

There was concern registered about process on some aspects of what was discussed, and then, of course, the Yellowknives Dene elder, Isadore, provided us with a very useful, historical perspective on mineral development in the region.

We didn't complete the discussion on socio-economic impact assessment effects mitigation. And I have five people on the list who wanted to deal further with that topic this morning. So after we complete that discussion, we'll then move on to today's topic, which focuses primarily on cumulative effects.

So the individuals that I have on the list that wanted to speak were Hyme Benzohar, David Gilday, Kevin O'Reilly, Rachel Crapeau, and Tim Byers. So Hyme, we'll start with you.

**MR. Hyme BENZOHAR:** Thank you, Mr. Chairman. I'm glad this is another day, because the leftovers of yesterday, as far as I'm concerned, were not totally exciting. Yesterday, I got actually a refusal of a response to a question, under the pretext that it was not in the terms of references. And of course, we know that it wasn't the situation. I want to assure my friends of DeBeers that today, they will have no opportunity not to answer because of terms of references. I have made sure that all my questions will be direct clarifications of the things DeBeers itself has stated in its conformity response. So John, the standard reply of yesterday won't hold this morning.

Before I get into this, there is one concern that was left over from yesterday, and that was the rate of production. I just want to get it out of the way. That was raised by Janet. You, John, had replied to Janet that when a decision to increase would be taken, and you said a decision for significant increase would be taken, i.e., you defined it as a decision from 3,000 to 6,000 tons a day would be a significant decision, then certainly you would advise and consult, et cetera. I'm kind of puzzled. I mean, I come from the outside, and I also listen to London and not just what I hear here. I wanted just to bring out that apparently, there seems to be a decision already in place to go to 6,000 tons a day. I just don't know if there's a lack of communication between London and here. I just want to remind all of us here that last year, as part of the privatization process of DeBeers, DeBeers was required to present an immense amount of very detailed information in reports presented to all the investment banks, to the stock markets in London, Johannesburg, elsewhere. And as part of this documentation, they

were asked to disclose their actual production plans worldwide of every mine going forth for the next ten, 15 years. That's a document signed by the heads of DeBeers in London.

In that document, it talks about Snap Lake. It says that there will be two years of full production of 3,000 tons a day. In the third year, it will go up to 4,500, and from the fourth year on, it says 6,000 tons a day for the end of the life of the mine.

Now that document is out there. Now, maybe things have changed. Maybe it hasn't been communicated here, but since you made yesterday the undertaking that if there is a decision, did DeBeers make a false statement to the stock markets and to its investment community? How do we look at this? That's my first question.

**MR. BILL KLASSEN:** DeBeers.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Richard Molyneux, DeBeers Canada. Hyme, Mr. Chairman, I think as best we understood, the information which was included in the document that you referred to represented the best interpretation and projection that could be made at any particular point in time. That information was obviously based on geotechnical, geological, and engineering understandings of the Snap Lake deposit based on information which, as we sit here in the moment, is several years out of date. And when that document which was prepared well over a year ago, it was based on information that it come out of an earlier cycles of engineering design and evaluation of this, and very much largely based on information which we had inherited from the Winspear company.

In the time between the preparation of that document and the finalization of our plans for Snap Lake, we have obtained a huge amount of, additional understanding of the nature of the ore body that we are dealing with. Many of these have been discussed widely across Canada in terms of the complexity of the dyke. Information which only came from underground development. The implications of this are such that we have designed this mine in 3,000 tons per day. As we sit here in the moment, we believe that we do not have any information -- engineering or otherwise -- to be able to say with any confidence that we could mine at any significantly higher rate than that. We certainly need to demonstrate first that we can successfully mine a 3,000 ton per day operation.

When Mr. McConnell was talking about fluctuations in production, he was referring to the normal sort of range that one has on any producing mine. And when it goes through problematic periods where the production may be 2,000 or 2,500 tons per day, and you can go through good periods when it might be in excess of that.

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However, the average would work out at around about 3,000 tons per day. The entire operation, from water intake to disposal of waste products to accommodations to ventilation, is engineered around that. One cannot significantly change that without making significant changes to the project.

If, in the course of the first years of operation, we saw there were opportunities for doing this, we would not be a sensible organization if we did not look at optimally mining this in the interests of all stakeholders. But if there was a significant change which would require re-engineering on the project, it would be done in consultation with all of the stakeholders and taking the project through whatever process is necessary.

So the information in the document you referred to was quite correctly the best information that was available to DeBeers at the time of preparation. And I hope that answers your question.

**MR. HYME BENZOHAR:** I'm relieved, Richard, thank you.

**MR. BILL KLASSEN:** Excuse me. Just to remind everyone these proceedings are being interpreted as we go along, so I caution you to speak so that the interpreters can keep up.

**MR. HYME BENZOHAR:** Hyme Benzohar. Thank you. I think that answered the question. The documents did say that it also was based on the availability and capacity of plans and equipment, but if I understand you correctly, the actual equipment that you have in the mine, that you are intent to build, is a 3,000 capacity. And if that is correct, then, of course, the whole rest of the question falls away.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Richard Molyneux, DeBeers Canada. The mine, as it is being designed and built, will be designed and engineered for a 3,000 ton capacity. There will be certain areas of the project where common sense would dictate that if engineering can be done that would allow easy changes to that in any direction, that is part of the design.

**MR. HYME BENZOHAR:** Hyme Benzohar. Thank you. Now, I'll keep my promise and go only on the document of conformity, conformity response. In the conformity response on page 41, under the subheading conclusion, the following is stated, quote:

DeBeers will set up a Yellowknife diamond sorting facility. Sorting and valuation of diamond production to allow presentation to the federal mining royalty valuer will be carried out in the proposed Yellowknife facility.

On page 39, you state under the subheading, Final Sorting and Valuation, the following:

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Final sorting and valuation of rough diamonds is managed by the rough diamond marketing arm of DeBeers, the diamond trading company, located in London, England.

End of quote. I have four questions on this. First question, and Mr. Chairman, I shall ask the questions all together on this subject. Is that the right way to proceed?

**MR. BILL KLASSEN:** Yeah, I think that's the most expeditious way to do it.

**MR. Hyme Benzohar:** Thank you. Hyme Benzohar again. What is the difference between a sorting and valuation proposed in Yellowknife and the final sorting and valuation of the Snap Lake goods to be done in London?

Second question, how will the sorting level proposed for Yellowknife compare, let's say, to what is currently done by DeBeers in Botswana?

Three, what number of jobs do you expect to create in the proposed Yellowknife facility, and over what period of time? And I want to add to that my concern that it was yesterday that in your beautiful booklet, there was no mentioning of any job for a proposed Yellowknife sorting facility.

Four, on page 33, reference is made to a centralized DeBeers sorting facility for production from other jurisdictions. Please confirm that a proposed facility for Yellowknife is not dependant upon having access to production from other jurisdictions in Canada, and any explanations you can give on this concept of having other productions there would be appreciated, whether you talk about your own other productions or whether you talk about productions from other mines.

That is all in relation to the sorting issue from the conformity response. Thank you.

**MR. BILL KLASSEN:** Richard, before you answer that, could I just ask for a bit of clarification, Hyme, on the comparison with the sorting facility in Botswana, since probably you're the only one in the room that, aside from maybe some of the DeBeers people, with what that facility looks like. I'm not sure how helpful that will be to the rest of us.

**MR. Hyme Benzohar:** It is really a very full, complete facility that is handling the enormous production of Botswana to a very, very great extent. I mean, you have different levels of doing so, and it's a fantastic sorting facility. Of course, the volume here is less, but the degree of sorting is very, very elaborate there. We would hope that DeBeers would agree to do something similar in the Northwest Territories in order to maximize employment opportunities and a learning curve for the people here in Yellowknife.

**MR. BILL KLASSEN:** Thank you for that clarification. DeBeers.

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**MR. RICHARD MOLYNEUX (De Beers Canada):** Richard Molyneux, DeBeers Canada. Firstly, I can confirm, if that was part of the question, that the intention is to sort Northwest Territories production in Yellowknife. The degree to which that sorting will be done will obviously be to whatever requirements are dictated by Canadian regulations. How that relates in terms of the detail of sorting compared to what is done elsewhere is something which, I imagine, we would decide based on available skill levels, once that facility is up and running. But certainly the difference between what is done here and done there, as you are full aware, the huge number of assortment categories that diamonds are sorted to, and as is the case with production from other operations run by DeBeers elsewhere, a final check, sorting and refinement of those categories is done in London. However, we certainly would be doing the greater part of the sorting here in the Northwest Territories.

What we are considering, and this is subject to further discussions and negotiations with parties like the GNWT, is looking for opportunities for creating, maximizing employment, by the development of a centralized sorting facility in Yellowknife. We have not considered sorting production from other companies, but if regulations in other jurisdictions allow it, we certainly see this as an opportunity in the North for sorting production from other potential DeBeers operations in Canada.

**MR. HYME BENZOHAR:** And what was the number of jobs that you -- that was part of the question -- that you hope to create?

**MR. RICHARD MOLYNEUX (De Beers Canada):** Richard Molyneux, DeBeers Canada. At a production level of about one-and-a-half million carats per annum, we do not see a huge number of sorters required for this. And you are probably looking at the region... I mean, it really is going to be dependent on things like skills levels of probably, I would think, a half a dozen employees.

**MR. BILL KLASSEN:** Hyme, could you introduce yourself every time, please, for the benefit of the transcribers?

**MR. HYME BENZOHAR:** I will. Hyme Benzohar. Thanks, Richard. You are aware, of course, if you say that you want to sort in accordance with Canadian regulations, we need to talk about minimum. And the Canadian regulations...we want to have some comfort for royalty purposes. I would assume that they will also twist your books and other declarations of income. It is, of course, a huge difference between the, I would assume, the whole intent of 15 categories that you would have for government regulations, and the up to 15,000 categories you may have in London. The Northwest Territories Government would really like you to consider the widest possible range of sorting, also because of the skills. I don't think there's a need to go for an...(inaudible)...issue. Do you want to add a comment to this, Richard?

**MR. RICHARD MOLYNEUX (De Beers Canada):** Richard Molyneux, DeBeers Canada. No, I'm not sure of the comment.

**MR. Hyme BENZOHAR:** Then we go to the next subject. Hyme Benzohar, sorry, Mr. Chairman. I caught you before you caught me. On page 39 of the conformity response, it says that:

Assorted production from each producing mine is mixed at the DDC ; and divided into selling parcels that lets the individual requirements of a DeBeers' client. Mixing production from different mines smoothes the overall viability between the productions.

End of quote. The formal reference on page 40 is made to the branding of Canadian diamonds issue, and I say, again, quote:

The DDC has investigated the option of the branding of Snap Lake diamonds and opportunities for marketing Snap Lake diamonds as part of a broader Canadian...(inaudible)... It is considered that the current market for branded Canadian diamonds has limitations that can be met by production from other Canadian producers, and that excessive competition in this area could negatively impact the premiums being attained.

End of quote. I have a number of questions on this. One, what research was carried out as part of the investigations into the options for branding Snap Lake diamonds? What are the limitations identified by your research for branded Canadian diamonds? Can you supply copies of the research, the data and the results of what I assume is a lot of significant investigation DeBeers has done?

Two, you state that the existing Canadian diamond producers are benefiting from the premiums being attained on Canadian diamonds. The mixing of diamonds from various productions by the DDC eliminates the possibility of any premium for any Canadian premium for the Snap Lake goods. Why have you chosen to forgo those premiums that your mining competitors are receiving?

I think I'll first let you answer those before I go further, because that is quite a lot. Please go ahead.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Richard Molyneux, DeBeers Canada. Hyme, I'm quite sure you're enjoying putting questions to me in areas which you know are certainly well outside the area of expertise in the team in the room. I think I can address some of those. Firstly, with regard to the question of limitations around branding, as you certainly know but which is probably not generally known, there are already a large number of specific Canadian branded goods being promoted. My understanding is something like 12 to 17 brands of Canadian goods; Ekati, maple leaf, polar bear, loonies, and others.



DeBeers interpretation, based on marketing research which is being carried out as part of ongoing and extensive marketing which you are fully aware -- market research which is done by our organization on a regular basis -- that the market is already confused by the number of different brands, and that the introduction of yet others would just add to that confusion.

The development of very strong brands as part of the promotion of diamond jewellery is something that DeBeers believes in fully, endorses and supports the work being done by the Canadian producers in this context. At the same time, it is a situation where branding and the development of brands and the marketing of branded items, specifically something unique like Canadian, needs to be done in very careful harmony with the rate of actual growth and demand.

Certainly based on information which has come out of market research, specifically in North America in the last year or so, the feeling is that this is a situation where the existing brands in fact cater for the demand out there.

However, what we have been asked to do in areas like this is to try to look ahead. I mean, we are talking about a situation where our Snap Lake production is only coming on the market effectively four or five years from now. It is a highly dynamic situation, which is why we have made the comment that we would obviously keep our eye on the situation. If the increase in market is such that it can accommodate additional brands and the pushing of branded items, this would be reviewed on an ongoing basis.

In terms of why we are losing the premium with our standard marketing approach in terms of combining production, we certainly feel that the Diavik production which is coming on-stream almost immediately with existing production in Canada is going to be such that those premiums and the margins which have been enjoyed would be under pressure by the development of additional brands and the pushing of this as a marketing strategy. I hope that answers your question.

**MR. HYME BENZO HAR:** No it doesn't, Richard, and I apologize for addressing the question directly to you. Of course, it is your prerogative to ask any of your colleagues to answer the questions. It is not appropriate that I direct. But what you are saying, in a way, is extraordinarily strange.

You have, in your confirming paper, confirmed that there is a premium on Canadian goods. I am not talking about whether you have a dozen brands or more, because the one thing they all have in common is they are Canadian. Canadian goods in the world are seen as pure, clean, not contaminated, like with the wars in Africa or money laundering or whatever. It is a very special, different product that if rightfully marketed will give a premium to those selling the polished and a premium to the mine because you can sell your rough for a higher price if the polished generates a better price.

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Now here you are sitting, president of DeBeers Canada, and you are saying Rio Tinto and BHP, it is enough that they do it. We shouldn't do it because then there are too many. I don't think that DeBeers owns Rio Tinto and BHP. Are you, as a commercial company, giving away your potential profit margins, and say let them make that money, and not us, DeBeers? That is the puzzling aspect. It is not a question, it is a comment and I will not force you to answer that.

But the issue that the Territories faces here is, if you take your goods from here, you send them to London. You mix them in London and then send them back to the aboriginal groups or the local manufacturers here that you have committed to supply, those people are missing out on their Canadian brand opportunity. Unless of course, you say "Hyme, you have it all wrong. We will supply those manufacturers here directly from the Snap Lake production." If that is the situation, then of course, I say thank you and have no other questions on this subject. Can you clarify that, Richard.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Was there an actual question there Hyme?

**MR. Hyme BENZOHAR:** I will give it to you straight. When you enter into agreements with aboriginal groups or with manufacturers in which you give them access to DeBeers rough, do you actually mean direct supply of Snap Lake goods from the Snap Lake Mine? That is one question.

The second question is, if you say, "No, we are not doing that" are the local parties aware of it, that you are taking away from them any possibility to 'cash in on the Canadian brand?

**MR. RICHARD MOLYNEUX (De Beers Canada):** Hyme, there are really two entirely different issues there. The one is related to premiums as to branding. As you are fully aware, this issue is related to issues like marketing and impressions about marketing and how much the market can actually absorb before premiums start getting eroded. That is something that we have opinions about at this particular point in time, and we've quite clearly indicated that our opinion is that between Ekati and Diavik production, the opportunities for marketing Canadian diamonds and enjoying premiums will be met in the foreseeable future. For that reason, as of now, we have not considered the development of our own Canadian branded line.

With regard to the provision of Snap Lake rough to local diamond interests, I would just like to make two comments on this. Firstly, as has been indicated in that conformity response, DeBeers does have established marketing practices. We do have a strategy which has been very successful for ourselves in the industry. We do have clients that we are under commitment to supply to. It was always our intention and hope to be able to include in the boxes provided to clients a full range of Canadian goods. That was our preference.

However, we do understand and respect the policy of the Government of the Northwest Territories in this regard, and the interests of local stakeholders. We do not have, at this stage, a fixed policy with regard to the supply of rough to local industry. However, we believe that the details of this should be wrapped up in a socioeconomic agreement between ourselves and the GNWT which we are committed to negotiate. We do have a schedule of meetings agreed to with the GNWT to negotiate on this issue, and we have already advised various stakeholders of proposals on our part for the direct supply of Snap Lake rough to local stakeholders and specifically aboriginal groups.

**MR. Hyme Benzohar:** Sorry, can you repeat the last thing you said?

**MR. RICHARD MOLYNEUX (De Beers Canada):** What I said is, yes, we have already tabled proposals which would include the supply of Snap Lake production directly to stakeholders, including aboriginal groups.

**MR. Hyme Benzohar:** Thank you. I want to pin that down a little more. You have said you will, in the conformity response, you have said indeed that DeBeers intends to offer rough to rough diamond producers as part of these impact agreements. The impact of this is that the involved First Nations partners will be in a position to access a defined share of production, either for supply to its own cutting interests or onward supply to other businesses.

You have said in a statement, you have confirmed that you will give direct -- you will give a full range of Canadian goods. The remaining question is very simple. Will those goods be given to the partners here, in terms of those agreements, as identifiable Canadian goods?

In other words, would a factory that gets a box know this is Canadian and the government can confirm for marketing purposes that those are Canadian goods, or not?

**MR. RICHARD MOLYNEUX (De Beers Canada):** I can confirm that yes, that would be the case. They would be exclusive Canadian goods.

**MR. BILL KLASSEN:** Did you want to comment, Louie?

**MR. LOUIS AZZOLINI (MVEIRB):** A procedural matter. We are discussing, again I emphasize that I appreciate there are ongoing discussions with regard to sustainable economic development and the objectives of the Government of the Northwest Territories and DeBeers respecting socioeconomic agreements. I encourage you, that until those agreements are placed on the public registry, and I won't say it anymore today because I said it yesterday already -- those agreements do not exist in the eyes of the board, and if at that point the board would not consider it in its decision making.

So albeit you may be discussing it and the board is not aware of it, then its decision may vary from what you would expect otherwise, if you are seeing these

agreements as pivotal for facilitating the conclusion of the environmental assessment.

**MR. Hyme Benzohar:** Mr. Chairman, may I respond to this? You are absolutely right sir and we understand that perfectly. That is the very reason that the Government of the Northwest Territories decided to ask this question, as we are very familiar with the marketing system of DeBeers. Every statement we have seen so far from DeBeers indicated that there would be supply of London goods to the Territories. This is the first time someone as prominent, important and as highly respected as Richard Molyneux has gone on record saying "We are going to supply Snap Lake goods, clearly identified as Snap Lake goods, to local manufacturing."

I think that it is very significant, and in the absence of the agreements that you are referring to sir, this is something that I hope that all the groups present in the room will remember and use when they pursue their own economic ventures together with DeBeers.

**MR. BILL KLASSEN:** Thank you. Florence, you had a comment and then we will continue with Hyme.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** I just had a question, it seems to be a problem in making a decision, probably from the board's point of view. This is how I understand it to be. The board will not acknowledge any documents that are not put on the register. That document that they are referring to, I assume it is the CMA document and the IBA documents where this topic of rough diamonds will be discussed in there.

So, a decision by the board can't be done until those are in place. And so if that is the case, then the CMA agreements and the IBA agreements should be in place before the EA agreements are signed. I think that is the -- this is what I understand it to be. Because otherwise, you will be in a situation where the board will not be able to make a decision based on the content of what is going to be in CMA or under the aboriginal IBAs.

The other thing that I want to question was that, when Mr. -- I know he came to Lutselk'e, and I can't remember your name, I am sorry -- you were only there once. He said Canadian diamonds -- I just was thinking last year, DeBeers had an agreement -- or several years ago -- with BHP to market their diamonds. When he said Canadian diamonds, I was wondering; are those diamonds in the position of DeBeers and will they be part of what he is calling Canadian Diamonds, including Snap Lake diamonds. Is that the mixing that they are talking about, or is that Canadian diamonds being mixed with other diamonds? Just a question on that part.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Yes, when we previously met, DeBeers did have an agreement with BHPBilliton for marketing of 35 percent of

their production. That agreement has not been renewed, so in the future we will not be marketing that portion of Canadian production.

But when you talk about mixing production of Snap Lake with Ekati, yes it does get mixed with production from other places around the world, not just with Canadian sources.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Sorry, I wasn't paying attention. Did you say that Snap Lake diamonds will be mixed with other diamonds from other parts of the world?

**MR. RICHARD MOLYNEUX (De Beers Canada):** Yes, that is correct.

**MR. BILL KLASSEN:** For the benefit of those who came in after I made the opening remarks, we are continuing with questions related to yesterday's topics. People I have on the list to speak, in order, are Hyme Evenzors who is currently asking questions; David Gilday, Kevin O'Reilly, Rachel Tarpo, and Tim Byers. And unless the people who are indicating they want to speak now have comments specific to the question that has just been asked, I would like to continue.

**MR. LOUIS AZZOLINI (MVEIRB):** Sorry for interrupting. Florence, you asked me to respond to the question as to the board receiving -- I will be very quick. Florence's question was, the board may wait until it has the information from the agreements before making a decision. I don't know the board's mind and I don't know if they would or not, but if these are an important part of the overall mitigation of potential impacts or provision of sustainable economic development of the Northwest Territories, they may choose to wait until that information is on the public registry. That is their choice.

You would have to make the argument to them that they should wait until these things are on the table.

Secondly, the board is capable of receiving information under confidential cover. That is, it can receive information that is secret between two parties such as contracts, and that information will not be put on the public record but will form part of its decision making when it comes time for a decision.

So there are provisions within the law for the board to consider such information such as IBAs or any other confidential information that the parties may want to provide the board. Thank you.

**MR. BILL KLASSEN:** Hyme, Kevin has a...

**MR. Hyme BENZOHAR:** Before Kevin, a point of clarification and also in reply to the remark by the lady. The questions we are posing here are only clarification to the conformity response. We are not raising new issues or other issues. Regarding your question on mixing. The practice of BHP, BHP has only the Ekati

mine so BHP is selling in Antwerp Canadian diamonds, diamonds that are seen and identified as Canadian.

RioTinto, that will also have a different production. They have the argot production. The president of RioTinto diamonds in Antwerp has gone on the record that in respect for the national heritage associated with the Canadian goods, they will market the goods in Antwerp separately as Diavik, Canadian goods. Also an ability to identify the goods as such.

DeBeers has a practice, and I am not criticizing that practice as they are a very, very good marketer of diamonds, of mixing production. The only reason we brought up the point here is that we are very much concerned that by mixing the Canadian product, potential value may be lost and that value will be lost to the players in the Territories.

But since Richard Molyneux assured us they would supply the goods to the Territories as Canadian goods I think we are very relieved and can only be grateful, very grateful to Richard for those clarifications.

**MR. BILL KLASSEN:** Thank you. Kevin, your question on this particular topic.

**Kevin:** I wanted to just follow up with a question. I believe I heard Mr. Molyneux make a commitment on the part of DeBeers that they would be prepared to sell Canadian rough diamonds to organizations, people in Yellowknife for cutting and polishing. I am wondering if he is prepared to make a further commitment on whether those diamonds would be from the Northwest Territories.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Clarification that the diamonds we are talking about are Northwest Territories diamonds. Further clarification, we are talking about the supply of Snap Lake production. This would be in the context as indicated in the conformity of supply through the medium of things like participation agreements and to what we see being joint venture partners. Confirmation that there would be a supply of Northwest Territories diamonds which would be clearly identifiable and kept separate as such.

**Kevin:** Just a couple of follow up questions then. So I understand that DeBeers is prepared to make Northwest Territories diamonds available to aboriginal organizations only under impact benefit agreements? Is that the case?

**MR. RICHARD MOLYNEUX (De Beers Canada):** I can confirm that that is our proposal, offer which is being made. I want to please the comment on that earlier that the details of rough diamond supply is something that we see as being part of socioeconomic agreements. We are intending to negotiate with the GNWT and are scheduled to start working on that next week.

**Kevin:** Just trying to get some clarity on all of this. So DeBeers is negotiating this directly with the Government of the Northwest Territories and/or the aboriginal organizations? I guess I understood that they were going to be negotiating this

with aboriginal organizations directly. Is that also something that is on the table with the Government of the Northwest Territories, or is it all rolled together somehow?

**MR. RICHARD MOLYNEUX (De Beers Canada):** They are separate agreements that will be negotiated separately. My understanding is we will be negotiating with the GNWT and aboriginal groups in terms of the socioeconomic agreement. We will be negotiating with aboriginal groups in terms of independent and separate impact and benefit or participation agreements.

**MR. BILL KLASSEN:** Kevin, I would like to get back to Hyme. You have your turn later on the list.

**Kevin:** I am just trying to get to the bottom of this and understand clearly whether DeBeers is prepared to negotiate supply of Northwest Territories rough diamond as part of a socioeconomic agreement with the Government of the Northwest Territories.

**MR. BILL KLASSEN:** I will let DeBeers respond to that, but I thought it was clear.

**MR. RICHARD MOLYNEUX (De Beers Canada):** I had hoped it was clear. But yes, affirmative, that is the case.

**MR. Hyme BENZOHAR:** I promise I will wrap it up in the next five to ten minutes. On page 41 of the conformity report, DeBeers states: "based on this production, i.e. the Snap Lake production, and the current understanding of the requirement of the NWT industry, the actual quantity of goods that meets requirements that will be available from the Snap Lake production would be extremely limited."

That raises two questions. One, what is DeBeers current understanding of the NWT diamond cutting and polishing industry? And two, what quantity and percentage of Snap Lake production meets those requirements?

**MR. RICHARD MOLYNEUX (De Beers Canada):** Do I have your attention, Hyme?

**MR. Hyme BENZOHAR:** Richard, I was just advised that for the interest of time there is no need to go into this and we will withdraw this question and we will hope that it is discussed at a later time. We have taken about an hour of the time of this group. I do want to stress and also to Karen that the Government of the Northwest Territories to maximize the benefits and opportunities for all the people of the NWT, from the development of our resources here. So the secondary diamond industry can provide very, very tangible benefits for the people of the Northwest Territories and that is what we are trying to achieve through the line of questions that we placed here.

I think I would like to wrap it up. I can only say from someone who comes in from the outside and knows DeBeers very well and knows the people very well, I think that the Northwest Territories is lucky to have someone of the stature of Richard Molyneux here as the president of DeBeers Canada and I have a feeling after having listened to you that things will work out very, very well. I think that sums up the parts of our questions. Thank you.

**MR. BILL KLASSEN:** Thank you, Hyme and DeBeers. The next person that had questions remaining from yesterday was David Gilday.

**MR. DAVID GILDAY (ECE):** I was thinking, when you commented on the Bingo Hall, we will be selling Nevada tickets here to make sure we've got the partnership dollars ready to go, so get those at the break. I would like to start off, if I may, addressing cultural issues and specifically language.

Yesterday Mr. Weick started off on a conversation about threshold issues, and certainly language is one of those threshold issues. We in the Northwest Territories place a very high priority on sustaining aboriginal languages, and we do that because the communities are predominantly aboriginal and that is one of the highest priorities of our people.

The primary languages in the communities, certainly of the primary and catchment communities are aboriginal languages. What I would ask the company to do, because of the enormous threat that aboriginal languages are facing today, not just here but around the world of course, is I would like to ask the company: what mitigating measures will you take at the site to ensure that aboriginal languages are used as much as possible? I accept the safety issues that have been pointed out by the other diamond mines that we have, but what efforts will you be taking? Signage, use of the languages, and could we get something on the record in terms of language programs, please.

**MR. JOHN MCCONNELL (De Beers Canada):** We certainly realize it is a very difficult issue and certainly dear to the hearts of the aboriginal communities. You touched on the issue of safety which is a very major concern, working in more than one language at any mine, which is why under the Mines Act which stipulates that the language of operation shall be English.

In terms of programs onsite, we talked about the mine training centre. There are some software programs available these days that assist in language training, we would certainly make that available to the employees. Other than that, though, I think initiatives would be in the communities, hopefully in partnership with the GNWT, in providing language training.

**MR. DAVID GILDAY (ECE):** When I have visited other mines, one of the...

**MR. BILL KLASSEN:** David Gilday is speaking.



**MR. DAVID GILDAY (ECE):** Oh, sorry, David Gilday, yes. Having visited other mine, one of the things that I found that is somewhat discouraging, and I'm sure everybody in the room would find it discouraging, is the writings that are on walls that are very disparaging on basis of race. So people from the North are, without question, going to walk into these situations where people write nasty things. Always written in English. And one of the points that I would like to make is that the companies need to make these industrial sites as welcoming to everybody as they possibly can. And I know the company would remove nasty messages as quickly as anyone would, but it would still have a dreadful impact on the individuals who, stepping into an industrial site that is an imported industrial site, face a certain level of intimidation and discomfort.

So my concern with, having perhaps aboriginal language signage, various uses of the language, is not just to proliferate language, but to increase comfort levels of people who come into these mines. I wonder... I'm wondering then about the written language. Will there be signage? Certainly I know international safety signs are a great way to go because they are based on symbols, but what can you do to enhance the cultural experience and the sense of acceptance that people are going to need to feel in order to sustain their employment in this industrial site.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with DeBeers. I think, you know, things like signage are important. I think it goes beyond that, though, in terms of the design of the accommodation, what you serve on the menu, trying to make some traditional foods available. So I think we'll be certainly looking at all of those things, and as we move into the detailed engineering for the site, we would hope to take advantage of talking to some of the workers at Diavik and BHP, and some of our past experiences at Snap Lake and a number of our operating people have worked at other sites in the NWT and in Nunavut. Hopefully we can try to make the accommodation and the work atmosphere a little more pleasant for aboriginal people. I mean, it's in our best interests. The more aboriginal people we have on site the better it is, because they're going to stay here. This is their home.

**MR. DAVID GILDAY (ECE):** David Gilday. Thank you, John. One of the commitments that DeBeers has made is to occasional funding to support, or funding support to existing and emerging community-based programs or agencies that have the mandate to strengthen aboriginal culture. Would you be more specific than using the term occasional? Or give us some indication what that means? Will that be something once a year, or something on a five-year plan? Or has the company thought this through? Can you give us some detail on that?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I don't think we have thought that through. I think a number of these things will be discussed as part of IBA negotiations. You know, funding will be made available. I mean, it's obviously got to be tied to the profitability of the operation and so, you know, it

could change depending on markets. It could change depending on what our ultimate operating costs are at the mine. And that's why we haven't committed to anymore specifics on that.

**MR. DAVID GILDAY (ECE):** David Gilday. Thank you, John. You indeed, and perhaps you'll have the same answer, but we're going to ask you to elaborate on the commitment, and I quote, "To help to obtain culturally appropriate resources for local schools in partnership with community and government educational agencies."

It is a good positive statement. Yesterday, one of the programs that my deputy minister, Loretta Foley, mentioned was a pathways program whereby we're designing curriculum to be more -- let's call it applied curriculum -- to assist people to take on jobs that will be in the trades area, or certainly beneficial to mining industries.

I guess I would like the company to look very closely and perhaps commit to joining us in that endeavour. It's a partnership opportunity that hopefully in discussions we'll work very closely on.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Certainly, you know, as we said yesterday, we'd like to look at all partnership opportunities. I think John indicated that there is a meeting set up with the Minister and deputies of Education sometime in the latter part of January. I think that's the right opportunity to advance that initiative.

**MR. DAVID GILDAY (ECE):** David Gilday.

**MR. BILL KLASSEN:** Excuse me, David. I'm sorry, I can't remember this gentleman's name. Angus has a follow-up on that particular point.

**MR. ANGUS MACKAY (HSS):** Just a follow-up to the response about the interest in partnerships. I know we talked a bit about that yesterday, I understand. Just a bit of... I'm looking for a bit of clarification here on DeBeers' perspective on partnerships and who might be involved. For example, for employee and family support services, providing counselling and so on, there's a talk about partnerships there. Has DeBeers considered the idea of partnering with other mining companies with the view of setting in place an employee and family assistance program, jointly through contract to provide services to their employees and to employees and families of their sub-contractors in both the primary and secondary communities? Is that something that's being considered in terms of that sort of partnership arrangement?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Certainly. I think, you know, yesterday afternoon, our discussions focused around partnerships with the various governments in the region, mainly because that was who were at the table yesterday. But we certainly intend on having... or hope to have partnerships with the private sector, whether it is the other diamond

mines or some of the contractors that are here in town. I think a good example is the, you know, the apprentice handbook we talked about yesterday. On that is DeBeers, Diavik, a number of federal government departments, the GNWT, as well as the local consulting firm, Genesis. They're a partner in that as well. So I think... we hope to reach out to as many people as we can.

**MR. BILL KLASSEN:** David.

**MR. DAVID GILDAY (ECE):** I'd like to swing over to training, and Bill, by all means, if people want to intervene with questions, I'm happy to have that. It's not going to throw me off.

Yesterday, the company stated that it won't set any hiring targets. However, you did give a little follow-up saying that through the IBAs and the agreement with the NWT, maybe we might find a little wiggle-room in there. So we're certainly hopeful that there'd be room for consideration of targets.

I'm interested here in the apprenticeship side. You've got a mine that you're estimating will be about 500 people at full production. And of that number of people, how many on site will you expect to be tradespeople?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. We have that number, but it's not on the tip of my tongue here at the minute. We can get the number and bring that back to the forum later in the day.

**MR. DAVID GILDAY (ECE):** David Gilday. Where I'm going with this is that mines, of course, are heavy with journeymen. It's a great spot for the trades. And what you're committing to is ten apprentices on the mine. Now, I'm assuming that the mine is a 24-hour mine, so what is it... two or three shifts? Probably two shifts. That's irrelevant, I guess, but it means there are a lot of tradespeople working at any given time. Here in the Territories our trades ratio for training purposes is normally one-to-one, journeymen to apprentice. In circumstances that warrant it, where you've got good control, where your apprentices aren't left on their own terribly long, environments are safe, we're prepared to increase that. And I'm wondering if DeBeers would commit not just to ten apprentices on site, but perhaps a minimum of ten with a maximum of what the northern labour market and educational system could produce. Some upper level, so that as we get beyond our current capacity of production of apprentices, and make no mistake; you know, I know it's a limited capacity at the moment, but as we go beyond that, that indeed the company will hire more apprentices and not just feel committed to ten only.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess without have the exact number of apprentices and journeymen, I can't really make a commitment, but it would certainly be our desire to increase that number over time. I mean, one of the other things we talk about in the EA is a trades training program. You know, it's something I've been familiar with because it is something we initiated at

Nanasivik that was quite successful. And it was taking a program where some of these guys are very talented, but they just don't have the math to get them into the apprenticeship program. So we would design a Snap Lake trades program that would allow those individuals to come in and be part of it, even though they can't necessarily pass the math.

So I think how that relates to your question, I think it's a balance between these trades trainees and the apprenticeship program, and the total number of journeyman required for the site.

**MR. DAVID GILDAY (ECE):** David Gilday. I assume that what I'm hearing then is it's the company's intention to maximize the number of apprentices, not feel that there is a need to have a cap, to maximize the number. And indeed, you preempted a question that I had. I'm pleased to hear that you will have a program on site that encourages and -- let's call it unskilled labour -- to prepare to become tradespeople and enter into apprenticeship programs. That's a positive endeavour that I know other mines are taking.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I certainly wouldn't call it unskilled.

-- Laughter

**MR. DAVID GILDAY (ECE):** How about unjourneyed? When we do talk about apprentices, of course, there will be a lot of... there will be a number of contractors on site, if this is like the other mines. Will DeBeers be requiring the other contractors on site to hire apprentices, and not just apprentices, but apprentices from the Northwest Territories? In running the apprenticeship system, we do get inquiries from southern people who want... who are in apprenticeships who are saying to us we'd like to just switch over to your apprenticeship program rather than being part of someone else's apprenticeship program.

So my concern is that the mine and the mine's contractors, more importantly in this case, actively solicit northern people to be apprentices, not bulk out on southern apprentices.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. It's yet to be determined the number of contractors we'll use on site during operations. But I think we've made the commitment in the EA that any contractors we use are subject to DeBeers policies in terms of employment, maximizing aboriginal employment, and meeting with or being in parallel with our commitments in terms of minimum numbers of apprentices, trades trainees, and minor trainees.

**MR. DAVID GILDAY (ECE):** Thank you. David Gilday. One of the exceptional elements of the northern trades program or apprenticeship program, I don't believe it's found in any other jurisdiction in Canada, is that we provide wage subsidies to employers who will take apprentices on. It's a graduated subsidy

maximized at the early stage in the first year of the apprenticeship, diminishes in the second and third years, and in the fourth year, there is not a wage subsidy. We find that the demand for these subsidies, of course, outstrips our capacity most of the time to provide them. We're always concerned that large employers who have a great capacity to hire apprentices are often the most profitable enterprises, relative to a mom-and-pop garage that hires the local kid and normally loses the apprentice to go on to a bigger firm who pays better wages in the end. Will DeBeers be looking for wage subsidies from the Government of the Northwest Territories to hire apprentices, or will the company opt to use company resources solely for the purpose of apprenticeship?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with DeBeers. I guess I see wage subsidies as similar to other partnerships, and I think we would be looking to take full advantage of those types of subsidies and programs that are out there.

**MR. DAVID GILDAY (ECE):** David Gilday. In the training positions, I note that the company has listed ten apprenticeship positions, 20 underground positions, and then I believe it is another 20 positions... another 10 positions for people within three years of production. Does the company feel it's necessary to throw in a phrase like "within three years production", or would the company prefer to commence these training levels at the construction stage, so that in fact, as other companies try to do, they have their construction contractors take on the apprentices and the trainees in the beginning, prior to even opening the mine, so that on opening, in fact, you could be maxed out on those positions that you're committing to.

So would the company undertake to have its construction companies commence the apprenticeship and the general training from the outset?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. It's certainly our intent to do that, you know, to try to maximize the aboriginal and northern employment through the construction period, bring on apprentices during that time, so that, you know, they are two or three years into their apprentice before we go into operations. I mean, it just makes common sense.

I guess the reason we put the, you know, three years in there in terms of meeting the commitment, you have to remember that a lot of this document was written over a year ago, and it was very difficult to assess the impact that Diavik would have on the labour market.

I think things are starting to settle down now. We have a better understanding, and I don't think we'll have trouble meeting the commitment from day one, and those are minimums. They are not maximums. I should point that out again as well. But it is certainly our intention to try and have as many as we can, of what we see as the permanent workforce employed through the construction period.

**MR. DAVID GILDAY (ECE):** Thank you. In fact... David Gilday. I'm pleased, John, that you say these are minimums, because that's, of course, the spirit that we look for all of the industrial partners to pursue.

In the area of employment, and I know you've said you won't set targets, one of the things that has been critical to us is what is reported by the mines as their northern employees. And, of course, there are different ways to report and those different ways have been somewhat problematic to us. So I'd like to perhaps ask the company, if it will, how it plans on reporting. And perhaps I can give you a list of things that we've thought through and we've seen in other agreements or... pardon me, in other mines. And things that we would pursue that are meaningful to northern people. For instance, we would like to see hiring reported by community, by the priority group, and of course by the job categories. We also would like to see hiring reported by the number of people hired from non-NWT communities, so that we know exactly how many people are recruited from outside of the Northwest Territories as opposed to within.

With that, we'd like to have the company commit to reporting their employees by place of residence. And by that, I don't care if it's... if you report Wha Ti or Rae or Yellowknife or an individual community. It's within the Northwest Territories or without. A concern we have is that people hire on as northern residents, you get the statistic, and they immediately move down to Edmonton and live their more cheaply, and Edmonton gets the tax revenue, Alberta gets... well, I guess they don't get transfer payments, but we lose the transfer payments, et cetera.

So would the company commit to actually reporting jurisdiction of residence for employees? And maybe I should stop. I've given you three. Will you respond to those please, John?

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I think you've, you know, raised something that certainly we see in the press regularly to do with Diavik and BHP, and whether or not they're meeting their targets. I guess I'd ask you, you know... I won't ask you. There are methods out there of verifying whether somebody is a GNWT resident. How effective they are I'm not sure. I mean, I think the other mines have used GNWT's medical health card system as a verification that they are an NWT resident. I guess beyond that, I'd be interested in hearing how... we can't control where people live. I'm just not sure what the value of some of that information you're suggesting is, other than are they an NWT resident or not.

**MR. DAVID GILDAY (ECE):** David Gilday. There might be no value if there's no requirement to hire and no targets to hire. If it's left wide open, but I'm assuming that'll be dealt with through IBAs and benefit agreements, et cetera. But the importance... it's extremely important to us, a territory that is clearly under-funded -- not an issue of the company -- relies on a resident population, can't continue to tolerate people living in southern Canada, taking their wages from northern Canada, paying their taxes in southern Canada, and having all of the per capita

grants going to southern Canada while we provide, because there might be a medical card, the medical services, the roads, et cetera.

So John, to us it's very important that there become a method to verify our people working at Snap Lake actually NWT residents. Now, I say it like it could there be nobody, and I know of course there will be a lot of people, but we want to account for all of the people. We would like to, through this partnerships thing, where we find that the... if people are migrating to the south because it's a cheaper place to live, we would like to have the information so that we can in fact consider responses and mitigating measures to help people stay here. Without the information, and you're the only people that can provide it -- because we can't get it from an employee, of course, you're the only people that can provide it -- we can't work on the issue.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell with DeBeers. I guess you're suggesting that the NWT health card system is not a verification of NWT residents. Is that correct?

**MR. DAVID GILDAY (ECE):** David Gilday. I'm suggesting that there have been problems with that method of identification in the past. To be frank, John, there are so many problems with identifying what represents a northern resident. You can get your driver's license the day you come to town. It takes several months for your health care card. There are a whole host of things for student financial assistance. You have to be here for a year. It's a national standard.

So we do have difficulty in identifying who's a Northerner, if people choose to be moving around.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I guess, you know, it's an area we can certainly look at and discuss. There are problems, you know, with confidentiality of information of employees, and so we'd have to look at that as well. I mean, employees aren't... wouldn't be committed to us to tell us where they've moved to either, similar to what you're suggesting. So I would suggest that, you know, it's something we can talk about and try and work out a better system. I would have thought that the health card was the best way, but you're saying that's abused and it isn't the appropriate system.

**MR. LOUIE AZZOLINI (MVEIRB):** A quick supplementary to that. Mr. Roy Ellis, with Louie Azzolini speaking. I'd like to ask Mr. Roy Ellis if it is possible to obtain that information through other means.

-- Interjection

**MR. ROY ELLIS (ELLIS CONSULTING):** No, I was awake.

-- Laughter

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**MR. ROY ELLIS (ELLIS CONSULTING):** Yes, there is. I mean, just speaking with experience with Diavik, but the employment records indicate the employee's residents. When they file their taxes, there is a T4 issued. Unless they're lying to the company about where they live, and they get a T4 issued with the wrong province of residence, then... so I mean, there are administrative methods of verifying where you live.

**MR. DAVID GILDAY (ECE):** David Gilday. But with access to information, are those doable? I guess the one source is company record. People say I live wherever, if they say they live in Edmonton, that's pretty simple. If they say they live in Yellowknife, that's simple. Now, I know people can leave the address on your records as an old address. Somehow, I think you've got a better chance of having accurate information on that than we do. But John, I do appreciate that it's a dilemma, and we would like to work together with you to try to resolve this. I'm sure it'll be an ongoing problem for the government for years and years to come, but the closer relationship we can have with the company the better that will be.

**MR. BILL KLASSEN:** David, do you have many more questions? I'm thinking that since we started early, we should take a break sooner, but if you're almost done, we'll wait until that's... until you're finished, then we'll take the break.

**MR. DAVID GILDAY (ECE):** We have a number of subject areas, so I think it'll be fair to everybody to take a break.

**MR. BILL KLASSEN:** Okay, let's have a coffee break for 15 minutes, and then we'll start up again.

Comment: End of 3

-- Break

**MR. BILL KLASSEN:** Officially, we haven't yet touched on the subject of sustainable development which was the last item on the agenda yesterday. I think that the comments have certainly been addressing it at least indirectly, but just so that everyone is aware, we will be providing an opportunity after the list of people I have spoken just to canvas the room on the subject of sustainable development.

It has also been pointed out to me that some people had thought the sessions would be ending mid-afternoon, and (break in recording) finish in a reasonable time, so people if they have planes to catch, they can do that. With that in mind, I would encourage the people who have questions to focus on the more important point. That is not to diminish the importance of anything that has been discussed so far, but I am wondering if the level of detail that we are getting into are some of the things that will -- as responses have frequently indicated from DeBeers -- be the subject of agreements whether with the GNWT or IBAs. Perhaps does not need to have a public airing here.

As I mentioned this morning and as has been repeated a couple of times during the last two weeks, you do have the option of putting that information in your

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technical papers to the board and then of course there are the hearings themselves. Recognizing all along that the purpose of these sessions is to try to clear up some of these issues before we get to the board hearings.

So, having said that, we will continue the discussion and David Gilday, you were still at the microphone.

**MR. DAVID GILDAY (ECE):** I have taken my watch off, I will watch it and indeed we will work to high grade this, recognizing we can provide written information. Very quickly then, southern employees we were touching on as an important piece. Will the company be putting in place corporate initiatives to encourage people to move from the south to the NWT, relocate. I don't want the details now because of the timing issue, but will you commit to running programs of that nature?

**MR. JOHN MCCONNELL (De Beers Canada):** We already have a northern benefits package tied to our salaries that we think encourages people to live in Yellowknife or the NWT.

**MR. DAVID GILDAY (ECE):** I presume that includes things like relocation though. It's not just good pay, it is relocation incentives?

**MR. JOHN MCCONNELL (De Beers Canada):** That's correct.

**MR. DAVID GILDAY (ECE):** Thank you. We are really going to fly through these if we can. I understand that DeBeers has indicated in the document that, "at this time there is no proposed role for GNWT on the MMAC." Keeping in mind the positive comments that we both expressed yesterday about the need for partnerships and the value for partnerships, I wonder if the company would explain that position and perhaps indicate whether or not it is prepared to change the position.

**MR. JOHN MCCONNELL (De Beers Canada):** We are certainly prepared to change the position. What we don't want to see is another proliferation of boards and committees, taking into consideration both the capacity of DeBeers and the capacity of the aboriginal communities. That is the only comment, we want to try to keep the number of these committees and boards to a minimum.

**MR. DAVID GILDAY (ECE):** I understand as well that Yellowknife, which will be central to the operation of the mine from a business perspective and a transportation perspective is not included as partners in the committee. Would the mine also consider including that community?

Perhaps I can elaborate on that. Other communities as well in the catchment area that are not included, so that in fact the Northwest Territories' interests are represented.

**MR. JOHN MCCONNELL (De Beers Canada):** I think the omission of Yellowknife was certainly not on purpose, we certainly see it as a primary community and certainly expect participation from the Yellowknives Dene. In terms of expanding it further, we'll take that under consideration, but my feeling is you make these boards so big and unwieldy that they are then too big to achieve the objectives.

**MR. DAVID GILDAY (ECE):** Thank you. I will slip ahead then to our concerns on the spatial areas. I think the people have the list of which are the primary communities, the employment catchment communities, and then of course you have the third level of interest which is just the NWT in general.

Our goal as a government is certainly the maximization of employment of northern people period. We recognize in the case of the Snap Lake mine the primary priority being the primary communities. We of course want to make sure that the people who live in the regions of industrial activity get the highest priority in hiring on.

However, as the mine is aware, we are running -- we are very pleased because of the mining industry -- to be running one of the best employment rates in the country, and certainly within the area around the mines there is terrific opportunity with the Diavik and BHP mines now and it will be difficult to get large numbers of people.

It would be logical to me to open the recruitment area broader than just the primary communities. Of course, opening it up means there needs to be transportation access to the mines.

Will the mines consider opening up transportation or fly in sites that are further afield from the primary communities? I think specifically south of the lake. We have communities like Fort Resolution, Fort Smith, Hay River, which have people who need work just as much as anyone and can certainly fulfill the mines desire and goal to hire more northerners, but they have no access the way things are setting up.

So, will the company expand the primary hiring communities beyond those that are stated today?

**MR. JOHN MCCONNELL (De Beers Canada):** As we state, our primary focus will be on the communities we have identified. We have, however, included a large number of communities primarily south of the lake which we see as also enjoying employment and business opportunities.

**MR. DAVID GILDAY (ECE):** But the problem, of course, will be when the person from Fort Resolution or Fort Smith wants to go to work they will be jumping in their car and driving around the lake and hoping to make it to a fly in site. Will the company then, in expanding, consider fly in communities south of the lake so that people there do have access to the mine?

If I might elaborate on that, as we all know all of those who try to purchase or build a house in Yellowknife, it is extraordinarily difficult, from a price perspective if not finding the land. If the company were to expand south of the lake to a community such as Fort Smith where they have suffered an enormous economic downturn in the last number of years; land is available, housing is probably half the price as here. There may be real company benefits to be opening access to south of the lake, both Hay River and Fort Smith.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess I am still not quite understanding your question. I think what you are asking is, would we provide transportation to employees living in those communities? Is that correct?

**MR. DAVID GILDAY (ECE):** That is a great way to phrase it. Perhaps most importantly to at least provide a fly in access site south of the lake.

**MR. JOHN MCCONNELL (De Beers Canada):** Yes we would. Obviously Hay River is a primary area, has a major airport, and we would look at doing that. Perhaps government should look at moving their government back to Fort Smith. That would take care of that one, wouldn't it? I see a big thumbs up from Bob Turner.

**MR. DAVID GILDAY (ECE):** Actually Lutselk'e. The best fishing anywhere, and beautiful country. I am pleased to hear that you will consider Hay River as a site and I would recommend Fort Smith as well. Now to expand your catchment area, the other mining companies have provided fly in access from Fort Simpson, Norman Wells. What they have recognized is there are not sufficient employees in any given area, because the labour market has a variety of sectors, and they've broadened the access, specifically because they are following the government policy of maximizing the employment of northern people. Would the company commit to expanding to other areas such as Fort Simpson so that people who have no other access to employment of the mine would have access?

**MR. JOHN MCCONNELL (De Beers Canada):** I won't make any commitment, but I think it just makes logical sense. We are committed to hiring the maximum number of northerners we can, and providing them with the opportunity through transportation for employment at the site is probably the route to go.

I would emphasize that again, our primary focus will be on what we consider the primary communities or the most affected communities in this area.

**MR. DAVID GILDAY (ECE):** Thank you, John. I really am trying to race ahead here in the name of time if you would just let me look at the notes a second, please. If we could -- an issue that came up yesterday and I was asked to get clarification on is the DeBeers fund.

The question, just for clarity. Was the \$3m that DeBeers puts into the DeBeers fund, is that spread over other countries than South Africa? Does it include other

countries or is it solely to that country? What we are trying to do is quantify, how big is the commitment does the company make, or does it broaden this out to a multitude of companies, which of course on a per capita basis reduces the value.

**MR. RICHARD MOLYNEUX (De Beers Canada):** The figure referred to is the DeBeers Fund which is exclusive for South Africa. There are separate equivalent funds which are managed in both Namibia and Botswana.

**MR. DAVID GILDAY (ECE):** Thank you very much. Now one question that I guess relates to our history of mining in the north, we know that as mines come near their end and lose their attractiveness to the major corporations they often change hands. It has proven very difficult here in Yellowknife where a mine changed hands, because of various issues the mine went bankrupt and the employees wound up with very little pension benefit going forward.

Is DeBeers able to make a commitment that employee pension plans, no matter what the turnover of the mine, will be protected from the vagaries of mismanagement, just to cut it short.

**MR. JOHN MCCONNELL (De Beers Canada):** I guess you've come up with one there that we haven't given a lot of thought to or anticipated. I am not sure what sort of means would be necessary for that kind of protection. We've talked a lot this week about security funds to ensure proper reclamation during various phases of the mine life, and I think that is a very understood process now.

I guess I would like to hear more on how that can be arranged and perhaps that can be incorporated.

**MR. DAVID GILDAY (ECE):** I will take that that the company is committed to working to protect the pension plans of all employees, no matter the turnover of the mine to other owners?

**MR. JOHN MCCONNELL (De Beers Canada):** That is correct.

**MR. DAVID GILDAY (ECE):** I am not sure that you haven't said this already John, but please bear with me. Will DeBeers be requiring the contractors onsite to live up to every element of the socioeconomic programs that DeBeers is living up to itself, or committing to.

**MR. JOHN MCCONNELL (De Beers Canada):** I thought I made that plain earlier in the discussions.

**MR. DAVID GILDAY (ECE):** Does that mean yes? I must have missed it, it is not in my head at the moment.

**MR. JOHN MCCONNELL (De Beers Canada):** I think that commitment is actually written in the EA, it has been written in a number of IRs, I said it this morning earlier and I will say it again. All contractors and consultants, the

commitment we make is on their behalf and they will follow all of our policies and procedures.

**MR. DAVID GILDAY (ECE):** Thank you, John, that is what I wanted to hear and I recall now you did say that. That is grand. With that, perhaps I will, in the name of time, back off and will pass on the torch.

**MR. BILL KLASSEN:** Thank you, David. Thank you, DeBeers. That brings us to Kevin O'Reilly.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you, Bill. I guess I wanted to start with a couple of follow up questions arising from questioning on this, and then I want to get back to an issue I raised yesterday.

The first point I wanted to ask about was this DeBeers fund that has been mentioned a few times now. Yesterday I heard DeBeers commit to set up a similar fund for Canada and I am wondering if they will commit to setting up a specific fund for the NWT. We will start with that one.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Kevin, if I can only draw on the model we have elsewhere, we do have a central, national type fund where things like policy decisions are made. Policy here would be agreement about the type of social investment one makes or doesn't make, but we are certainly accustomed to managing that on a localized basis, which means we would have a local working committee in place which would absolutely include representatives from a wide range of impacted communities and other stakeholders.

That working group would have a high degree of economy on how the funds are disbursed. I guess that is answering yes to your question.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you. I certainly appreciate that commitment. I think it is to DeBeers advantage to actually provide as much detail as they can on how that fund might be set up in the Northwest Territories and administered and what sort of financial commitment DeBeers might be able to make towards that type of fund, to assist the board in one of the relevant areas they need to consider: economic diversification, sustainable economic development. It is right in the terms of reference.

So if DeBeers can provide any additional explanation of how that fund might work, who would be involved in managing it, what sort of autonomy they would have and so on, I think that would be to the advantage of DeBeers and the board. Can DeBeers undertake to provide any additional information on this fund prior to the closing of this proceeding?

**MR. BILL KLASSEN:** Do you mean prior to the end of today, or prior to the end of the board hearings in March?

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Certainly if they could provide it in advance of the hearings I think it would be to their own advantage and the advantage of the parties. As soon as possible would be great.

**MR. RICHARD MOLYNEUX (De Beers Canada):** We are not in a position to table anything today, but I will certainly make the commitment to providing something in writing over the next couple of months, and well in advance of March.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Great. Thank you very much for that commitment. I understand that from something that Mr. Molyneux said today that DeBeers is now prepared to make a commitment to consult with stakeholders if there is to be an increase in the production rate, a significant increase in the production rate at the mine.

I am just wondering, what sort of consultation process does DeBeers have in mind for that? Is it something that would be required as part of the normal regulatory process, or would it be something above and beyond that?

**MR. RICHARD MOLYNEUX (De Beers Canada):** With my understanding of the processes involved, I would imagine the consultation would take place in a number of different forms. It could certainly be required as part of a regulatory process. It would also certainly be part of agreements we all have in place with other stakeholders we have in place like the aboriginal groups and would be a necessary part, for example, of IBAs.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you. I am wondering if DeBeers would be prepared to make a similar commitment if there is to be a significant reduction in the rate of production?

**MR. RICHARD MOLYNEUX (De Beers Canada):** Again, based on my understanding of what the requirements and the expectations would be, we would certainly see it as being required as part of relationships with aboriginal groups. I don't know that it would be required as part of the regulatory process, but I imagine that would be dependent on what sort of order of magnitude of changes we are talking about.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you. I am pleased to hear that commitment to consult with stakeholders on any significant reductions in the rate of production. I wanted to get back to an issue that I raised yesterday, if I may. It really goes to the nature and scope of socioeconomic commitments that DeBeers has made. Really trying to get some clarity around these commitments.

I understand that there are predictions made in the environmental assessment report with regard to employment, training, contracting, and these predictions are based on 40 percent during construction, 60 percent during production and 60 percent northern activity again during closing activities.

I also heard yesterday that DeBeers is not prepared to make those commitments. They are prepared to use them as predictions but not make them as commitments.

I know that DeBeers has made a number of commitments in other places where they operate. There are the DeBeers funds that have been mentioned, there is state equity in some operations. They have committed to do research and development in some locations.

When I go back and look at the DeBeers website, just a couple of days ago they committed to a cutting, polishing and jewellery making facility located next to the Premier Mine in South Africa. Unfortunately, we don't have those sort of commitments that they have made in other parts of the world spelled out in the environmental assessment report, but would DeBeers be able to provide some sort of summary of the kinds of commitments that it has made elsewhere around the world, for the board and the parties, as soon as possible?

**MR. LOUIS AZZOLINI (MVEIRB):** If I understand your question correctly, Kevin, you want DeBeers to provide a summary of all its socioeconomic endeavors globally?

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** I am just looking at the terms of reference for the environmental assessment. If I can find the proper place here: 2.14, corporate compliance. One of the points here talks about "DeBeers shall describe its relevant experience over the last ten years of mining operations in Canada and other countries with similar regulatory and social policy regimes concerning the following." One of the items is, "record in honouring commitments on environmental and socioeconomic matters in the event of planned or premature mine closings, change of ownership" There is a variety of things in here.

What I am trying to get at, is if they have made commitments in other parts of the world, have they honoured them? Have they lived up to them? I think it is important for people here and the board to understand what sort of commitments they have made in other parts of the world.

If they could provide some additional information on that. When I went and looked at the environmental assessment report, they talk about the DeBeers fund, some of the work they have done in Kimberly, but there is not very much in the way of specific information on the commitments they have made elsewhere.

**MR. LOUIS AZZOLINI (MVEIRB):** I may be called to task on it by the people I work for, but I do believe you are pushing the edges, actually going beyond the edges of the terms of reference. You are looking for DeBeers to provide you with a comprehensive statement of everything that they are doing with respect to socioeconomic and cultural matters. The terms of reference are looking for DeBeers to provide a clear understanding within similar jurisdictional

environments. The nature and scope of its compliance with agreements and regulations. Corporate commitments are not -- as required in other environmental assessments -- generally don't require the company to fully disclose everything, everywhere that it does in the world at any given point in time.

And while I appreciate you want to ask the question, I do believe it is beyond the terms of reference.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** I don't believe it is actually beyond the terms of reference. I have simply suggested the company may wish to summarize those in greater detail than they have provided in the environmental assessment report. I think it is certainly to the company's benefit to outline what sort of commitments they have made elsewhere and whether they have honoured them or not as part of their corporate compliance as suggested by the terms of reference.

I would still like to know from DeBeers whether they would be prepared to provide some sort of summary of what sort of commitments they have made in other operations and whether they have been able to live up to them.

**MR. BILL KLASSEN:** Thank you, Kevin. The questions have been asked, you've heard the perspective from a staff member of the board. I will give DeBeers the opportunity to respond. In any event, the question has been noted. DeBeers.

**MR. ROBIN JOHNSTONE (De Beers Canada):** I think there is a fundamental disagreement with the terms of reference, Kevin. I think the key statement and the terms of reference around corporate compliance is the similar regulatory and social policy regimes, as Louie pointed out.

There are fundamental differences between many of the countries that DeBeers operates in, and in Canada. So we have provided DeBeers approach to social and economic and environmental commitments in the environmental assessment. We have also provided further examples of that in the information requests as well.

At this stage, you know, we are proud of our record but at this stage, it is not DeBeers intention to provide further information to the review board.

**MR. BILL KLASSEN:** Kevin, go ahead with your questions.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you. I am not very -- I guess I am disappointed in the response that I just received. I would have thought it would have been in DeBeers' best interest to talk about the good things they have done in their other operations around the world. Some of those are actually posted on their website. I am just disappointed they are not prepared to summarize those in a more comprehensive way than what they have presented in the environmental assessment report, but I will leave it at that for now.



Yesterday we did have some information presented around what DeBeers called impact management measures; really mitigation. This new report that was passed around or made available yesterday, I had asked some questions around whether there were cost estimates for the programs outlined in here. I also heard one of the DeBeers consultants say that money is not a problem for the programs, that it is not an issue. I believe that is in the public record now.

I am just wondering whether -- and I had asked questions around the cost estimates, and DeBeers took that question under advisement. I wonder if they have had the opportunity to give it any further consideration, whether they are prepared to provide any additional detail on how they would go about implementing this, whether they have those cost estimates and whether they can make them available to the board and the parties.

**MR. BILL KLASSEN:** As you were speaking, Kevin, there was some indication that that individual might want to recant.

**MR. JOHN SIMPSON (Genesis Group):** Are you trying to get me fired, Kevin? That was my own personal point of view from history in the North and wasn't related to DeBeers, but my own personal point of view. I recant that point.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Kevin, at this stage we do not have further, more details to provide you with. One example that came up yesterday and that you raised was the idea of -- and I can't remember the term here -- the community education facilities? Adult learning centres in the communities. We have costed those out, and I think you may have misinterpreted. Those have been costed out and are entirely at DeBeers expense. That is something we will not be seeking partnership funds for on the construction of them, but will be paying for ourselves. So we do have costs on those.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you. If DeBeers could provide whatever estimates they have to the board and to the parties, I think that would be helpful. Are they prepared to do that?

**MR. JOHN MCCONNELL (De Beers Canada):** I think, Kevin, there are a number of programs. I am not sure if there are any benefits to the board for us to cost out programs and provide that information. Many of them, as we said yesterday, are contingent on partnerships. Robin talked about the community learning centres. Although we have agreed to provide the infrastructure costs, we are looking for long-term commitments from the GNWT to staff those facilities.

That is not to say that if the GNWT doesn't come to the table we wouldn't go ahead with them, but we want to get some commitment from the GNWT as well in terms of staffing. We also want some commitment from the community that they are going to provide the site for them. That they are perhaps going to be asked to provide the power and heating costs.

Those are all discussions that will go on over the next months, and may take years. Another thing, these facilities, it is not planned that they are all going to be built next year. We see it happening progressively as part of an overall five-year plan.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. The questions I have been asking are around trying to get some clarity on the mitigation measures that DeBeers is proposing. It is in the interest of making sure that the board understands whether the mitigation measures are going to succeed or not, and how much uncertainty there is around them, and so on, in making informed recommendations on terms and conditions and so on, around this project.

So I think the kind of questions I am asking are certainly relevant and I understand that DeBeers is not prepared to provide any additional information on the programs that would actually implement this document that we received yesterday.

I wanted to move on here. I wanted to get back to this issue of commitments around employment, training, contracting, business opportunities. I am trying to understand the basis for DeBeers not providing clear targets.

In the corporate commitments section of the environmental assessment report, there are a few clear commitments around a few targets. I am looking at table 14.2-2. One clear commitment is to establish a trades training program and provide ten positions for aboriginals or northerners within three years of production.

Another clear target, establish an underground mine training program and provide 20 positions to be made available to aboriginals and northerners within three years of production.

So there are at least two very clear, specified targets in your table of corporate commitments here, but yet you are not prepared to make similar commitments on northern employment, training, contracting and so on. I am trying to understand the inability, perhaps unwillingness to provide those clear commitments. Is it a problem with the data that you have? Is it a problem with the methodology or predictions that you've made? Is it a problem or uncertainty around the partnerships that you are proposing? Is there some uncertainty at the corporate level around these commitments? What is the source of the inability to set clear targets in these areas?

**MR. JOHN MCCONNELL (De Beers Canada):** I think you are missing two major commitments we've made: to maximize aboriginal and northern employment, and to maximize business opportunities for northern and aboriginal companies. We just heard Mr. Gilday tell us that they can't tell you who an NWT resident is. So, you know, targets become meaningless if you can't tell who a northern resident is anymore.

You know, we are committed to maximizing those numbers. We've given you a glimpse of what we propose as a plan to try and do that and we are willing to make very significant commitments, both in terms of dollars and resources, to achieve those.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. So I understand then that the source of this uncertainty around being able to set clear targets in these areas relates to the inability to predict what these partnerships are going to be? It is not a problem with the data, not a problem with methodology and its not a problem of corporate commitment, it's a problem with knowing what these partnerships are going to be?

**MR. JOHN MCCONNELL (De Beers Canada):** I don't think there is any concern about the partnerships. I think -- you know, people have choices. Some may choose to work for us, some may choose to work for Diavik, some may choose to move to Edmonton and go to work for companies down there.

I guess I would like to come back to targets. I mean, do you think targets are an appropriate way of measuring socioeconomic -- a socioeconomic measure?

**MR. BILL KLASSEN:** I would prefer not to get into a debate on the point. I would prefer that DeBeers, to the best of its ability, respond to the questions and then move on to the next question.

**MR. RICHARD MOLYNEUX (De Beers Canada):** If I can respond to this. I think what people are looking for here is perhaps a clarification is around what our honest intent is around the word maximize. One can take a target in terms of aboriginal northern hire at 40 or 50 or 60 or 70 percent, and people now -- because they have a solid number in sight -- think that represents a more concrete commitment.

We are saying we would want to maximize. From my point of view, that actually means you have an upper target which is 100 percent. Now in other parts of the world and circumstances in terms of cultural and profiles of people are different, and perhaps our examples are -- Botswana and Namibia, where we, many years ago, started operating mines in situations where the developmental level of the country and the people were such where the aboriginal content of the workforce was quite low.

We set ourselves a long-term objective of maximizing. We are currently looking at companies which are well in excess of 80 percent of aboriginal people from the highest level down in both cases -- managing directors, are aboriginal people.

So for me, what I am saying with maximizing, you are actually setting what everyone here knows what is an impossible to achieve target, but there is a target. Genuinely say we would like to see these operations having the highest possible content of aboriginal and northern people.

Now, I don't know if that is any more of an explanation, whether people are actually wanting to see something like, 60 or 50 or 40 percent as a particular target, but it is my preference to actually aim high and really aim at something which is true maximization.

**MR. LOUIS AZZOLINI (MVEIRB):** I am just going to jump in here. For impact assessment purposes, people are locked into these numbers. You need information so that you can understand the nature of the impact both positive and negative. So for impact assessment purposes, you try to model or understand what the mine may do from a human resources standpoint, both positive and negative.

Now, what I sense is getting involved in here also is, and what no one has touched on is, the GNWT from a technical basis has not explained why it needs these numbers and how it is contributing to the technical quality of the report. Now these are technical sessions and we are beginning to move into areas where I sense there is some political motivation, and we want to save that for the hearing.

So if it is possible, I think it is important that we focus on technical areas. Now if there is a technical basis, if there is a government policy you are attempting to achieve through some technical standards of employment or location of employment, I think we can address that comfortably. But we are entering into areas where I as a board staff member feel uncomfortable, because there are political components to this as well. Let's focus on the technical.

I appreciate that numbers are important, but I as an environmental assessment officer, I am concerned with numbers to the extent that it enables the board to understand the nature of the impacts and the benefits.

What I sense is going on here is a negotiation to try to get the benefits out for the North. So just word that if this discussion continues you may want to take it to the board level, because I hope we can focus on the technical aspects of it.

**MR. BILL KLASSEN:** Thank you, Louie, for that clarification. With that in mind, Kevin, please continue with your questions.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. Just so I can be very clear for the record, I do not represent the Government of the Northwest Territories and could never purport to do so and I do not have any political motivations or political aspirations or whatever. I am simply trying to establish the adequacy of the mitigation measures that DeBeers has proposed for this project. I am trying to understand why they seem to be able to make some predictions based on some targets of northern employment, northern training, northern content, but they don't seem to be able to make the transition from the predictions to make those clear commitments when it comes time to formalize those sort of arrangements. That is why I am asking this set of questions.

So from what I have heard from DeBeers, they can't make those sort of commitments because they are not sure whether they would like to maximize northern employment, contracting and so on, up to 100 percent but they can't make a clear commitment. They have predicted certain benefits in the environmental assessment based on some targets. I will make my final point on this. I am not clear then how accurate those targets for prediction can be if they are not prepared to make the same targets in negotiating and trying to make arrangements to ensure that proper mitigation is in place.

I want to move on though, because I don't think I am going to make any further progress on this one now. I want to deal with the issue of timing. This is once again to try to establish some certainty around mitigation measures. I understand that DeBeers is prepared to formalize some kind of commitments on northern employment, training, contracting, and so on, perhaps in the form of socioeconomic agreements, impact and benefit agreements.

I am just wondering around the timing of these agreements. We also heard from Mr. Azzolini earlier that the board really can't consider these agreements unless they are provided to the board in some way as proof of a mitigation measure.

I am wondering whether DeBeers is prepared -- or they have any views, are they prepared to make any commitments around the timing of these agreements? Are they prepared to attempt to, in good faith, negotiate these agreements before the conclusion of the environmental assessment? Should they be in place before the project construction start, or should we wait forever? Is there any consideration of timing of these agreements? Does DeBeers have any views on when these should be negotiated?

**MR. GREG EMPSON:** Mr. Chairman, just by way of clarification, on behalf of the Yellowknives Dene, it would not be our attention to have any agreements between the Yellowknives and DeBeers put on the public record.

**MR. BILL KLASSEN:** Thank you for that clarification. That was a point that crossed my mind earlier as well. These negotiations will take place in private and having been involved in some negotiations, I know it is just about impossible to predict the timing, but go ahead, DeBeers.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Sorry, just so I can be clear. I am not asking that the contents of impact and benefit agreements be put on the public record. What I am asking for is whether the commitments that DeBeers is prepared to make in these areas, whether they have any views on when they should be finalized. I am talking about the timing of them. The content of them, that is a different issue. I am talking about the timing of them. Whether they should be done, whether they have any views on whether they should be done before the conclusion of the environmental assessment, before construction starts, or if they have any other views.

Why I am asking these is, once again, I want to understand the certainty around the mitigation measures that they have proposed and for the board to understand how much certainty or uncertainty is associated with them. Once again it is the issue of timing.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Kevin, part of the -- obviously we'd like to have as many agreements signed off as early in the process. We've certainly already commented in previous places about the length of the process, so we are certainly interested in efficiencies wherever possible.

The reality of it is, in terms of providing information and certainty around the timing of those agreements is, we can't commit other parties until they can talk with us. So on that basis, it is inappropriate for us to commit other parties to what we think is a good timeline.

I think the other key part is that environmental assessment is a key part of the process in determining what should be discussed in socioeconomic agreements and environmental agreements. The environmental assessment process, you've seen the EA in front of you. This is the opinion of De Beers and its consultants as to what the environmental impacts are. Certainly we've had feedback over the last couple of weeks in terms of other people's views on what the impacts are.

So the results of that EA process are key parts of building those external agreements. In the meantime, the reality is that the board is faced with making a recommendation based on the information that it has in its hands, whether it is through the EA, whether it is other information on the public registry or under confidential cover.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks. I don't think I'm going to get much more clarity on that issue. I did want to ask one question of the Government of the Northwest Territories if I may. I'd like to know what their position is with regard to the timing of a socioeconomic agreement. Whether it is their view a socioeconomic agreement should be concluded, or at what point it should be concluded: before the environmental assessment is finished, before the project starts? I don't know if they have any view on that. I understand some of that depends on the willingness of the other party to come to the table, but I'd like to know what their view is on the timing of this.

**MR. BILL KLASSEN:** Would the GNWT person identify himself, please? I have your name here somewhere, but I can't remember who you are.

**MR. JASON MCNEILL (RWED):** It is -- the GNWT would very much like to see a socioeconomic agreement in place before any board decision is handed down.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you very much for the clarity on that. I did have a couple of other questions with regard to sustainable development. Would you like me to ask them now, or should I wait?

**MR. BILL KLASSEN:** Thank you, Kevin. I would prefer that you hold off specifically on sustainable development until I've heard the other two people who have questions that were left over from yesterday before we got into sustainable development. So thank you for those questions. Richard.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Kevin, if I could just add another point. It certainly our preference also to see a socioeconomic agreement in place before that final decision on the EA.

**MR. BILL KLASSEN:** Thank you for that. We move then to Rachel Crapeau of the Yellowknives Dene.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I've got information that we put together and yesterday I noticed that when I was trying to ask my question that I wasn't asking it right, because it was on the spur of the moment. Last night I worked on this information. It is just something that I want to table. It is information for the GNWT wildlife people as well and the government departments that have a fiduciary obligation matters to deal with, with the Yellowknives Dene.

We've been through how many days of listening, and also we participated, but this is one thing that I wanted the Yellowknives Dene First Nation to put on the table. It's regarding the areas of importance to the Yellowknives Dene First Nation potentially affected by the Snap Lake development project; the traditional Yellowknives Dene First Nation trapping, fishing and hunting areas; and De Beers' response to the Mackenzie Valley Environmental Impact Review Board information requests round one.

We note with concern a comment on the current land use of the Snap Lake area. Response number 1.43 from De Beers states: "At no time during the consultation with community groups were trap lines identified within the regional study area. In addition, during the review of documents related to aboriginal land use in the vicinity of Snap Lake and listed on pages 6-50 and 6-51 of the environmental assessment report, there was no identification of trap lines within the regional study area. Based on the consultation conducted and review of documents related to land use, it is determined that no current trap lines are found within the regional study area."

Was this sufficient consultation? How thorough was the consultation process? Especially for the Yellowknives Dene whose traditional land use areas may be affected by the project? Response 1.43 states:

"There were in excess of 70 consultation sessions over a three year period. These sessions involved community elders, political leaders, youth, First Nations staff and the general public."

Of the 70, there were six meetings in Dettah; two in N'Dilo and four mine site visits for the Yellowknives Dene. Table 4.2-2 of the EA report. But page 6-52 of

the environmental assessment report makes an essential point in evaluating this information. It states:

The Yellowknives Dene traditional knowledge study for Ekati reveals the area in and around Snap Lake has been used heavily for trapping activities. No existing trap lines in the vicinity of Snap Lake were identified during site visits to Snap Lake by elders from the Yellowknives Dene, Dogrib, Treaty 11 and NSMA. However, people currently trapping have not confirmed this information; so it appears that attempts have not yet been made to verify the accuracy of the trapping information that De Beers received. De Beers should make a commitment to consult the local contemporary trapping expert before drawing any conclusions in regard to the prevalence of trapping in the affected area.

The aboriginal consultations that De Beers refers to might more correctly be described as information gathering sessions, at least in the Yellowknives Dene experience with De Beers. There were no attempts to solicit constructive criticism of the Snap Lake diamond proposal. The purpose of the meetings and mine site visits were to:

1. Inform the Yellowknives Dene of the mining operations and the company's proposed strategies to manage and mitigate environmental problems; and
2. Gather our traditional knowledge.

Both of these objectives are endorsed by Yellowknives Dene in order to promote good understanding of the project by our people and to help the project's activities benefit from our people's knowledge of the land. However, it should be noted that the consultation process is not finished when these two objective areas are met.

In our view, it is also important and necessary for the company to hear from us on our opinions of the project and our conviction of what constitutes sound environmental protection.

Also noteworthy, the Yellowknives Dene 1997 traditional knowledge study; the Weledeh-Yellowknives study, traditional knowledge of Ekati - it identifies the Snap Lake area as having wolf harvesting trails, but nobody, according to De Beers, identified recent wolf hunting within the Snap Lake area. Have the experienced, currently active wolf hunters been solicited to verify this information, this declaration?

We are uneasy with the implication that because no harvesting is currently taking place in the Snap Lake regional study area, then any disturbance or damage to the area will be of little consequence to aboriginal communities. De Beers believes that this situation will last until mine closure when the land is supposed to be reclaimed to as close to a pre-development state as possible. This conception negates the possibility of our people needing to use the area in future years, prior to mine closure and reclamation.

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Compensation for impacts to trappers: The De Beers EA does mention though that Yellowknives Dene from Yellowknife and Dettah traditionally use a travel route between Lac Cavo Blanc and Lac De Tours to get to trapping areas around Mackay Lake. Also disturbing to us is the idea that De Beers seems to want to deal with impact compensation to trappers on an individual basis, as stated on page 6-56:

Impacts to individuals' traditional use of the land. For example, future loss of traps, will be avoided if possible. Where a loss is demonstrated, De Beers will negotiate a settlement.

It is not normal practice for industry to settle with individual Yellowknives Dene. Rather, a case of compensation for lost access to harvest area or disruption or damage to an individual's harvesting tools, trap lines, et cetera, must be negotiated with the Yellowknives Dene First Nation as a whole through our representative bodies. For example, the land and environment committee, and the chief and council.

Contemporary Yellowknives Dene continue to require access to their traditional harvesting land in the same, unrestrained way that their ancestors did. Yellowknives Dene believe that unrestricted access to productive harvesting areas should be maintained for their future generations as well.

The Yellowknives Dene traditional significant areas: The Yellowknives Dene traditional knowledge report identified important sites such as burial sites, migration routes, fish spawning grounds, et cetera, north of Mackay Lake, but no areas have been reported south of Mackay Lake. That is where we have our camp. The EA report states on page 6-54:

There may be traditionally important areas to the Yellowknives Dene within the Snap Lake RSA, however, during consultation associated with site visits, no traditionally significant areas within the RSA were identified by the Yellowknives Dene. Consequently, De Beers did not -- or could not -- due to the lack of identified sites, analyze the possible impacts of the Snap Lake diamonds project on traditionally significant areas.

The EA report, page 6-58:

The linkage between the Snap Lake diamond project and loss of traditionally significant areas is not valid. No further analysis is necessary.

The EA report conclusion:

Overall, the EA report claims that:

- 1) The magnitude of impacts on traditional land use will be low because of:

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- a) the small footprint of the mine site, and the mine and the esker access roads, which is a maximum of 550 hectares; and
  - b) no evidence of current, intensive traditional land use.
- 2) There is no link between the mine and the potential loss of areas of special significance to aboriginal people, so no analysis of impacts on this is required.

We have serious reservations about these conclusions. We believe that they were not based on sufficient consultation with the Yellowknives Dene. De Beers are advised to approach us for in-depth discussion of these topics before the Mackenzie Valley Environmental Impact Review Board conducts its public hearings on the Snap Lake environmental assessment, scheduled for March 2003.

We do not want to see the board make its recommendations on line approval before these issues have been completely resolved to our satisfaction.

This is the paper that I worked on last night and I wanted to table it today. I had two other questions that I wanted to bring up. In light of all of this, we were thinking yesterday and the day before, 100 years from now Lawrence's little girl, she is quite small, and Michael Paper's granddaughter is really quite small. Little Mote Sangris is starting to make knock-knock jokes. Little Ceasar Charlo is running around, just a happy go lucky character. Little Katalee is thinking about starting school.

They are quite small, but 100 years from now when they are older and they have children and grandchildren, who is going to tell them that the land in that area is safe? That the water is safe? The animals are okay? We want to know that.

The other one we were prepared to work on is the session on caribou. Rob Turner brought it to my attention yesterday. Maybe before we finish today we can get a date on when we are going to gather our elders. From what I understand, I think De Beers is willing to work on this caribou session with us. We are looking at maybe January.

The other item that I wanted to ask was, Mr. Holminic, who left, was talking about getting together with De Beers and finding out more information on the diamonds being worked in the North. If they get together and talk, could we sit in on that session? Just like at the beginning of last week, we had people leave and sort things out. Is it going to be that kind of scenario?

My other item is, when we do the socioeconomic cumulative impact session today, I have Alice Abel who works for our health and social program who has a 10 minute presentation with her coworker Karen. We have some information that might be of interest to De Beers. That is what I wanted to present today.

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I just remembered, the gentleman who wanted to talk about how this was God's land, and are you going to give 10 percent back to God? When I talked to him, what he meant was, is De Beers going to give charity to the homeless, charity to the people who need food. There are going to be a lot of people who are going to be benefiting but not necessarily everybody. The homeless need help, and the people who have no food need help. That is what he wanted to ask, and he didn't ask it the right way I guess.

I talked to him about it, and I told him I would help him. Thank you.

**MR. BILL KLASSEN:** Thank you, Rachel. Before I ask De Beers to respond, I will just point out that Peter Holminic is still here. He is sitting over there.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Sorry, it was the person who was here who...

**MR. BILL KLASSEN:** Oh, Hyme Benzohar works for GNWT and he will be back later this afternoon.

**MR. RICHARD MOLYNEUX (De Beers Canada):** Rachel, if I could answer your last question, it is the one that I can answer. When we were talking about a fund, a De Beers fund, it would be pretty much designed to address the sort of issues which you have just touched on. It is our practice elsewhere to use funds of this nature for investing socially. As I've indicated, it would be managed by some sort of a local committee involving stakeholders and most definitely representatives from your community who would have the ability to influence how the money I spent.

So yes, we would want to see some of the benefits from this project going directly into charitable areas of the types you have referred to.

**MR. BILL KLASSEN:** Thank you, Richard. There were a number of points that Rachel made during her presentation that I think need comment from De Beers. Florence, you wanted to comment as well? Florence has a question on the fund.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** I usually speak my own language which is Chippewyan, Denesoline, so for this one I would want to do that, just to support the initiative from the GNWT about the use of language and as a teacher, I strongly believe that in order to maintain and preserve your language, you have to use it. So if you are speaking English only, that is not a very good example. So I want to speak in Chippewyan. Do we have a translator?

(Translation Not Available)

**MR. RICHARD MOLYNEUX (De Beers Canada):** Thank you for your question and the opportunity for me to clarify. We certainly would see a fund of the type that we have in mind as providing benefits to all the communities of the north, and equally I would think that all communities would have the opportunity of

participating in the management committee I referred to and be part of the decisions that will be required as to how and where any funds that would be available would be used. I hope that answers your question.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Mahsi.

**MR. BILL KLASSEN:** : Is De Beers ready to respond to the points that Rachel raised?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Rachel, I would like to address your first point, which was regarding the Yellowknives Dene uneasiness of the implication that there is little traditional land use activities in the area of Snap Lake. Impact assessment relies on the best information available. You know, it is unfortunate that the YK Dene were in a position that they had to decline our initial approach to discuss traditional knowledge. We think the best forum to basically get a clear picture is through your contribution of traditional knowledge to the project.

Having said that, that is the stage that we were at at the time of the impact assessment, that we had little information from the Yellowknives Dene. We are thrilled that you are certainly interested in basically moving beyond that and moving to being able to talk with us further and providing the information and the format that is appropriate for your elders and lands environment committee meeting.

We really look forward to that opportunity and are very happy to discuss a date for a meeting to continue that process.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** Continue that process, do you mean sitting with the Yellowknives Dene or the caribou session?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Both, Rachel. Sitting with the Yellowknives Dene and certainly with the Yellowknives Dene alone, and certainly with the proposed meeting on caribou, I think it would be a great venue where a lot of information can trade back and forth.

**MR. BILL KLASSEN:** Rachel, did you want De Beers to respond to any other points that you made?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** If they sit with GNWT diamond expert, I would like to know if we can sit in on that, or is that going to be part of a different process?

The other one is the 100 year question. That one was also to the regulators. The government people who are sitting here with us since last Monday. They need to look at that question too. Thank you.

**MR. BILL KLASSEN:** Okay, so if De Beers could respond to the first point about the diamond processing, and then regulators in the room could respond to the concern that Rachel raised regarding the environment 100 years hence. Tim, did you want to...

**MR. TIM BYERS (Yellowknives Dene):** Thank you. If I could elaborate a bit more on specifics of Rachel's concerns about 100 years in monitoring. I guess the specific focus, if you will, to help the discussion is we have learned over the past few weeks that ground water, possibly contaminated by underground workings, will take anywhere between 80 and 150 years, or perhaps longer -- let's stay with something -- five generations. Let's go with that. Five generation before that contaminated water gets to the north east lake.

So basically, we are wondering if De Beers can tell us if they feel an obligation to monitor that lake or to provide funding for government to monitor that lake five generations from now, to both make sure that lake is going to be uncontaminated and to be able to verify or validate the EA predictions of what the water is going to be like when it hits that lake.

I understand from your EA that the water chemistry will have retained a change for 300 years, it will stay the same for 300 years. So all that taken into consideration, we would like to know if De Beers feels an obligation to provide monitoring for that lake five or more generations from now, and also open up this question to all of the regulators present: DFO, DIAND, and find out if regulators have thought about this. And whether there is not just a long-term monitoring program, this is delayed monitoring. Delayed in the way that that lake will not experience an effect for five generations from now. So there is going to be a delay of maybe five generations before somebody says, oh right, that lake is going to be receiving that water...

**UNKNOWN SPEAKER (De Beers):** Discussion on it. In the short-term, it is going to be up to the board to make a decision on the significance of that impact, if one is predicted at all. That is the representation by which the issue of further monitoring will be addressed. But I wholeheartedly agree with you Tim, that individuals in this room have to pay close attention and give careful thought to whether this is an issue or not, and what the monitoring required will be, if any.

It is a quandary that everyone here is going to have to sort through in their own mind. Until we've gone through that process, in our mind, because of the fundamental process of getting to this impact, we need to go further through this process to identify any monitoring needs.

**MR. BILL KLASSEN:** Rachel, did you want to comment?

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** That question was not only about water. It just so happened that Tim seemed so keen and interested in water on our behalf, which is fine. We are worried about the land,

the revegetation, the wildlife. I remember my dad trapping in that area. One time, I think maybe Fred Sangris, asked my dad, show me on the map where you've been.

My dad told him, "That map is not big enough." In other words, saying he'd been everywhere. I remember one year he got 1,000 or 1,500 white fox, trapping for white fox. I remember my uncle travelled around that way the last time they went out trapping together. That was the first time my dad went by skidoo, the little Elan. He was cursing away because that Elan broke down and they were in the middle of the lake and they had to set up tent on a windy lake. My brother had to go and rescue them and fix the machine. They got going, and they were travelling around that way for trapping.

My brother works now, but he takes off at 5 or 6 in the morning to go hunting or do something out on the land. I have a brother-in-law who works at BHP but he comes back and looks after his boys. He has four boys, and he takes them out on the land on his two weeks off.

The young men who are working and have children, that is what they are starting to do. We are helping trappers to go out on the land. We have very little money for wildlife help, for helping the trappers, but we are trying to work with our budget so we can help work with the trappers. But with the little money that we get we have to organize fall hunts, community hunts, help with gas and oil. We also have to maintain our bush radios. We also have to do the other wildlife monitoring work that we can.

It is not really that much, but we try to the best of our knowledge to help hunters go out. Today, two of our people are not here because they went hunting to Rae Lakes. That is far from here. Normally the caribou are right in our area right now. That is a long ways to go for caribou for the people in our community.

These things are very important to us. We need to know the answers to these questions and we need to have it tabled so maybe we will have answers by the regulators, the people who look after the water, the wildlife, the land -- everything. Maybe by January, maybe by March, it doesn't have to be answered today. Thank you.

**MR. BILL KLASSEN:** I think it is well understood that your concerns are broader than water, and that was being used as a specific example. I would like to provide the opportunity then to the government agencies that are here: RWED, Environment Canada and DFO to comment on your concern and perhaps offer some advice as to how that can be addressed.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** I forgot something here. Suppose DeBeers sells the mine to someone else, it is going to be a new owner, see? We don't want to be stuck with a Giant Mine scenario. Thank you.

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**MR. BILL KLASSEN:** We will let DeBeers respond to that point after these other three agencies have... oh, you don't need a response to that? Okay.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** No, no. I just don't want us to be stuck with the Giant Mine scenario where the taxpayer and the people in the surrounding communities have to sit and try to figure out what to do now.

**MR. BILL KLASSEN:** Okay, then who from these three agencies want to speak to this concern of the Yellowknives Dene?

**MR. DAVE BALINT (Fisheries and Oceans):** I think initially, in looking at the lakes to the North, DFO did express a concern. We raised a number of information requests in response to the impacts that were assessed in the two lakes to the north, and we had a significant concern because 10 percent of those lakes were, in our opinion, would be destroyed and would be uninhabitable, especially to the fish and the aquatic organisms.

As a result of that, there was a significant study done, that was that North Lakes Report, and the rationale that was explained and presented there alleviated much of our concern. I am not a groundwater expert, but specialists in our department and other people did comment in looking at the information that was presented by Golder, DeBeers and within the government agencies. Our concerns are alleviated, or we are not as concerned with that.

Yes, there is the potential because groundwater will move there, as stated in the report, but the impact and with the level of flow that would enter those lakes, it is almost negligible and will be very, very hard to monitor. The only way that could be monitored would be perhaps through **psometers** or other ground wells to monitor that as the water would travel.

Yes it is in the back of my mind, this does need to be looked at 300 years down the road. The only way that I could see that could be looked at is through similar types of monitoring programs. It has to be written out through other -- I guess the examples would be the monitoring that is done with other agencies or BHP through EMAB, all those types of things. That this would have to be documented, because I don't think I will be here in 300 years either.

Any other questions, Tim?

**MR. BILL KLASSEN:** Mark, did you want to comment?

**MR. MARK DAWE (Environment Canada):** Pretty much what Dave said. He's covered all of the bases. Environment Canada expressed concerns initially with the flows and groundwater contamination that could reach north lakes. The North Lakes Report and several discussions between our groundwater experts and Golder Associates alleviated most of those concerns.

Yes there will be some flow there, but remodelling and recalculation and a better understanding of what is happening reduced the amount that is expected to go to those lakes. As Dave mentioned, the long-term monitoring, it is hard to do 300 years hence. I don't know how to approach that. I don't know where to go from there. Thank you.

**MR. BILL KLASSEN:** Thank you, Mark. Jason.

**MR. JASON MCNEILL (RWED):** The GNWT also agrees with what our colleagues at DFO and Environment Canada said. Water quality is not specifically under the jurisdiction of the GNWT, but the GNWT is and has been committed to monitoring animals and vegetation throughout the NWT. Especially caribou. We foresee no change in our commitment to monitoring the health of animal communities throughout the NWT within the next 200 to 300 years, depending on changes in the jurisdiction and devolution.

**MR. BILL KLASSEN:** That is very bold. It is usually difficult to get commitments out of government that go beyond the next election, but thank you for that. We may have to inscribe this on the NWT equivalent of the Rosetta Stone.

I think that it is close to noon, so I will take the opportunity as the facilitator to venture an opinion. I think that we as a society need to make those kinds of commitments, but whether future generations will honour them remains, of course, to be seen.

It is five to 12, we are approximately a half day behind schedule. I am not concerned because I do not leave Yellowknife until Monday anyway, so we can work tomorrow as far as I am concerned. I would suggest that we only take an hour for lunch today, come back at 1:00 and see if we can't finish the agenda. I will see you all at 1:00.

--- Break

**MR. BILL KLASSEN:** That I am unable to predict. We still have one federal agency, DIAND, asked whether I wanted them to comment on the commitment to long-term monitoring, so I will provide an opportunity for a DIAND representative to speak to that, then we will deal with the last leftover item from yesterday which was sustainable economic development. I know some people have a couple of questions on that point, and then we will move to a presentation on socioeconomic and global cumulative effects. There will also be a presentation from the Yellowknives Dene First Nation by Alice Abel.

I am not going to attempt a wrap up as to reconciliation of the issues we discussed yesterday afternoon and this morning. I was scrambling to keep notes but I haven't distilled those. We will have to wait for the transcripts on those particular discussions.



So if we are ready to begin, I would like then to invite someone from DIAND to comment on long-term monitoring.

**MR. FRASER FIRMAN (DIAND):** Velna Sternburg was actually going to address this issue, but she is not here right now. I just want to agree with what Environment Canada and DFO were saying, some of what RWED was saying, not all of it though.

Comment

There is actually a policy, the Mine site Reclamation Policy for the Northwest Territories, put out by the government, Indian and Northern Affairs. When it comes to post-closure responsibilities, it says:

"Following mine closure, mining companies or their future owners should continue to be responsible for the site, including the remediation of any additional environmental complications which develop."

I just wanted to get that in, I don't want to add any more or take up any more time, but I wanted to make that point clear from Indian and Northern Affairs Canada. Thank you.

**MR. BILL KLASSEN:** Thank you. It is an interesting policy, and that paragraph in particular I am sure we all agree with. They should do that. So, let's move to what the agenda described as sustainable economic development. There is no presentation on that topic that I am aware of. At least one person that has questions on that subject. So what I propose to do is simply to proceed with questions on that item and then move on to the cumulative effects.

I will go to Kevin O'Reilly who has informed me that he has a question and then I will take others as they come. Kevin.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks, Bill. I am not sure that the right people are here to necessarily answer the question, but I felt it was important to ask this. If this project goes ahead it will be the third diamond mine in the Northwest Territories, and there are significant revenues that do come to the government from taxes, royalties, perhaps other fees and so on.

I am just wondering whether there has been any consideration given to targeting the use of any of those revenues into heritage funds, economic diversification funds or programs, and I guess I would like to ask the Government of the Northwest Territories whether they have given this any consideration.

And before Mr. Azzolini gets his hand on the microphone, I want to tie it back to the terms of reference, because -- and I don't just ask questions of DeBeers. What I want to do is -- this goes back to the issue of, and it is right here in the terms of reference, economic diversification and sustainable economic development. It certainly could be one way to provide for that, and not necessarily on the part of the proponent but certainly something that the governments can do.

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I do want to ask the Government of the Northwest Territories whether they have given any consideration to this, and if they cannot answer it then I would like a commitment to provide a written response. I will ask the same of the federal government, but I would first like to hear from the Government of the Northwest Territories.

**MR. LOUIS AZZOLINI (MVEIRB):** The terms of reference were issued to the proponent, in this case DeBeers. You can choose to answer if you want, you can choose not to answer. It is within the scope of reference to the extent that the proponent was asked to provide information on that topic.

**MR. JASON MCNEILL (RWED):** In regard to your question, that is something that is going to have to be looked at by upper management in the GNWT and we will have to get back to you on whether or not we will be answering that question. If we do, obviously we will be giving the answer to you then in a written form.

**MR. BILL KLASSEN:** Thank you, Jason. Did you want to wait on a response from DIAND, the other agency you identified, Kevin?

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** I just wanted to confirm then that I would be getting a written response from the Government of the Northwest Territories that would indicate whether they are going to respond to it or not, and secondly, if they do choose to respond to it, they will provide some rationale or justification for whether they have considered it and whether they would actually act on this?

**MR. JASON MCNEILL (RWED):** Yes. The answer is yes to your question.

**MR. BILL KLASSEN:** Is there someone here from DIAND who would like to respond to the question as well?

**MR. FRASER FIRMAN (DIAND):** I am here from DIAND, but I don't have a comment. I can take it back to DIAND to those who have more authority than myself and get back to you, I guess. That is the best I can do right now.

Comment

**MR. BILL KLASSEN:** Thank you. I think that there is still in place, DIAND has a sustainable development policy. Whether that speaks specifically to this, I am confident it doesn't speak specifically to the establishment of a fund, an earmarking royalty for deposition in a fund like that, Kevin, but maybe that is the best we can do right now.

**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thanks, Bill. I understand that. I understand that Mr. Fairman is not the Minister of Finance, so.... But I do appreciate the effort that he will undertake to get a response from the federal government on this issue of targeted use of revenues from the project to encourage sustainable development and economic diversification. Thank you.

**MR. BILL KLASSEN:** Thank you, Kevin. Are there any other questions on the subject of sustainable economic development. Bob Turner.

**MR. BOB TURNER (NSMA):** In the past, in other scenarios, I have always talked about the idea of sustainable development and what our definition of that was. I have mentioned it to the Minister of DIAND, I mentioned it at the regional monitoring workshop, and I believe that we are at a time when we have the opportunity to ensure sustainable development occurs, because I think everyone is aware that when a large project happens out on the land, it doesn't matter how much restoration that occurs at the immediate vicinity of the area, they aren't going to be able to restore it back to its natural state.

There is a loss of habitat, there is an effect on the fish habitat, the wildlife habitat, and now in our regional area here, especially the Slave Geological Province, there is a lot of activity happening. There are a lot of areas that have been abandoned. There are abandoned mines. There are overpressured areas. There are a lot of areas that can be reenanced by a fund that industry could start contributing to as well as government where other areas can have habitat enhancement occur to balance out the lost habitat that occurs on new and existing mines. I just wanted to put that point out on the table that I think government and industry should begin discussing and coming to some realization that we have to consider more seriously the idea of real, sustainable development.

**MR. BILL KLASSEN:** Thank you, Bob. Ed Weick.

**MR. ED WEICK (Consillium and Gartner Lee):** I don't know, I was going to raise this under cumulative effects, but I think it has more to do with sustainable development. There are some sections within the EIA that read rather dramatically, I think. It is estimated that all existing and proposed mines in the Slave Geological Province will close within a time period of 20 years; between 2007 and 2028. That is a very alarming statement, I think.

Then it says what will happen after that, I think a page later, that there will be out migration from small communities to large communities. The final statement on the next page, "within a relatively short time period, as the mining industry phases out of operation, communities may then experience major social disruption in the face of sharply increasing unemployment levels." Bad things, okay?

Now yesterday we did discuss how long these mines might last, and the hope was expressed that they will last much longer than 20 to 25 years. When you read that all existing mines will phase out by the same time, by 2030 and thereabout, you sort of wonder what is going to happen after that. You hope and pray that more mines may come on-stream.

So really, when you are talking about sustainable development up here, I think what you are really talking about is an extension of this mining economy, this non-renewable resource economy, into the future. Hopefully they will find more diamond pipes, hopefully they will expand the existing ones, hopefully the thing can go on.

Because the kind of thing you are developing here through all of this is that kind of economy. If the mines close down, it closes down. I don't know if that is a question or a comment, but your EIA presents a rather dramatic statement and I thought it should be highlighted.

**MR. BILL KLASSEN:** Thank you for highlighting it. I was going to ask DeBeers if they wanted to respond to any of the comments that have been made.

**MR. JOHN MCCONNELL (De Beers Canada):** No, I think most of them have been comments, not questions.

**MS. JANET HUTCHISON (NSMA):** Just a question related to that last comment. Considering its mine design and looking at cumulative impacts, did DeBeers consider alternatives in terms of mine life or date of mine closure to take into account potential cumulative impacts, considering many of the mines will be closing within a few years of each other?

**MR. JOHN MCCONNELL (De Beers Canada):** I think in setting the production rate we did take that into consideration. The first consideration was ensuring an economic project. The second consideration we looked at mine life. We have also talked in there about exploration potential, and certainly we are continuing with exploration presently on the Campsall Lake properties.

That is an indication that we would like to see it go for longer, but I think the reality is that is the extent of the deposit as we know it right now.

**MR. BILL KLASSEN:** Thank you. Anything further on the subject of sustainable economic development? If not, we will move to the presentation by DeBeers on cumulative effects.

**MR. JOHN MCCONNELL (De Beers Canada):** Our presenter this afternoon will be John Virgil of Golder and Associates.

**MR. BILL KLASSEN:** Louie, are there lights at that end that can maybe be dimmed? That's pretty dim.

**MR. JOHN BERGELL (Golder Associates):** Good afternoon and welcome. The purpose of this presentation is to clarify the general approach used by DeBeers for the cumulative effects of the Snap Lake Diamond Project. The topic has been addressed in section 12.1 of the environmental assessment where it basically outlined the general approach.

In addition, there were a number of responses to information requests which explained how the cumulative effects assessment for the Snap Lake project really followed the framework of the practitioners guide.

The practitioners guide also emphasises the need for flexibility. For example, in the terms of reference it was explicitly stated that no determination of significance should be produced.

So DeBeers then came up with a way of simulating that by using environmental consequence. So the approach used for the cumulative effects assessment followed the practitioners guide, but was modified when needed to maintain a best practice approach.

Before I present the approach, I think it is first useful to define cumulative effects. The definition used in the environmental assessment for cumulative effects was, they represent the residual impacts from the Snap Lake project in addition to the residual impacts of other projects or activities that have been or will be carried out in the reasonably foreseeable future.

From the outset, it should be emphasised that DeBeers used information from the Snap Lake baseline and other mines in the Slave Geological Province to conduct the cumulative effects assessment. Baseline data really captures the effects of past and current projects, and natural and environmental factors. For example, baseline data on water and air quality includes long-range deposition from activities and natural variation in wind direction, rainfall and snowfall.

Similarly, the movement of caribou near the Snap Lake project reflects changes due to past and current developments, and also traditional and non-traditional land use.

However, it is difficult to separate the effects of a project from other influences such as tourism and outfitting camps or exploration camps. Although there are preliminary screenings available from Mackenzie Valley Land and Water Board for other activities such as tourism and exploration camps, information is limited to identifying the types of effect and the proposed mitigation. These screenings provide no predicted zone of influence and no assessment of the magnitude to change in socioeconomic and environmental components in the region.

We also have a limited scientific understanding of Arctic ecosystems. However this is one area where traditional knowledge of the plants, animals and the water bodies in the barren lands can help us interpret monitoring and research studies.

Now I would like to present the approach used by DeBeers. As I previously mentioned, the approach for assessing cumulative effects followed the practitioners guide developed for the Canadian Environmental Assessment Agency. This approach has also been adopted by the Mackenzie Valley Environmental Impact Review Board.

The first main element of the approach involves the scoping of issues. This is where we identify those issues based on key questions. They were used to identify potential environmental and socioeconomic effects from the Snap Lake project.

In addition to western science, traditional knowledge and community consultation used to identify those issues for the projects specific environmental assessment were implicitly transferred to the cumulative effects assessment.

The second element of scoping was to determine the spatial boundaries for each component. Really here we are asking how the effects of the Snap Lake project could overlap the effects of other projects and activities. It is important to point out that the spatial boundaries differ among components.

For example, environmental components really consist of two types. Those components which are relatively stationary and do not move very much such as geology, terrain, soils and plants; and other components which vary under degree of movement such as animals, fish, air and water and also traditional and non-traditional land users.

The socioeconomic component, the spatial boundary was defined as the primary communities in the employment catchment area, the Northwest Territories and Canada as a whole.

This map here provides examples of the spatial boundaries used for the cumulative effects assessment for the Snap Lake diamond project. For those stationary environmental components like plants, terrain, soils and geology, the spatial boundary consisted of the regional study area which is outlined by the black circle.

For more mobile components like air quality, the spatial boundary was determined and is outlined by the purple polygon shape you see there. It was determined by the concentrations of dust, the extent of those concentrations of dust and prevailing wind directions.

For the aquatic resources such as water quality, hydrology, hydro geology and fish, the spatial boundary consisted of a lockheart river watershed which basically runs from Snap Lake through McKay Lake, through Elmer Lake, Artillery Lake and into Great Slave Lake.

For wildlife and wildlife habitat, the spatial boundary was defined by the annual home range of the Bathurst caribou herd, which is outlined by these green lines. Finally, the communities highlighted in yellow represent the primary community and catchment area included in the spatial boundary for socioeconomic cumulative effects.

The third element of scoping involved determining the temporal boundary for these components. For all the environmental and socioeconomic components the

baseline data collected captured the effects of past and current projects. To forecast these effects into the future for environmental components consisted of the period from construction to closure, which is 26 years. For the socioeconomic components, the temporal boundary consisted of construction to 10 years past closure, or 36 years.

The second main element of the approach to cumulative effects involves the analysis of the effects themselves. The first thing to do here is to conduct a linkage analysis. First we need to ask the question, will the Snap Lake have a residual effect on a component? And by residual effect, we mean those effects after mitigation. Mitigation is also a key element of the practitioners guide.

If the Snap Lake project has no residual impacts on a component then there is no potential for cumulative effects. However, if Snap Lake project does have residual effects on a component, then we need to ask a second question. The second question is, do residual effects for the Snap Lake project overlap effects from other projects?

To answer this question, we need to predict the zone of influence for the projects. The zone of influence can be defined as the area within which a component will be affected by a particular project. And again here, just as with spatial boundaries, the zone of influence will vary among components.

For example, those stationary environmental components such as plants, soils, terrain, and geology, the zone of influence for those components from the direct effects of a project, or the physical footprint of a project, is limited or is equivalent to the actual size of the project footprint.

Alternatively, for wildlife movement and behaviour, the zone of influence may be anywhere from 10 to 15 kilometres of a project footprint. These numbers are based on monitoring studies at the Ekati Mine and the predictions from the Diavik environmental assessment. For socioeconomic components, the zone of influence extends to all the communities and municipalities that will be affected by the financial and social changes of a project.

Now this diagram here represents a hypothetical scenario of three projects and their associated zones of influence. The projects or developments are indicated by the triangles. The zone of influence is indicated by the outer circle boundary, and the range of the components is indicated by the shaded area.

Now the important thing to note here is that these environmental components that displayed little or no movement relative to the distance between the projects do not overlap zones of influence. Therefore we have no potential for cumulative effects. There is no valid linkage.

The second diagram provides the same hypothetical scenario; that is, we have developments with associated zones of influence, but there is one important difference here. The difference is that now we are considering those

environmental components that move over large areas of the landscape and have the potential to contact the zones of influence of these three hypothetical projects.

For example, the shaded area may represent the home range of a grizzly bear or a wolf, or the summer/autumn range of caribou. Or, just as importantly, it may represent the area of traditional land use. The thing to note, and I am sure you can see, is because of the extent of the movements, there is potential for the component, whether it is a grizzly bear, whether it is caribou, whether it is traditional land users to contact the zone of influence of these three hypothetical projects. Therefore, the potential for cumulative effects is there and the linkage is valid.

Now subsequent to conducting the linkage analysis, DeBeers identified several components that may be influenced by the Snap Lake project and other projects. That is components that show potential for cumulative effects. These were socioeconomics, heritage resources, traditional land use, air quality, noise, caribou, grizzly bears, wolves, and wolverines, wildlife health and human health.

After determining those components that show a likelihood for have cumulative effects, we then conducted a residual impact analysis. DeBeers used the same approach as the project-specific environmental assessment for the Snap Lake project. I also used information and results from other current developments in the Northwest Territories. For example, I used information on archaeology, air emissions, habitat loss and wildlife mortality from the Ekati Mine, the Diavik Mine, the Jericho Mine, and Lupin Mine. I also used information on noise, traffic volume and habitat loss from the Tibet Pontoto Winter Road.

Where it was possible and there was enough information to assess and conduct a residual impact analysis, the analysis was quantitative. For example, we used air modelling and there was GIS based habitat loss that was used. For cases where the information was limited or lacking, we used more of a qualitative assessment and professional judgment.

Now after conducting the residual impact analysis, another main element of the approach for cumulative effects involves the determination of environmental consequence. Here again we used the same methodology as a project-specific assessment for the Snap Lake diamond project. This included assessing criteria such as magnitude, geographic extent, duration and reversibility.

Reversibility here was used to indicate the potential for recovery from an impact. For example, components with high resilience are more likely to recover in a shorter period of time than components with lower resilience.

DeBeers also incorporated the elements of uncertainty into impact analysis. These elements of uncertainty are defined in the environmental assessment and include limited data about the environment, natural variability in the data,



measurement error, capability of the model to capture reality, understanding ecosystem processes including reversibility, and the quality and quantity of information available for other projects.

It should also be noted that these elements of uncertainty were specifically addressed in the discussion on cumulative effects of wildlife in the environmental assessment and in addition, they will be used to help design monitoring programs for the Snap Lake project.

The final main element of the approach for the assessment of cumulative effects involves the consideration of monitoring. DeBeers has designed baseline studies to collect data that can be used to understand the contribution of the Snap Lake project to the regional cumulative effects of diamond mines on environmental and socioeconomic components in the region.

For example, baseline studies for wildlife and wildlife habitat follow the study protocols used at the Ekati Mine and these study protocols are also being used at the Diavik Diamond Mine.

To summarize, there are a few important points that I would like to emphasize. DeBeers followed the practitioners guide. The practitioners guide, one of the elements is that there needs to be flexibility in approach. So DeBeers customized the approach to deal with specific project requirements and the terms of reference.

All in all, DeBeers learned from the experiences of other EAs in the NWT and applied a best practices approach based on the information available to conduct their cumulative effects assessment.

Furthermore, data collection is consistent with those used at the Ekati and Diavik Diamond Mines to contribute to our regional understanding of cumulative effects. Thank you.

**MR. BILL KLASSEN:** Thank you, John. What I would like to do now is to canvas the room for questions of clarification on the presentation, and then having done that we will have the presentation from the Yellowknives Dene, and then we will move to issues or concerns related to the subject of cumulative effects. Are there questions of clarification? Florence.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Just a question on the caribou. You only mention the Bathurst herd. Did you look at other caribou herds?

**MR. JOHN BERGELL (Golder Associates):** No, Florence. Our information really tells us that the majority of animals that are moving through the Snap Lake regional study area belong to the Bathurst caribou herd.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** John, based on your information, you said. Where did you get your information from.

**MR. JOHN BERGELL (Golder Associates):** The information comes from the satellite collared animals that RWED has.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** John, the presentation made by Anne Gund, if you remember -- oh you were not here? Were you here? She noted in her presentation that she had two female caribou that were not part of the Bathurst herd.

**MR. JOHN BERGELL (Golder Associates):** Yes, but that is just really recent information, Florence. I think it is important to understand that the writing of this environmental assessment actually began more than a year ago, and it is difficult once you get that new information to go back. So yes I have seen that information and that will be considered in the future.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Just one more question. John, in your presentation you said that a practitioners guide. I am not familiar with that. If you could just explain that to me. Thank you.

**MR. JOHN BERGELL (Golder Associates):** There is a cumulative effects practitioner's guide. It is a guide. It was built for the Canadian Environmental Assessment Agency. It has also been adopted by the Mackenzie Valley Environmental Impact Review Board. In that guide it basically outlines the process that a proponent should go through in order to do a best practical job of assessing cumulative effects.

**MR. BILL KLASSEN:** Are there other questions for clarification? Greg.

**MR. GREG EMPSON (Yellowknives Dene):** Two issues. First, you mention that the data collection process used was the same as that used by both Diavik and BHP. If I understood what you were saying though, was the model or the methodology that was used was similar to that used by both Diavik and BHP and secondly, I didn't hear anything about monitoring of cumulative effects in the future. Was that something I missed or was that something that was not...

**MR. ROBIN JOHNSTONE (De Beers Canada):** The last slide was on monitoring, Greg, and basically what the statement there is that we recognize that there are initiatives that are ongoing to address regional cumulative effects, but in the meantime we will continue to collect information that is in a form and collected in a method so that it is comparable with the methods being used elsewhere. So, for instance, caribou surveys, similar methods between BHP and Diavik and DeBeers.

**MR. BILL KLASSEN:** Any other questions of clarification on the presentation? Okay, if not we will then move to the presentation by the Yellowknives Dene. I believe that is Alice Abel.

**MS. ALICE ABEL:** Good afternoon everyone. I would like to say something in my language first before I begin. Mahsi cho. (Translation not available) I just wanted to introduce myself in my language.

Within the Yellowknives Dene First Nation there are many programs, and one of them is the Health and Social Development Program. There are about six staff. We provide programs and services to the members of N'Dilo, Dettah and Yellowknife and also other non-Dene people too. There is the manager position, that is Mary-Lyn Erasmus. The drug and alcohol counsellor, that is the program I am working in. There is the cultural program, a justice program that just started a couple of weeks ago, a coordinator was hired. We have a child, youth and family counsellor and there is the Canadian prenatal and nutrition program. Also, the aboriginal healing coordinator.

The kinds of programs and services we provide are we have the awareness/prevention programs, like drug and alcohol programs, family violence awareness programs, one-to-one counselling. Also, on the land we have programs. We have youth and cultural programs. This past summer we had a three-month program on the land for the children and the youth which was very successful.

The part on the cultural aspect of it is where it is really important for our young people to understand our culture and languages. Our programs are providing that kind of service to the communities. With any kind of resource development in the North, there is always a social problem.

As you can see this chart here, all of those are the social issues within the communities. Our programs provides services to all these problems within the communities. We work in three different communities like I mentioned. There is quite a bit of work that is involved. These are all the social problems. As you can see, we have a qualified staff to work with people in the community to help people to change their lifestyle from being in a place where they are not feeling good, they are feeling down, they need help, they need the support, we are there to help them.

We do turn to the elders too for their help and support. We get guidance from them too. Here, lots of traditional values, beliefs, culture and language, as the young people today, for them to really understand their culture we have an on the land program. Little small kids, children and youth are picking up their language, but as time goes on that needs to continue.

As you can see, there is quite a bit. This is a large -- the majority of it are the issues in the communities. We have been working with people to help themselves too. Our program, what it would like to do -- I know DeBeers are talking about programs within their project -- we, in the health and social development program, would like to deliver programs and facilitate workshops to the employees.

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For the funding situation and resources, we need more staff to deliver the programs with DeBeers. I would like to ask Rachel to say something in case I missed what I needed to say.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** For example, financial problems, unemployment issues, problems maybe in a marriage or if somebody who is working needs to talk to somebody in the employee assistance program that is being offered, if they wanted to turn to somebody maybe they could talk to someone from our health and social program instead of someone who is hired from down south who is hired as a consultant to the company. We were thinking more in terms of culturally relevant counselling programs that we could look at in the future.

A lot of our young people will not talk to a stranger, someone who is not from the north and doesn't know the north and doesn't know how the problems are for us in our communities. So, we were thinking that maybe we could do something differently with people we have already worked with, Dene people in the north.

Alice speaks Dogrib, she is from Dettah. I grew up with her in Wool Bay. We know a lot of the Dene families. Marilyn is the manager, she has worked with the Yellowknives Dene and worked with the health and social program for a number of years. She knows more about the issues. The program that is being delivered for our membership is geared towards what we can do for our membership right now, but we are thinking maybe we can do more for our young Dene employees who will be working in the future, if they need help.

I know that from when we did work on the Diavik environmental assessment, we noticed that the socioeconomic section of the technical sessions did not offer a lot for our young people. The communities were left with trying to figure out where to find help for the young people who were having problems. They were making lots of money, they don't know how to budget and they are spending money in areas they shouldn't. There have been marriage problems, breakups, it is affecting our communities and we are trying to get a handle on this type of scenario. Maybe we can do something together, even with the other aboriginal communities.

This way we get the culturally relevant counselling sessions that might work with employees who will stay with their jobs and help their families and be the recipients of your hoped for future awards, where there are good employees, and good providers for their families when they get back home for their two weeks off or something. This is what we were thinking about.

The program, the Yellowknives Dene First Nation health and social development, is really funded with not very much money. We do what we can with what we have and we always have to keep fundraising. Alice was here to present that viewpoint.

**MS. ALICE ABEL:** The other thing I would mention is doing things in our language, which is really important. People who are coming to the office, they feel comfortable to speak in their language which is really important. When they are feeling comfortable in whatever language they want to talk in, English or Dogrib, they can get in touch with their own feelings and really express what they need to say.

I know there are a lot of members from Dettah who are working at Diavik and BHP. When they go back to work the children at home are saying, "Where is Daddy? When is Daddy coming home?" It affects the family at home too. We would like to provide that program with employees that would be working at DeBeers so that we will be working with the father and the family.

When they get back home, things would not be as tough. When the father comes back, once the children are getting close to their dad, then he leaves again. It is tough. These are the things we are working on with families, to help them to live in a good way, to have a better life for themselves.

**MR. BILL KLASSEN:** Thank you, Alice and Rachel. I think that gives us a much better understanding of some of the social issues that are faced in communities as a result of development and the attendant pressures on families in communities. So thank you again.

Perhaps before you put the mic away, Alice, if someone has questions. Are there any questions of either Alice or Rachel in connection with this information? Florence.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Just a question to Alice. Outside of the Dettah and N'Dilo members that your program services, were there other people from other aboriginal communities that came for services there also?

**MS. ALICE ABEL:** Yes. There are people from Rae, Lutselk'e, the Sahtu region. So these are not within the community but outside of the community. Also, people who are living within the community but are not band members but are living with someone in the community. So we do provide service to them.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Were there people who spoke in their language with them?

**MS. ALICE ABEL:** Well, at the present time there are two staff who speak the language at the present time, but we don't have other people who speak Chippewyan within the office there.

**MR. ED WEICK (Consillium Gardner Lee):** Alice, is it getting better or is it getting worse? Do you have more work or less work, what is happening? You've been in operation for a while. Are things getting better or worse in your community? What is the situation?

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**MS. ALICE ABEL:** It varies. Well, the program has been in existence since 1994. They started with one staff at that time, and there were two the following year. So now we have more staff. Within each program we have one worker within the program, as we are dealing with doing -- like we are doing all different kinds of work: home visits, one-to-one counselling, delivering programs. Whatever we do in one community, like if we do a presentation in N'Dilo then we do the same thing in Dettah.

Last month was National Addictions Week, so we had activities within the community in N'Dilo and Dettah. Even making a banner where it says National Addictions Week, Drugs and Alcohol are not our Medicine, Return to Culture. Then we have a symbol, "Keep the Circle Strong" and then we have the four colours. It was on a canvas that is 15 feet long and 5 feet wide. We made two of those to put up in the band office in both communities, so whatever we do in one community we would do it in the other community.

So during the National Addictions Week we had programs. Also doing awareness in the communities.

**MR. ED WEICK (Consillium Gardner Lee):** But do you feel you are making progress, are there more kids doing drugs or fewer kids doing drugs? What is the situation? Is it changing for the better or for the worse?

**MS. ALICE ABEL:** It is slow. There are people who I know who used to drink and do drugs, now they are sober today and it is really good to see that. They made the changes in their lifestyle. And also, being there for their family.

**MR. RICHARD MOLYNEUX (De Beers Canada):** I really just wanted to provide some explanation. Reference was made, I think be Rachel, to our employee assistance program. This has been recently introduced by DeBeers, valuable to all employees and it is offering a counselling service to address the sort of issues which have been brought to our attention. I appreciate that this has been introduced using a southern consulting company and there are possibly cultural elements which make it insensitive, and we will certainly revisit that with a view to perhaps using local resources for the counselling. Thank you for suggesting that.

**MR. BILL KLASSEN:** Thank you, Richard. Thank you, Alice and Rachel. It was very helpful. I would like to move on then to the socioeconomic cumulative effects and go around the room to see whether there are issues that people want to discuss in connection with specifically socioeconomic cumulative effects and then we will move onto what on the agenda is called global cumulative impacts. Any issues on socioeconomic cumulative effects? Ed Weick, and others.

**MR. ED WEICK (Consillium/Gartner Lee):** I raised this earlier and I have a better understanding of cumulative effects now. What was said was the temporal boundaries for socioeconomic cumulative effects, I think, exceed the life of the mine by 10 years, I believe that was said. Within that period of time, again getting

back to an earlier point, several mines will shut down. The zones of influence overlap. They will all affect the primary communities and the catchment communities. How does DeBeers propose to work together with the other mining companies and with government to mitigate those cumulative effects and to deal with any residual impacts that may occur?

**MR. BILL KLASSEN:** For now we are just going to record these items, and once I have a complete list we will have a discussion on them. Heidi Klein had her hand up, and so did Roy.

**MS. HEIDI KLEIN (Gartner Lee):** I just wanted to ask some questions about the socioeconomic data.

**MR. ROY ELLIS:** I have an issue related to the quantitative side.

**MR. BILL KLASSEN:** Thank you. Are there others issues? Bob Turner.

**MR. BOB TURNER (NSMA):** I have an issue with the cumulative effects in regard to increasing populations of potential employees.

**MR. BILL KLASSEN:** Are there any other items? Yes, can you introduce yourself. I think you just arrived.

**MR. GARTH WALLBRIDGE:** I was here at the outset and I am back today. My name is Garth Wallbridge, and I am legal counsel for the Rae Edzo Metis Nation. We have a question relating to the impact of the socio-economic landscape so far as the Rae-Edzo Métis go.

**MR. BILL KLASSEN:** Are there any others? Okay, if there are not, then let's go back to Ed Weick's point on temporal boundaries. Ed, do you want to elaborate on that before De Beers responds?

**MR. ED WEICK (CONSILLIUM/GARTNER LEE):** Ed Weick, Consillium Gartner Lee. Not really. I think the idea is that within, if there is this sort of overlap beyond the life of the mine, then that would suggest that certain mitigative measures can be put in place by all of the mines that are going to be shutting down, with the cooperation of government. I would just like to hear De Beers address that particular issue.

**MR. PETER HOMENUCK (IER Terriplan):** Peter Holinik, IER Terriplan. I think, Ed, your question was how De Beers intends to work to mitigate the potential effects of the mine closures occurring within a fairly short period of time. I think that we've acknowledged that and recognized that in the cumulative socio-economic analysis. And in that respect, notice that we have put very heavy reliance on impact management measures, the need for partnering with a wide variety of government organizations, community organizations, for the purposes of increasing transferable skills to provide for people having the opportunity to find other employment, whether it be in mining or in something else. And during

that roughly 25-year period, we think that there is considerable scope for developing a range of other kinds of activities, services, and industries that can benefit from the mining being here but not solely provide the mining. So we think that there's the opportunity to develop some entrepreneurial kind of partnerships, and I think that's the emphasis that is implied in some of the measures that have been identified.

**MR. ED WEICK (CONSILLIUM/GARTNER LEE):** Ed Weick, Consillium Gartner Lee. I think that I don't really expect more of an answer than that for the moment, but there will be a problem. Twenty years, 25 years is not very long, and it has to be dealt with. Thank you very much.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I'd just like to make another point on what Ed has raised, and I guess I've been a miner and my father was a miner, and I hope my daughter gets in the mining business, and her children. So, you know, when we talk about the life of these mines, I would hope, and I think that government has a role here in encouraging exploration in the NWT. I think we recognize that probably the Slave province has one of the greatest potentials in the world for resources, mineral resources. And I think it's up to the GNWT and the federal government to put in incentives to encourage further exploration and to ensure future mine development.

**MR. BILL KLASSEN:** Thank you. We will go then to Heidi's point on socio-economic.

**MS. HEIDI KLEIN (GARTNER LEE):** Heidi Klein, Gartner Lee. I'm just reviewing some of the IRs that were put forward, and what I would like to get is a fuller indication of the information used to identify impacts from other projects. What data sources did you use? What effects analysis did you undertake?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Heidi, Robin Johnston, De Beers Canada. Can you provide more information there, rather than... so we don't have to go through all the EA this afternoon.

**MS. HEIDI KLEIN (GARTNER LEE):** Sure. I'll make reference to the presentation that was just completed by John. You made reference to Ekati and BHP and that you had information from the effects of those projects, which were included in the cumulative effects analysis in this project. And I just want to get a full understanding of what kind of information did you collect, what reports did you draw on, things like that.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnston. It's a general question. I'm going to give a general answer. So we included things like the wildlife effects monitoring program report. We included information from the West Kitikmeot Slave study. Peter, would you like to cover some of the issues that were discussed in the socio-economic?



**MR. PETER HOMENUCK (IER Terriplan):** Well, we had access to the list of issues that were identified by communities and government for both Ekati and Diavik. Those are very similar to the issues that... those were the site-specific studies, very similar to the issues for De Beers. So that reinforced in our minds, reinforced that the issues that we identified for De Beers were relevant, so that gave us the comfort that we had the key issues to address. And as you know, we developed them into five specific questions that we analyzed and probed. There are some bits of information that we had that were more quantitative, specifically around the number of employees. But other than that, the information that came out of the project- specific EAs.

**MS. HEIDI KLEIN (GARTNER LEE):** Heidi Klein, Gartner Lee. Did any of these pieces of information or datasets talk about to the residual effects from the impacts identified previously from these other projects, so I have a clear idea of how your residual effects linked with the residual effects of other projects?

**MR. ROBIN JOHNSTONE (De Beers Canada):** Robin Johnston, De Beers Canada. I think by definition, that's what cumulative effects analysis is. And so the Diavik environmental assessment, you know, even the recent GNWT diamonds and... or communities and diamonds certainly provide information. But the focus is on, by definition, is on residual impacts.

**MR. BILL KLASSEN:** Okay, we'll move to Roy's question.

**MR. ROY ELLIS (ELLIS CONSULTING):** Roy Ellis, Ellis Consulting Services. What I'll do is try and introduce the question. I'll get to the question at the end, so bear with me for a minute. But what it really relates to is the lack of what appears to be a quantitative analysis in the sections, primarily due to or relating to the employment and the business...(inaudible)... and so on impacts that relate to that. And really, what you have is you've collected the baseline data. The linkages you've established that BHP and Diavik overlap the primary communities. You've identified the... you've done extensive work on the labour force. You've got labour force data from 1999 in your baseline. There's other work that you've done since then trying to identify labour market. You've got the employment impacts of those, Diavik and BHP, quantified. But what's missing and I think what's critical to understanding the impacts of the project, and to what people really need to know is that you haven't taken that next step then and done a quantitative analysis where you've taken your baseline, added your project, added these other projects, showed the impact on the labour market, and we get back to the... what I call the 40-60-60, the assumptions that were made on terms of northern -- and I'm not talking about targets now. I'm just talking about the numbers that were there.

In the cumulative impacts section is really the section we would've expected to see that tested, to show whether those numbers were reasonable or not. In other words, is the labour market in the Territories able to absorb that? You're predicting somewhat over 900 jobs in the operations side. Is the labour market

able to absorb that employment impact without significant migration? Your assumption was 150 families are going to move to Yellowknife during the operation side. Now, the question is, I would've expected in this section that that prediction be tested and shown that the labour market could... now, you did refer to the work that was done at BHP and Diavik. Both those assessments went that next step and attempted to relate it to the labour market, and show how they related to the other projects. Because the information's critical for... like, for example, the City of Yellowknife wants to know what's the potential demand for housing when this project opens? Does land have to become available? All those things take time to plan. And really, in this section, I would have hoped to have seen some quantitative numbers presented that would... and we realize there's risk and there's uncertainty and all that. But really, you're in the best position of doing this work to give those numbers out. And those are the numbers that are really needed for the board and I think the effective parties and the other stakeholders to understand the project.

So after all that, my question is, will you undertake this analysis and present a quantitative... where in essence, what I think you were supposed to do, which is to take your baseline data and pose your project plus these other projects, show the impacts, and show them quantitatively. That's what I really expected to see here, and I hope that you would do that now.

**MR. BILL KLASSEN:** Thank you, Roy. We'll wait for De Beers to respond.

**MR. ANDY SWEDERSKI:** Good afternoon. Andy Swederski, with Terra Plan Consultants. I'd like to respond at least in part to that question. The cumulative effects of the Snap Lake project have been completed as presented in the environmental assessment report, both in Table 5.3-2 and also in Appendix 5-2. The issue with regards to presenting cumulative effects both within the project itself have been done at the employment, the gross domestic product, and the labour income level, both for the NWT and for Canada. The aggregate levels of labour demand were examined, and it was based upon that examination that led to the approach that De Beers undertook in conjunction with what was already presented on the human resource plan.

I will come back to the specific point that was asked, but I think it's important to understand part of the challenges that are inherent in making these types of predictions. The NWT labour market really is characterized by a number of very significant challenges. The Government of the Northwest Territories, through the fine work of the Department of Education, Culture and Employment, and specifically some of the work that Mr. Gilday's division undertook, in 1997, an NWT labour force development plan was released, and that was subsequently updated just this summer. One of the principles that guided the work of both those documents, which are very fine and very helpful documents, the first one we were able to use directly in the submission, they identified among a list of characteristics is the fact that labour market information is, first and foremost, it's

a complex issue. The data does exist, is incomplete and it's not particularly well-shared across government, employers, and individual workers themselves.

The other point is that in order to address that, and it's a fundamental issue that needs to be addressed, is that no one actor can do that on their own. Government can't do it on their own without the input of employers. But individual employers, whomever they may be, also need to rely and make use of that labour market information. Who's out there? What are their skills? What are their potential? To be able to do human resource planning and labour force analysis.

And attempts to address these types of dynamics are really complicated by the fact that much of the data that is so crucial for this kind of planning is private. It's in the hands of private companies, from small companies to large companies. The issue of protecting the individual rights of employees is paramount. In short, it's extremely difficult to get at that level of data that I think some would like to be able to work at, but in fact, it's a realistic limit. If someone came to my company and asked the names and details of all of our employees, I would have to think twice about what level of detail I could give them; where their residency is, are they on a rotational basis. Those are corporate decisions that are made.

Now, the work that has been done is certainly progressive by the government and by some of the other larger employers, but the fact remains it's a significant gap.

What I found encouraging through not only the labour force development strategies that the government is undertaking, is they reference the issue of partnerships to not only collect that data but to build an ongoing dataset that all employers could draw upon. In the recent document, there is in fact an implementation plan that talks about setting up a number of very specific initiatives to do that, which includes job futures reports, update on employers surveys. There's dissemination and promotion of employability skills information, and importantly, to implement the actions that were outlined in the electronic labour exchange. These are fundamentally progressive steps, and De Beers is totally behind it.

In fact, if you had the opportunity to listen to some of the proposals from John Simpson's presentation, it's contributing to that dataset that's vital.

The issue of making specific forecasts for impacts on employment, unemployment rates, is equally challenging. It can certainly be done. I would... I would go so far that to indicate that some of that is important information for regulatory agencies to consider, but the labour market in the NWT can be summed up in a couple of points, and I'll draw upon the conclusions that were reached from the work of the GNWT.

We have a chronic skills shortage. We have a chronic shortage of people available for training in those right sets. What we need to do is, in partnership,

put in a whole range of initiatives, supports, so that those skills are developed and they're transferable, across the life of the mine and when mines close.

The effect of predicting the impact on labour market is even more complicated now with the advent of oil and gas development, or the potential thereof.

In short, the approach that has been taken, I believe is a reasonable one. Forecast can certainly be made, but I would also I guess conclude by saying that even the GNWT does not make unemployment projections. It reports on employment levels and status, but it fundamentally does not issue the employment/unemployment forecast. There are some independent analyses.

**MR. BILL KLASSEN:** Thank you, Andy. Roy.

**MR. ROY ELLIS (ELLIS CONSULTING):** Roy Ellis, Ellis Consulting Services. Yeah, if you ask people, there's a lot of things the GNWT doesn't do, so that's not... that's just an aside, but I'm not sure there was an answer in that comment to my question. But to use one of your phrases, just... but basically, the cumulative... the quantitative cumulative effects numbers that were given that you referred to, there was just two sources, and one was where you just summed the total employment impacts over the life of the mine, of your single project, and called that the cumulative impacts. That's not very helpful because anybody could do that.

The second was in the text, which basically said employment demand will go up if you have more projects. And that in itself is not particularly helpful in terms of planning purposes. So really, just to restate the question, so I'm not sure if you were trying to tell me your baseline data is inadequate to do a prediction on, or... like, I'm not... I'm assuming that your baseline data is adequate and I'm assuming that you've got the quantitative numbers for these other projects, and you have the information on the labour market. I'm just asking you to do the... take the next step and do the analysis that produces those projections, and then everybody will realize that there's an element of uncertainty and risk in using them, but they will serve a very useful purpose in helping people understand the impacts of the project.

**MR. ANDY SWEDERSKI:** I'll let De Beers respond directly as... sorry?

-- Interjection

**MR. ANDY SWEDERSKI:** Andy Swederski with Terra Plan. I'll let De Beers respond to as far as making a commitment. As far as my response, I think the point I was trying to make is that the assessment that was done is probably as reasonable as exists. Attempting to forecast, we can do all kinds of spreadsheets. My view is that I'm not sure that they would add particularly anymore detail to the understanding.

The fact is the previous larger projects that went through environmental assessments had predicted that the entire, their entire labour force requirements could be absorbed by the market. De Beers' position was that it was likely not in that situation, and that it compelled them to come up with a much more aggressive array of training programs to meet that.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I guess what Andy is saying is that because of... those numbers could be generated, but because of the high uncertainty with them, they're probably valueless. And I think Roy's... you know, on behalf of the board, if they want to make those predictions in their technical reports, they're quite welcome to.

**MR. BILL KLASSEN:** Thank you. Have we taken this discussion as far as we can today? Okay. We'll move then to Bob Turner's concern about increase in populations.

**MR. BOB TURNER (NSMA):** Good afternoon. Bob Turner, North Slave Métis Alliance. My comments are going to be relating to cumulative effects deriving from increasing populations. I guess not only from the mining company but government. We've always been concerned that as development increases, so does the pressures to our resources. And this is a cumulative effect on our resources being depleted, which is creating a negative impact. I guess to back up my comments, the government is the largest employer in the Northwest Territories. Having a centralized government as the majority of their employees in Yellowknife, the diamond industry, Diavik, BHP, and now De Beers will most likely have the majority of their employees located in Yellowknife.

The increasing populations has not always been a benefit, and especially to the aboriginal people of this area. I have always believed that the government should be putting every effort into decentralizing, and it is not, I believe, any benefit to have to us to have seven MLAs in one community in the Northwest Territories, which is almost half of the MLAs in the Territories.

With the increasing populations, I'm sure there's going to be another group jumping up and saying we need another MLA, and that has a negative impact on all of the smaller communities in the Northwest Territories. With all of these increasing employees coming in, it's... their families, which is more than just a number of employees, and with that comes a lot of recreational use of our resources in the immediate area and along the Ingraham Trail. You have increases in wildlife wastage. You have increases in infractions of both the Wildlife Act, the Fisheries Act, and I'd like to, I guess table a statistic that with every individual that's charged, there's probably 50 others that are doing the same thing but not caught by any authority. Maybe the government could study that and see if I'm in error.

But we've also... we have to deal with the increasing cost of living because of the increasing need for infrastructure in the community. We have to deal with the

increasing numbers of squatters down the highway to Rae, down along the Ingraham Trail.

And all of this is increasing pressure on the resources that the aboriginal people of this area rely on. We have to travel farther for moose. We have to travel farther for caribou. Our forest resources for firewood. We have to travel almost halfway to Providence to get a good supply of firewood. And the fishing resources are being depleted along the Ingraham Trail. Through studies, it's been determined that the impact is a very negative impact on the fish and the lakes along the Ingraham Trail. In particular, Prelude, Prosperous, and other lakes in the vicinity.

And in addition to that, we've got the annual winter road from Tibbitt to Contoyto. We've got an increasing number of loads that are going on that road. We have increasing use of the public having more open access to the resources and land. So our land and resources are being exploited increasingly as we move forward into I guess progress and the economy, so what that... and from GNWT comments, they stated they would like the mine to commit to encourage people to move North, and I do not agree with that. And they also would like to increase the numbers of that mining management advisory committee, and I do not agree with that. I agree with John McConnell, where the numbers should be low and government and industry only need to have an individual representative on that, along with the four other aboriginal groups.

So in conclusion, I guess we... I believe we, along with the Yellowknives Dene, Lutselk'e, and the Dogrib, should have priority in all benefits deriving from this project. And I'd like to know if government and industry would commit to start dealing with the negative impacts deriving from increasing populations in the city, and will there be a commitment to treat the four aboriginal groups with a priority in all opportunities and benefits deriving from this project.

**MR. BILL KLASSEN:** Thank you, Bob. You touched on both the socio-economic and the bio-physical cumulative effects. So the question at the end was looking for some commitments from De Beers and from government, so I'll provide the opportunity for De Beers to respond, and then the GNWT.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. Thanks, Bob. I think yesterday we presented a whole range of items we feel will go some ways towards dealing with the negative impacts. But I'm not sure that De Beers can solve all of the negative. I think it will take all of us collectively working to try and do that.

**MR. BILL KLASSEN:** Can I ask someone from the GNWT to respond to Bob's query?

**MR. DAVID GILDAY (ECE):** David Gilday, from the Department of Education. The questions that have been posed are obviously quite political, and I think that what we'll have to do is, and as people know, they've been well-discussed at the

political level in the NWT. So we'll take that under advisement. We'll ensure that the appropriate government representatives are aware of them, and we'll respond at a later time. Thank you.

**MR. BILL KLASSEN:** Okay. Thank you. The last person I had on my list that wanted to speak to socio-economic cumulative impacts was Garth Wallbridge.

**MR. GARTH WALLBRIDGE:** Thank you. I in fact don't want to speak specifically to the issues. Rather, my client, Mr. North Douglas, the vice-president of the Rae-Edzo Métis Nation No. 64 will speak to the issue. But just by way of introduction, we with the Rae-Edzo Métis Nation believe that there's been a major technical issue that's been ignored so far -- inadvertently or advertently, we're not certain -- and that is how the De Beers project will address the social and the economic impact on the Metis of Rae-Edzo.

As a lawyer, I can only imagine DeBeers is doing litigation monitoring in their work leading up to the development of their mine. They will know there is a recent court decision that speaks to the issue, by way **Oberter**, and that is the way where judges, when they sometimes make decisions throw in something that is not really relevant to that specific decision, but they throw it in there anyhow because they think it's important.

There is a recent decision of the Federal Court of Canada that the Rae-Edzo Metis are likely a fifth community, our could be a fifth community under the Tlicho Agreement. We think DeBeers needs to consider that.

My last comment is, we are late to the table but we are here. We are not going away. Mr. North Douglas, the vice-president, has some comments.

**MR. NORTH DOUGLAS:** Hello. My name is North Douglas. I am the vice-president of the Rae-Edzo Metis. I have several points I would like to bring to your attention. We are a party that has been affected by this proposed mine that is going to be happening here. De Beers needs to be working on an impact benefit agreement with the Rae-Edzo Métis Nation.

There have been two previous IBAs that have been negotiated. The Rae-Edzo Métis have not benefited at all from BHP or Diavik. Our people, only two of them got jobs. They got their jobs through the Dogrib Rae Band. What I am saying now is, this must stop now.

The Mackenzie Valley Impact Review Board has granted us direct affected party status. We are here because we have found some money, despite what has been happening in the past. I recently had some very good talks in our developments with the Federal Government of Canada and things are looking good.

So my question is, when can we meet?

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**MR. ROBIN JOHNSTONE (De Beers Canada):** Thank you very much. I think one thing that I would just like to start off with and then I will hand it over to John McConnell is that De Beers considers that the impact assessment has considered the Rae-Edzo Métis through the impact assessment and through the impact assessment on the populations of Rae-Edzo and Yellowknife by basically concluding the impacts to the Metis in those communities would be the same as the rest of the population or within the range of the impacts established by the population. I will pass it over to John McConnell.

**MR. JOHN MCCONNELL (De Beers Canada):** In terms of impact benefit agreements, North, I would be happy to meet with you to discuss that. I am a little confused, though, because in discussions over the course of the past couple of weeks you've told me that you are a member of the North Slave Metis Alliance. We are already in negotiations with the North Slave Metis. So perhaps you can help me out about the relationship between the Rae-Edzo Métis Nation and the North Slave Metis Alliance.

**MR. LOUIS AZZOLINI (MVEIRB):** Before we go down that road, I just want to get a word in here. I want to make sure that it is clear that because you are a directly affected party does not necessarily mean you are entitled to an IBA. An IBA is a private agreement or a private contract between two parties. As Yellowknives Dene have made clear, it is privy to those two parties unless they choose to do otherwise.

Now, the rules of procedure say that a directly affected party is someone who essentially is an occupier of land that could be affected. In this case, folks living in Rae Edzo are designated as a primary community for the purposes of the environmental assessment and the potential impacts of presumed social, economic and environment.

The board has granted direct standing to the Rae-Edzo Metis, and they were granted standing as a directly affected party. Now with respect to discussions on IBAs, and all of that, that is something that should occur if they want it to occur, but I don't think we are in this room to negotiate those kinds of things or places where you are going to meet.

I think we are trying to bring a context to these discussions which are productive and constructive and that lead to resolution of issues. I hope that we can maintain that spirit as we draw near the close here. If there is time afterwards that you get together and chat about it. But for now, I think, let's stick to the technical issues, please.

**MR. GARTH WALLBRIDGE:** Thanks, Louie. We understand what you have said and we knew that before we came here, of course. To answer your question, John, about the relationship between the two organizations, I think the best thing we can do is direct you to the litigation. It is pretty explanatory in there.



It is a complex issue. We are not here to get things bogged down in that. I will get you a copy and we can go from there. Thank you for your commitment to talk.

**MS. JANET HUTCHISON (NSMA):** Mr. Wallbridge, I am just wondering if you could clarify for everybody what case you are referring to?

**MR. GARTH WALLBRIDGE:** One of the names on the case is Clem Paul.

**MS. JANET HUTCHISON (NSMA):** You are referring to federal court action T-646-01?

**MR. GARTH WALLBRIDGE:** I don't think we want to go down this road too far, Ms. Hutchinson, but the reality is if that is the citation, that is it. All I know is that one of the names on the case is Clem Paul.

**MR. BILL KLASSEN:** As the facilitator, I suggest that we take this discussion outside of the room. I am not offering to hold anybody's coat, either. Thank you. I would like to go back to the individuals who raised the issues to see whether we have closure on any of the points that were raised and then Michel Paper has asked, he is one of the elders from Yellowknives Dene has asked for an opportunity to speak.

I think despite what the agenda indicates, we are probably going to need a coffee break here, so let me start with Ed Weick. The point you raised, has that been resolved?

**MR. ED WEICK (Consillium/Gartner Lee):** Yes, to the point that it can be resolved now, at this point in time.

**MR. BILL KLASSEN:** Thank you. Heidi Klein, your concern?

**MS. HEIDI KLEIN (Gartner Lee):** I will follow up in a sidebar rather than belabour it here.

**MR. BILL KLASSEN:** Thank you. Roy Ellis.

**MR. ROY ELLIS:** We will probably follow it up. There are still outstanding...

**MR. BILL KLASSEN:** Okay. Bob Turner, your point...

**MR. BOB TURNER (NSMA):** I am sorry, you are going to have to...

**MR. BILL KLASSEN:** I think the comments you made and the questions you asked, I wanted to know if you felt they had been resolved. Given that some of the responses were "we have to go away and take this to other people" I would guess it is not resolved.

**MR. BOB TURNER (NSMA):** No, it isn't resolved and in regard to Mr. Gilday's comments I am wondering if we can get a written response?

**MR. DAVID GILDAY (ECE):** That is what I was meaning to do.

**MR. BILL KLASSEN:** Thank you. North Douglas, or Garth.

**MR. NORTH DOUGLAS:** De Beers, hello. We are pretty easy to get along with and we are very proactive, and we would like to meet. Thanks.

**MR. BILL KLASSEN:** I take that to mean you have got the answer you wanted.

**MR. GARTH WALLBRIDGE:** Yes, thank you.

**MR. BILL KLASSEN:** Okay, Rachel, if Michel Paper wanted to come up and talk, this would be the time to do that. You'll need your headsets.

**MR. MICHEL PAPER:** Hello. My name is Michel Paper. I will tell a story.

-- Translation not available

**MR. BILL KLASSEN:** Thank you very much, Michel. That was fascinating. Thank you.

We'll take a... shall I say a ten-minute break, and then we'll come back and deal with the other effects topic, and then we'll try to wrap up.

-- Break

**MR. BILL KLASSEN:** If you own a red Cavalier that has the license number 76106, I have some bad news for you. It's parked out here on the street and somebody's run into it, so I hope it doesn't belong to anybody in this room. And that's not a Mike Bell joke, either. Peter.

**MR. PETER HOMENUCK (IER Terriplan):** Peter Homenuck, IER. There was an issue that was raised by Heidi during the questioning, and we've had a sidebar discussion and we're going to resolve that issue between us.

**MR. BILL KLASSEN:** And then you'll...

**MR. PETER HOMENUCK (IER Terriplan):** It will come back to...

**MR. BILL KLASSEN:** Come back to the information of the attendees, so that we know how it was resolved?

**MR. PETER HOMENUCK (IER Terriplan):** Yes.

**MR. BILL KLASSEN:** Okay. Thank you. Okay, we'll continue with the discussion on global cumulative effects. Vern Christensen, from the MVEIRB has joined me

here at the front of the room -- I guess this is the front of the room -- and will be making comments on the next steps when we get to that point.

The presentation that De Beers provided us on cumulative effects dealt with both socio-economic and with biophysical, and as far as I'm aware, there's no further presentation on cumulative effects, so what I'd like to do is... unless I'm wrong. Robin, there's nothing further? What I'd like to do then is to see if there's any further discussion on the topic of cumulative effects. The agenda has a number of points there. We've already had some discussion about methodology, or at least as it related to socio-economic cumulative effects, and so I'm just asking whether there's any further discussion on this subject. Heidi Klein.

**MS. HEIDI KLEIN (GARTNER LEE):** Do you want it now, Bill? Heidi Klein, Gartner Lee. This is more of a comment, an observation, there's one question in it as well. And this is sort of the global or general approach to cumulative effects assessment. In reviewing the chapter 12, it struck me that most of the mitigation measures were really those for which De Beers had control. And of course I understand you won't have control over the effects. That's the other projects that you listed or considered or were responsible for. And so what we're left with is, shall we say a series of residual effects, because I... and where you identify cumulative impacts, I don't think you were able to bring it to zero. And so it struck me what is being created here is a series of nibbling effects, and I'm wondering if you had some comment on that, or an approach for consideration, possibly talking to the other mines and joining on coming up with a collaborative, mitigative approach to the cumulative effects, or if you're in discussion with the government departments and agencies, and likewise, anyone from the federal government or the territorial government here, if you've got a comment on the nibbling effects that are being set up, I'd appreciate to hear that.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnston. I guess there's two things, Heidi. The first is that certainly mitigation is focused on minimizing effects that may contribute to cumulative effects on a regional basis. The second point is the way in which that's achieved, and you know, I think I'd not defer, but I guess I'd reference the recent discussions that have gone on around a single, regional monitoring agency. You know, I think in that forum, certainly De Beers highlighted its interest, and certainly its intent on cooperating in future initiatives. So I think to a large extent, I think that's the forum in which, you know, additional effects need to be addressed. I think that certainly we've pointed out at the single monitoring agency workshop is that there are a lot of things that should be happening, certainly beyond the ability of a single proponent. And we stated it at that workshop and we'll state it again; we think that cumulative effects monitoring is no substitute for land use planning. That's obviously beyond us to address.

**MS. HEIDI KLEIN (GARTNER LEE):** Heidi Klein, Gartner Lee. And I assume you're going beyond monitoring, or that the response, that there's also a follow-up response through land use planning where there might be restraints or

something like that in that program, not having had the benefit of attending that meeting? Because monitoring is just collecting information, but doesn't necessarily deal with the impact.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnston. That's exactly it, and that was our point.

**MR. BILL KLASSEN:** Okay. Thank you. Heidi, you were also suggesting that government agencies might want to get into the discussion, so I'll provide that opportunity. David.

**MR. DAVID GILDAY (ECE):** David Gilday, from Education, Culture and Employment. I'm certainly out of my realm of authority in dealing with environmental issues. We're involved in employment and training, so I'm afraid on a question of that nature, I will certainly defer.

**MR. BILL KLASSEN:** Okay. Thank you. Were there other points that anyone wanted to raise under this heading of global cumulative impacts? Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers Canada, Robin Johnston. You know, I think I'd be very interested in RWED's... sorry, Robert. I'd certainly be interested in RWED's approach to... we have impact assessments. We have a lot of other land use activities which may contribute to cumulative effects, some of which are below a threshold to measure, others that may be above, but I'd be very interested in the approach, or philosophy of how RWED basically takes information from the variety of projects into management of the species. Because ultimately, RWED is in a position of applying mitigation on...(inaudible)...in relation to setting quotas or something, and that's a big question, right? But I'd certainly be interested in any comments you might have.

**MS. ANN GUNN (RWED):** Ann Gunn, Wildlife and Fisheries. You are correct. It's a wide question, but I can give you at least a partial answer. We have a number of initiatives. We're working at a number of levels. We're working with a University of Alberta post-graduate student to use spatially explicit modelling, and to look at how the populations are faring by adding up some effects spatially. We're also, through, for example, the Bathurst Co-management Planning Committee, working with the communities to develop community-based monitoring, which includes, because the caribou integrate all the effects on them, it's looking at the caribou in that context, of how the caribou are integrating all the cumulative effects.

So as I say, we're working with a number of levels. I don't know whether you want to add anything.

**MR. BILL KLASSEN:** Thank you, Ann. Are there other comments on this topic? Robin.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Yeah, just another question for the GNWT. I guess I'm still curious as to the mechanism by which, you know, probably some of that information feeds back into harvesting quotas and that sort of thing.

**MS. ANN GUNN (RWED):** I guess the answer to that is through the co-management planning, so the work we do with the communities and involving them and, to some extent, it's a joint decision. We look at the trends. This is specifically for caribou. Robert can talk to the fur bearers, but we look at the trends in the population, we have a measure of the resilience at the herd level by looking at calf survival. We take that information to the communities and we jointly work on what it might mean for the future trends in the population. It's a balance sheet of losses and gains. And then we have a number of management mechanisms which include the commercial quotas and the resident harvest as to how we can modify the level of harvest.

**MR. ROBERT MULDER (RWED):** Robert Mulders, with RWED. In terms of carnivores, I guess we sort of look at densities of bears and wolverines, look at... make some estimates of what type of numbers are being produced across the Slave Geological Province. Specific say to wolverine, where we have native harvest going on in the Kitikmeot region under the WKSS baseline studies. We looked at carcass analysis, looking at age and sex composition, and looking to see whether that level of harvest was sustainable. And our view is that the central barrens has served as refugia, and that if there is moderate to heavy hunting pressure, say in the northern part of the Slave Geological Province, that the central barrens would serve as a buffer and possibly be a source of carnivore populations for adjacent areas.

But now, with increasing development in terms of mining activity, increasing pressure from caribou outfitters, there's more pressure on these resources, so we sort of have to work with the best available information we have. Studies that we have done with the West Kitikmeot Slave Study for bears and wolverine, and we assume that the mining companies as well will be doing some analysis, making some estimates on what the density of these species are in their regional study areas, and I would've thought that with the cumulative effects mandate under the terms of reference here, that De Beers may have considered various biological aspects. For example, under the terms of reference, there's discussion, acknowledgement of cumulative effects is the sum of all natural and human induced inferences on the physical, biological, economic components of the environment within a period of time and space.

And so there's an acknowledgement in the terms of reference, I believe, to look at all mining activity, as well as to consider the impact of existing tourism camps in the region.

So just turning around somewhat to De Beers, is that the analysis that's been done under the environmental assessment here, is fairly limited in scope, in that

it really just looks at direct habitat loss. It just refers to home range size, and how that relates to habitat loss. And there really hasn't been any broader discussion to look at what type of densities there are, what the impacts of direct mortality. For example, the caribou outfitting industry takes several times more wolverines out of the population than is being impacted by the mining industry the last few years.

And those types of impacts I think should be acknowledged or discussed in this type of environmental assessment report.

So I guess we acknowledge that there's a lot of complexity, a lot of issues to consider here, but the existent discussion could've been a little more comprehensive. I don't know if that... that's it.

**MR. BILL KLASSEN:** I think, Robert, that was an observation rather than a question, or was there a question...

**MR. ROBERT MULDER (RWED):** I think I was responding to Robin's question.

**MR. BILL KLASSEN:** Okay. I thought I saw a hand over on this side when I asked whether there were other comments. Chris O'Brien.

**MR. CHRIS O'BRIEN:** Chris O'Brien. I've always found this hard to get in, but I'll just throw it out anyway. Robin asked about how all this feeds back into determining harvesting levels, but I've always wondered how this feeds back into determining, for the sake of the natural environment, but also I think for the sake of industry, for certainty for industry in the future, how this works towards determining limits to development. There has been talk in the past of developing thresholds and limits for development, say in the Slave Geological Province. And I don't know where this work is, but it seems to me at some point, otherwise it's just an open-ended process. We keep on having more mines, and more accumulative effects assessment. Until I think we determine thresholds and limits on... in other words, how much the natural environment can take in the way of, let's say... an important component... caribou, the Bathurst Caribou Herd. Until we can determine what, how much development the caribou can withstand, it seems to me it's just an open-ended process. Somehow that knowledge has to feed back in, so that at some point we can say perhaps, maybe even De Beers' mine is already too much. We don't seem to be at that stage yet. I think we have to get to that stage as quickly as possible. I don't know if there's any... I don't know if that's a question or a comment, or to whom, but Ann looks as though she wants to say something.

**MR. BILL KLASSEN:** Thank you, Chris. I know that, in connection with some of the other developments that have taken place, there certainly has been discussion on thresholds, or at what point should there be no more development of new mines until an old mine's shut down. Ann, did you want to get into this?

**MS. ANN GUNN (RWED):** Ann Gunn, wildlife and fisheries. I think Chris' point relates all to what De Beers asked, and I think the short answer is, I mean, yes, there are limits to what the Caribou can cope with, and yes, we do have approaches that would allow us to set thresholds. There will be no one limit to how much development that caribou can cope with, because it's going to depend on where they are. Caribou numbers, as the elders have told us, they fluctuate. They go up and down. When a caribou herd is increasing, it will be relatively resilient. When it's stable and when it's declining, it will not be resilient to additional changes.

And I think to some extent, this relates to how cumulative effects is assessed, and why it puts a huge onus on all of us, not just any one individual company but all of us, to use all of the available information and all the available tools, so the modelling, looking at things like resilience. And resilience is, for a caribou, it's very simple. You need to know how much time they spend foraging, because we know the relationship between foraging time and how fat they get, and we know the relationship between how fat they are, and their chance of becoming pregnant. Just let me take a moment to give you an example. If, supposing, a caribou, a cow, didn't... she spent 15 percent less time than usual foraging, we could expect that she would not put on two kilograms of body fat. And depending whether she started off as fat or lean, that translates on average into about a 20 percent reduction in the chance of becoming pregnant. That is for an individual. We know from the work that has been done, the monitoring that BHP has done at Ekati -- in some years they have seen a 15 percent reduction in foraging time. But the example I suggested to you was if the cow spent six weeks feeding less. But some of these same cows go through Lupin, they go through the area of Tehera's mine, they come down, they hit Ekati then they hit Diavik, and now the possibility is that they are going to hit Snap Lake. So during that post-calving migration (which takes six to eight weeks), it is quite likely that individual cows will be at all sites. So the idea of a six-week reduction in foraging time is not impossible..

I just give these as examples, but there is an approach that we can use. There is an approach where we can set thresholds because through the monitoring we will know how much reduction in foraging time there is. Through the community-based monitoring that RWED is developing with the communities, we will know what shape the caribou are in, what shape they are in when they winter range, whether it is a good or bad year for them. We can do it, but we have to make the commitment. I guess one of the questions we have in the particular context of this session is, why some of this, why de Beers didn't choose to look at this. They did not choose to look at resilience, they didn't approach the cumulative effects through this. It is a round-about answer, but what I really want to emphasize is that we know from experience across North America some of the answers to the questions you have raised. Now we just have to make the commitment and, as Michelle said, the working together to achieve this.

I don't know whether you want to add something about cumulative effects in general.

**UNIDENTIFIED MALE SPEAKER:** I just have one question, just to start with, just to follow up on my comments earlier when talking about the terms of reference and cumulative effects. My understanding is that de Beers would consider not only the mining activity throughout the Slave Geological Province but also give some consideration to the impact of tourism camps. I am just wondering in terms of zones of influence, mortality, that is a cumulative impact and why that wasn't included in the environmental assessment.

**MR. ROBIN JOHNSTONE (De Beers Canada):** Three things I would like to touch on. One was just following thorough with Chris' comment, and I think what you are getting at, Chris, is the point I was trying to make before, that in the Slave Geological Province you have to get beyond cumulative effects monitoring. I am not saying that is isn't important. I think it is very important, and I think in terms of Anne's commentary there, certainly we have stated before that we will work with communities and regulators to identify monitoring priorities. Certainly establishing what the zone of influence around the Snap Lake property is with respect to feeding caribou is certainly important, but it gets back to land use planning. It has to continue beyond just cumulative effects monitoring.

I think in terms of what John discussed briefly before Robert in relation to your question. He discussed briefly about the problem with so much information around non-industrial land use activities being the amount of information available, and the concept of things like zones of influence. What is the 'zone of influence around a tourism camp? In the absence of that information, that that really binds the hands of a proponent in basically going there. The approach in the cumulative effects practitioner's guide focuses on things that are measurable, and that is what we have attempted to do to the greatest extent that we could.

Certainly in working through this, certainly recognizing the need, given the importance of the issues and given the importance of the species (whether they are kaseewic, whether they have a kaseewic status or societal importance, or they are just part of a landscape) -- certainly the monitoring and effective mitigation is critical on certainly what we want to talk with you guys about.

Comment: check

Comment:

**MR. ROBERT MULDER (RWED):** Robert Mulders with RWED. Some of the information is available. We do have land use sites and data base where those tourist camps are, and there is harvesting information available to indicate how much mortality there is at those outfitting camps. There is some data available that could be looked at.

One final overall comment and question as we are looking at the week overall was that earlier in the week there was considerable discussion about the wildlife base line, about the assessment methodology, about the impact ratings and about the impact predictions. RWED had identified some deficiencies in several



of these areas for caribou, grizzly bear and wolverine. Given the inadequacies and the clarity of how the impact predictions or impacts were assessed, our question is will de Beers make changes to the environmental assessment report to revise the base line information, the impact ratings and the predictions for these species?

**MR. ROBIN JOHNSTONE (De Beers Canada):** De Beers will consider the further information and will certainly talk with RWED about their dissatisfaction in the area of base line, but in terms we will not basically redo the environmental assessment at this stage. We are certainly willing to talk further prior to your technical reports and certainly, obviously, at the public hearing stage too, and work wherever we can to resolve what the outstanding issues are.

**MR. BILL KLASSEN:** Thank you, De Beers. Louis wants to comment but before he does our landlord stepped through the door at the back a little while ago and indicated to me that my head would be cut off at five o'clock, or some such signal, so we need to be out of here by 5:00 p.m. so that the room can be broken down and set up again for the next event. I think we have the time that we will need to get out of here before 5:00 p.m. Louis.

**MR. LOUIS AZZOLINI (MVEIRB):** I will not take an hour and a half, I promise. Previous wildlife sessions suggest or concluded that the certainty factor with respect to potential impacts on caribou should be lowered to low. In listening to the conversation this afternoon on cumulative effects you have some further concerns. Could you give us a suggestion as to what your technical report might say because what you're saying is that you are beginning to layer layers of uncertainty here. I am curious as to where you are going and maybe give de Beers a heads-up, and give us all a heads-up, about what you are thinking with respect to your technical submission. I think it is obviously an important topic. It is a very important topic and people may want to have an idea of what's up.

**MR. ROBIN JOHNSTONE (De Beers Canada):** If I could just get clarification before answering that question on whether it is uncertainty on an uncertainty, or whether it's referring to the same part of the impact assessment.

**MR. LOUIS AZZOLINI (MVEIRB):** The impact assessment directed at caribou of EEC was one component of it specific to the project. I am considering that aspect of the analyses, and I am then adding the analysis that was undertaken with respect to cumulative effects, and how the components are fitting together.

**UNIDENTIFIED FEMALE SPEAKER:** I guess where we are going is that the initial impacts -- the consequences of them were low and the confidence in them was high based on de Beers' assessment of the certainty of their information. Given what we perceive are the inadequacies in the base line -- so the amount of information that was used and the analysis, what was done with it, we think could be improved. Either the confidence rating in the consequence should be increased, or the rating should just be reassessed in light of including all the

information. I guess in our technical report we would probably have offered some details, depending on how the subsequent conversations go.

With the cumulative effects, de Beers have stated that the uncertainty is high, therefore presumably the confidence is low, but they don't discuss what the implications of that are in terms of the effects. They are basically saying that the magnitude of the effects is low, but if it is highly uncertain does that mean that it is actually potentially low to high. What does that really mean? What we wanted to do in our technical report was explore some of that. When you have high certainty in cumulative effects, in effect are you saying that you are not really sure what the impacts will be, or is there a particular direction of that uncertainty like they are unlikely to be a certain way? It was to try and resolve some of those issues.

**MR. LOUIS AZZOLINI (MVEIRB):** I encourage you as you move toward the preparation of your technical reports to remember that you are going to be writing for people like myself. I know a little bit about something. If you can communicate your language and your conclusions in a way that captures your conclusions without necessarily embellishing them -- and I don't mean this disrespectfully -- with a lot of the detail. Essentially you do want to communicate the essence of your conclusions and how you got there. In previous work, it can sometimes be a bit difficult to -- although the information is there -- unless you are an expert in the area to specifically understand it.

**MR. BILL KLASSEN:** To paraphrase, we are looking for non-technical technical reports. Is there anything further? I would like to thank Chris for opening this discussion for us. Anything further on this topic?

The next item on the agenda says General Discussion on Technical Issues, and it indicates that the facilitators will do that. I can tell you that the facilitator will not do that, so I am not sure. Louis, I will ask for some guidance from you as to whether at this point we ask whether there are any of the topics that were discussed in the last two weeks that anybody has further thoughts on and whether that was intended at this point in the agenda. You are nodding yes, so a lot of ground has been covered in the last two weeks and unfortunately I wasn't here for all of it so I don't recall whether there were places where people might have wanted some more time, but this is your last chance. If there were topic areas that were discussed on which you wanted to make another point, this is your opportunity.

I see we also have closing remarks after Vern representing the chair make some comments, so are there any items that anyone wants to raise at this point on all of the areas that we have covered? Florence.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Florence Catholic, Lutselk'e Dene First Nations. Not any points, but I just wanted to make clear to the group here that Lutselk'e has not gone through the documents. We

don't have the time and the resources to hire people to review those documents for us, and so to sit here and say nothing would be inappropriate for us. I just want to say that I have heard a lot of things this week and last week, some things that I understood and some I didn't. Some things that need to be done. We are going to be going through a process internally to be able to understand that, so that we can be involved in the public hearings in March. I don't want anybody to think that we are satisfied with the answers and what has happened here. I just want to make that very clear. I don't want to be on record that I was here and we didn't say anything, and that meant that we were satisfied. Mahsi.

**MR. BILL KLASSEN:** Thank you, Florence. Does anyone else have any comments? Could you identify yourself, please.

**MR. CHRIS PAGET:** I am Chris Paget, I am the Manager of Lands and Environment for the Dene Nation. Building on what Florence just said, and having heard what Rachel had said about consultation, I think -- I am not exactly sure how we will do it -- but the Dene Nation hopefully will be able to go through this process a little bit more looking at some of the documents that are produced and understand whether or not the consultations that have gone on for this particular EA satisfies the Dene membership as well as certain jurisprudence like the recent warehouse case with the Haida in B.C. We are not anti-development but we want to make sure that whatever development goes ahead is good development. Just for the public record.

Comment: check

Comment: check

**MR. BILL KLASSEN:** Thank you, Chris.

**MS. JANET HUTCHISON (NSMA):** I would just like to comment that in terms of mitigation and monitoring, those sorts of issues, a lot of the concerns DNSMA currently has are contingent, or at least whether they will be addressed or contingent on discussions that are to occur as I understand it hopefully between now and the public hearing, I guess I would just like to make the point that there is a fair bit of uncertainty at this point about whether consultation on certain items will be adequate; and on whether or not the parties will be able to get some of those agreements and discussions completed -- or at least get them to a point to where everybody has some sense of how effective they would be prior to the public hearings. I just hope that we can all cooperate to meet those time lines before March so that we all have a better idea of where we stand prior to the public hearing.

**MR. BILL KLASSEN:** Thank you, Rachel.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** The two weeks, there has been a lot of information to have to digest. It has been really good doing the technical session. It is always good to do a session like this before a public hearing. I understand that we are going to be organizing a workshop together on caribou with all the elders from all the aboriginal communities, which I think will help with our cumulative effects issues on wildlife. The thing is also

that my paper that I put together and gathered information last night and presented today was for the Yellowknives Dene First Nation and de Beers to work on together, and to also work with Resources, Wildlife and Economic Development.

I understand that the Dene Nation is interested in this environmental assessment of de Beers, but we have our land and environment committee people who do work together, and we have other people that are working with us, and now we are getting ready to go to the community people and present our information. Hopefully we have got them ready for the public hearing in March.

The other thing -- I think Lawrence wanted me to present something that he had a question on and it had to do with trans-boundary issues. He is very interested in how one mine project affects another one and then another one. It is like a domino effect on one another and it affects our hunting camps. It affects our hunting abilities. It might affect the young guys who want to go trapping, so he was kind of interested in looking at that further. Maybe we might do something about that for March.

The other thing that I wanted to think about, and I thought we could maybe present a paper in March, is the effects of the many people who want access to our lands. I just have to go home and look outside the window and I will see the many skidoo zooming by on Dettah and they go up to Duck Lake and they go up towards Jenny John Lake and God forbid if they should ever go to Campbell Lake Maurice is going to be very mad. This is very upsetting for some people. Maybe some people welcome a lot of new people coming into our territory, but some don't.

Comment: check

Comment: check

We did a survey on cabins around our areas in September. We thought there were only like 10 cabins around the lake. I think there are more than 30 now. The Ingraham Trail was very very low in numbers in cabins. We used to go there and get our wood. My late brother-in-law, Joe Toby, and my sister and all the kids, all of us when we were small used to go there picnicking and get wood, go rabbit hunting and stuff. Today I don't dare go there. I don't like going on that road. There is too much traffic. Even for the people who live there, they drive by you so fast you will end up in a ditch. Even in the winter the traffic out towards Drybone Bay by skidoos is pretty upsetting to see too many people going all over the place. My little nephews wanted to set rabbit snares, even their little rabbit setting area is getting interrupted.

Travel out on the land on the winter road, that is interesting. There is lots of traffic and it is working the way they said it is working, lots of traffic in the evenings. The day time is not too bad, especially when people want to go to work, but don't go there leaving at five o'clock. You have traffic heading towards you and traffic behind you, all those trucks really take over the road. On the weekend I had to go and check on some work over there and I had to put on some snowshoes and walk around and do some work. It is interesting how much traffic affected the

lake at Gordon Lake when the Sangris tried to set a net in the water and he said not much fish. I said to Jonas, "why did you build your cabin there?" He said, "because my family always went hunting here, and so it is sentimental, it's a warm place and it is hard over there."

I like the name Drybone Lake up on the winter road. I went traveling by there by canoe. It makes me think of my grandpa who was Michel Drybone and he had lots of brothers and because of his brothers and their families, Florence and I are cousins. There was a big Drybone family, a big clan.

Another little thing that I wanted to mention was this coming summer we wanted to do a continuation of our canoe trip that we did. I would like to do that with the young people. Michel mentioned that we have to keep teaching the young people everything that we know. Today he wanted to talk about how people like my grandpa and Albert Belargeron's dad, Jonas Fishbone's dad, Johnny Crapeau and Willie -- all those old-timers -- they all (like Chief Joe Sangris) they all worked together very very good. The thing about how they worked together was everybody went traveling different areas. My grandpa and my mum and my granny, they went up towards Artillery, they went up towards Ptarmigan Lake, and they mentioned a lot of big fish and maybe something that swims in the water that is kind of strange. I always heard about that and I was thinking that I have to see that place some day.

Comment: check

These people went everywhere and they all got back together and they all shared their information, and they all used the information for their hunting, their fishing and their trapping, and also so that they can live and survive the elements and that they are healthy. Albert Belargeron was led to the Thelon in 19 something -- I can't remember the year they went there. All these people wanted to go travel over there and they had to ask my dad to lead them over there because he knew the way. These people that traveled over that way there are not many of them left today. We have young people around their 40s and 50s who have been trapping and hunting and traveling on their own, and they know a lot of the elders' information. But we want to do more teaching with our young, and continue with our work with the canoe trips and maybe we can do something where we can monitor the caribou with the company, monitor the vegetation and monitor the water. All these sorts of things that we want to involve our young people in.

Comment: check

My question about the 100, 200, 300 a year thing -- it is not for the outsiders to monitor for us on our behalf forever. We want to do some kind of that work too. It is just thinking down the road for our young people. We have to try and work for them so that they see the positive affects of the good work that their elders and their parents have done.

That is basically it. I thought the elders were going to come back. I think they have deserted me, so we will see what happens at the next hearing.

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**MR. BILL KLASSEN:** Thank you, Rachael. Greg.

**MR. GREG HAMPSON (Yellowknives Dene First Nation):** Greg Hampson, Yellowknives Dene First Nation. Just a quick comment and admonishment if I might, and I am not going to single out de Beers. I am going to single out de Beers, I am going to single out the Government of the Northwest Territories and the federal government, along with Mr. Azzolini and his group. The reality of the situation, and the ability of the aboriginal groups -- and Florence and myself don't often agree on many things but this is one thing that we do agree upon -- our ability to attend, our ability to provide information, our ability to participate as an equal partner in the process very much depends (as it does with many people) on access, not only to resources but access to people that take resources, in order to play on the same playing field as the rest of everyone here.

Comment: check

Comment: check

We heard on several occasions from all of the groups here that they felt there had been a failure to consult. The response from the company, in this case de Beers, was that they had attempted to set up meetings and had attempted to set up community liaisons, and various attempts were made to consult with various groups, that they felt that they had been unsuccessful in doing. In many cases, and I can only speak on behalf of the Yellowknives Dene First Nation, the failure to consult was not a deliberate failure to consult but was, in fact, an inability to consult because of a lack of people and resources. That continued lack of people and the resources to engage in that consulting shows to me that the process is flawed and will continue to be flawed, and will not involve an equal participation by the aboriginal groups in this process.

I strongly urge all of those groups to re-examine their priorities and to re-examine how the consultation process takes place, and to consider perhaps looking at a different model for that consultation that will allow the First Nation groups to participate more equally. Thank you.

**MR. BILL KLASSEN:** Thank you, Greg. I think that we are melding a general discussion on technical issues and perhaps closing remarks. We will provide an opportunity after Vern speaks for closing remarks. So unless there are any other pressing issues right now, I will invite -- okay Tim.

**MR. TIM BYERS (Yellowknives Dene):** Just one quick request. Given that the Yellowknives Dene are quite concerned about the amount of -- we will call a spade a spade -- garbage dumps around the North, basically land fills, etc., at closure of mines, I am wondering if it is possible to receive a complete list of all materials that at closure will be left buried in the land fill, and also all materials that will be buried in the underground workings, if that is possible. With previous mines we were given in their EA report, yes all inert materials or all scrap materials -- and that is fine at a conceptual level but it would be really nice to have the specifics of -- is it insulation that we are talking about, is it containerized such and such, is it vehicles? I think that would be really helpful if we could get some kind of more specific itemized list, Thanks.

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**MR. JOHN MCCONNELL (De Beers Canada):** I think we can help you out there, Tim.

**MR. BILL KLASSEN:** Okay, thank you. I would then ask Vern Christensen, the executive director of the Mackenzie Valley Environmental Impact Review Board, to talk to us about the next steps in the process.

**MR. VERN CHRISTENSEN (MVEIRB):** Thank you, Bill, and good afternoon ladies and gentlemen. First of all, congratulations on making it through 10 days of technical sessions. This is a new process for the review board. The Snap Lake environmental assessment is the largest environmental assessment the board has undertaken, and the technical sessions that you have participated in over the last two weeks are our first attempt at this in the EA process. We certainly appreciate the fact that many of you came to these two weeks of sessions with your own expectations, your own sense of what the needs were for the process and with your own questions in hand. I also understand that the participants came to an early agreement on the process and that has seemed to work throughout the sessions.

Louis informed me that a regular routine was settled on early at about day two, and that the routine included de Beers' representatives providing a specific presentation in the morning and the afternoon which was followed by issues, identifications, some discussion and review of the material, and at the end of each session participants identified which issues were resolved or not resolved. This was adaptive management in action and it seemed to work. That is great and we are going to learn from this exercise as an organization and you have made a contribution to environmental assessment in the Mackenzie Valley. Thank you for that.

There were also a number of side bar discussions that occurred throughout the sessions, and copies of those meeting notes are being circulated for the review of the participants before they go on the public record; and the fact that people were willing to put in this extra time and effort to participate in this process in that way speaks to the commitment that everyone brought to these sessions and again is appreciated.

The technical sessions were an event which were built into the work plan for this environmental assessment recognizing that the Mackenzie Valley Environmental Impact Review Board conducts a quasi-judicial process, which means that it is obliged to conduct its business in a court-like fashion. This event was seen as an opportunity for all of the parties to get together and have a more informal kind of discussion to better understand the issues and the information, and perhaps resolve some of the issues before it continued further down into more formal process. We were especially glad that technical experts and traditional knowledge-holders were able to get together through these past two weeks and have face to face discussions and get into the meat of a number of the issues. If these sessions worked for you, or didn't work for you, we would like to hear some

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feedback from you on how well this event worked and what we might do to improve such events and other processes that may come before the board.

There were about 14 days between the planning session for these technical sessions. We had a pre-hearing, or... I shouldn't say pre-hearing, but a pre-technical conference session about 14 days before the start of these technical sessions. So the timeframe within the work plan was very tight to organize the sessions, and in that period of time, De Beers and many participants were able to prepare excellent presentations and many people flew or drove from all across the country to be here to participate, which was a very impressive achievement. And congratulations to you all for the effort that you've made. The board appreciates that.

But again, despite the fact that there was only ten days set aside for the technical sessions, we also hear that the time was tight, and so again, just to acknowledge that recommendations made by the parties in developing the work plan for this EA included having the parties submit technical reports after the technical sessions took place. So I think that's one part of the process that helps us in part to deal with the tight timeframe around organizing or participating in these technical sessions.

I know also that in the ten days of the technical sessions, we have some 70 60-minute cassettes recording the discussions that took place. These are being transcribed and will go on the public record, and to make life easier for everyone, we're also having GeoNorth document the discussions and getting these notes out to you as well in the next week or so.

Given the number of tapes and the level of interest and the participation, clearly there was a lot of information exchanged, and everyone seemed to take advantage of the opportunity of identifying, discussing, and resolving issues in this particular forum. So boards will be looking closely at the outcomes of the technical sessions and they will contribute to the board's decision-making process. The board will have a month to review your technical submissions and will be preparing its own list of questions that it will want addressed at the upcoming hearing in March. The board also looks forward to receiving a summary of De Beers and government commitments before the public hearings, so that the board and the public can fully appreciate what commitments have already been made. The board will want to focus its decision-making on those areas that require its attention in the public hearings.

Most of you will have a copy of the work plan and most of you probably understand all of the steps that are laid out in the work plan for the EA, but I'll just go over some of that quickly.

We now have the De Beers Environmental Assessment Report, and we've completed three rounds of information requests. And we've had ten days of technical sessions. And throughout, you've identified and tried to resolve the



issues as party to the EA. Your technical reports will conclude the technical part of the environmental assessment. The next phase will focus on the outstanding issues you identify for the board. So while phase 1 focused on the technical and traditional knowledge issues, the next phase will focus on the public's views of the project and your technical submissions. We will be having a pre-hearing conference, similar to the pre-technical session conference that we've had before the hearing and after your technical reports are submitted.

The board will then advertise, plan, and hold its hearings in the last week of March. After the hearing, everyone will have a month to put any final information on the public registry. The board will then get together, review the material in the public registry, and start preparing its report of environmental assessment and its environmental assessment decision.

So those are the next steps in terms of the environmental assessment.

So just by way of closing then, I wanted to thank the elders that came to the technical sessions for contributing to the discussions. I also want to thank the translators. Their services were needed and they really helped to make these sessions truly public and accessible to everyone. Muriel Betszina catered the sessions, and from all accounts, the Bannock and service was outstanding, and we'd recommend anyone planning similar sessions to give her a call. Many of you have been away from your families and homes for two or three weeks. I want to thank you for participating in these sessions. And all of you that are not so far away from your families and homes; thank you as well. We also want to wish you a safe journey and the very best for the approaching Christmas season. Thank you all very much.

**MR. BILL KLASSEN:** Thank you, Vern. That brings us to the second-last item, which is closing remarks. So I'll open it up to those who would like to make closing remarks. Florence, Kevin.

**MS. FLORENCE CATHOLIC (Lutselk'e Dene First Nations):** Florence Catholic, Lutselk'e Dene First Nation. I see the translators are gone, so I'll have to do this in English. I want to say first that those that are traveling, will have a safe journey home, and that you have a merry holiday.

I don't want to take too much time, because I have to go somewhere right away, so I have to speak really fast. And it's a good thing there's no translators here.

Lutselk'e Dene First Nation, as the Chippewyan community, it is also a holder of a treaty with the Crown, which is called Treaty 8. Under that we are entitled to certain benefits that are from the government, various governments. I heard talk of things as traditional, and people only talk about traditional, activities. We have also, in our past, have done economic pursuits within our own aboriginal people, and other aboriginal people. So that linkage of just using the land traditionally, I want everybody to understand that we also use it in a different way.

In my area that we live in, the land is very precious to us. To the east, we have Baker Lake, I guess would be our closest place. To the west is Yellowknife. To the North is the diamonds. To the south is our relatives in Northern Saskatchewan. This whole area, there is hardly anybody there. It's isolated, very good fishing, places where the caribou and the wolves and all the animals, the ptarmigans, the jackrabbits, the muskox... all these little animals multiply and live there. They live there and we live there, and we want to keep it that way. We also are not against development, as long as it does not damage our land. We're willing to share and have people enjoy the same things that we do, but not at our expense. We have had that experience already and we don't want to have that again.

In the Locker River, we have a special spiritual connection to the Lady of the Falls and the water that we're talking about at Snap Lake that flows into there is a big concern to the elders of my community. And so the way that presentations are going to be done to them is very vital and very important for industry to show that there will be no contamination, because if there is even an inkling that that could happen, the support for this development will probably not come from the community.

The other part I wanted to talk on was the duty to consult, and it's a big issue for us. We need to understand and be able to make decisions on good information. Not just our information, because we know our own information, but information of other people and how that information is to be translated to us within our language, so that the members can say what they think of this development.

The language is also very important, and we need to maintain that so that future generations, and I hear a lot of people talking about future generations, can enjoy the land and be able to carry on the activities that their forefathers have done. Although the mining activity is a necessity today, it's not going to be there always, and the people that own those business and work for them are not going to be here. They're going to move as soon as it's closed. But we, the people that live here, have to bear with whatever happens there. And so, coming from that point, we're really want to be really careful, and I want to thank the Mackenzie Valley Impact Review Board for giving me this opportunity to sit and listen to this technical session, and also to De Beers for their beautiful PowerPoint presentation. I know Louie always likes to send these volumes of things, and I want to have the copies of those presentations, so that we can look at them internally at the community, by ourselves, before other people can look at it, and also the written information.

As far as I know, the leadership will be requesting in letter form the board and to De Beers to hold workshops within our communities, and that's all I have to say. And I want to say thank you again. Mahsi.

**MR. BILL KLASSEN:** Thank you, Florence. Kevin O'Reilly.

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**MR. KEVIN O'REILLY (Canadian Arctic Resources):** Thank you, Bill. Kevin O'Reilly with Canadian Arctic Resources Committee. I too want to thank the board for the opportunity to participate in the proceedings. I want to thank De Beers as well for this opportunity. I wanted to respond to Vern's request for some feedback, so I'm going to provide some.

I think it's commendable that the board retained independent technical experts as part of this technical sessions and throughout the proceedings. I think that's an important step and I hope that's something that the board will continue to do in future proceedings.

You may be... some of you might find it ironic that we're often labeled as an environmental organization and we show up the last two days of the two weeks and we're here addressing socio-economic issues. Well, two points, I guess; CARC is certainly interested in more than standard environmental issues. We're interested in sustainability, but secondly, there's a capacity issue here that I heard raised by other organizations, First Nations governments. And I guess I'd like to raise the same issue of capacity. I certainly recognize that governments have a fiduciary obligation when it comes to aboriginal peoples, but I think there's general widespread recognition now that you get a better decision on projects and better decisions out of environmental assessment if participant funding is made available.

And I guess one of the first things that we did when we became involved in this was to request participant funding from the board. That request was denied. It was said that it was really beyond the jurisdiction of the board to do so. We did take up the issue with the Minister of Indian Affairs and Northern Development, and he told us it was up to the boards to request participant funding as part of their annual budgets. So I guess some feedback, Vern. I would hope that the board, in its next budget, would request participant funding from the Department of Indian Affairs and Northern Development, not just to help environmental organizations, but to help communities, First Nations, maybe even the Chamber of Mines, whatever. Organizations to get better decisions. And I hope that you've included that in your budget. It doesn't mean that you necessarily have to administer the funds. There's other ways of doing that at arms length. And if you'd like, I'd be happy to chat with some ideas around that, but I hope that the board has requested participant funding from DIAND in its next budget, and we can look forward to better participation and better decisions from the board in the long run.

I did want to make another point, that I think this was a useful session for the two days that we were able to participate, in a few different ways; in getting some questions answered, but also in securing some commitments. And I want to highlight for Vern a couple of... three of those commitments that I think I got in the last couple of days.

One was I heard De Beers very clearly state that they are now prepared to sell diamonds from Snap Lake in the Northwest Territories to buyers here. I don't think they've ever said that before, and I want to commend them for making that commitment. I think that's an important step forward.

I also heard that De Beers is prepared to set up a fund for the Northwest Territories, and that they are going to be providing additional details on that in the next two or three months. I think that's another important commitment from De Beers.

I asked the federal government and the territorial government to provide information, or I should say respond to, my request for whether they are prepared to consider the targeted use of revenues from this project for economic diversification. And both governments, their representatives at least here, have committed to respond in writing to that request.

So I think that it's been a useful session, at least in the two days that we've been able to participate, to secure those sorts of commitments.

I do want to say, though, that I think we would've found this session much more useful had the technical reviews... had technical reviews actually been done before we got here. And I mean that to the government agencies would've produced some sort of technical reviews of the areas of the environmental assessment report where they have expertise. It would've been much more helpful for our organization to understand where the areas of disagreement may be, and where I think would've made probably for a more focused discussion in the long run, but that order of things was changed earlier. I probably wasn't paying as close attention as I should have. That's what happened with the Diavik technical sessions, and I think they were very productive in having those technical reviews available for the actual sessions. So that's something I think you may want to reconsider or look at again.

I guess my last piece of advice is I understand that the board may have only scheduled one week for hearings – five days. And it's hard for me to believe that... I understand that the purpose of these sessions were to try to narrow the scope of issues, concerns regarding this environmental assessment of this project. But it's hard for me to understand how the board is going to be able to conduct only four or five days of hearings, and deal with all the issues that everybody feels that they need to get onto the table, and perhaps speak to the merits of the project but also deal with some of the technical issues that are still unresolved. So it's very hard for me to see how the board is going to be able to do that in five days at the end of March.

But once again, I do want to thank the board for putting this on and everybody who made it possible. Thank you.

**MR. BILL KLASSEN:** Thank you, Kevin. Is there anyone else that would like to make closing comments? Bob.

**MR. BOB TURNER (NSMA):** Bob Turner, North Slave Metis Alliance. Just in closing, I guess I'd like to thank the board as well as the government and De Beers for I guess being able to participate in this process. I've always mentioned in the past that processes should be improving as they move forward. And I didn't have that, I guess certainly in the beginning, that we were moving into a better process from which we had just left through the comprehensive study of Diavik. But a lot of things are pointing towards resolution as far as having benefits there for aboriginal groups directly affected. And I guess to go back into the history a little bit of the Metis and their relationships with aboriginal groups in the past... were always good in the past before government moved into the North. I think there's a lot of hurt feelings that have been developed over time by the divisions that were probably the most responsibly made by the government. And that blame, I guess, can be focused on them, but I also see, as time is progressing, to the future, but the government is also changing towards how they are treating aboriginal people. I've dealt with a lot of, you know, very sincere federal bureaucrats that see the problems that have been arisen by the divisions that have been caused within communities and between aboriginal groups.

But I see this as another opportunity to bring them back together where they can work together, where they can be dancing again together, and benefiting from the resources that we're not really against, but we would like to see developed sustainably, and hopefully that will continue to move in that direction in the future. Thank you.

**MR. BILL KLASSEN:** Thank you, Bob. Janet.

**MS. JANET HUTCHISON (NSMA):** Janet Hutchison, NSMA. I'm going to limit my comments primarily to process and consultation. I think it's important, given that we were asked to make comments, that some of this be put on the record.

First of all, in terms of some of the processes leading up to this particular technical session, I was particularly concerned that the parties were asked to go into this technical session without the information they were promised from the pre-hearing conference. That is not directed at any individual. However, there was an assurance given that parties would receive transcripts, that there would be formal discussion about the issues that would be dealt with in this session, and that this would all proceed in a fairly orderly manner. That was not anyone's experience, and I think we all received a lot of information in the last couple of days before the technical sessions that placed a great deal of strain on the resources of the aboriginal organization I represent, and in fact, just simply wasn't realistic in terms of their capacity to absorb that information and be prepared to deal with it at the start of the technical sessions.

There have been requests outstanding for a significant period of time for the board's reasons on refusing certain IRs. That is part of the technical phase of this process. The parties were asked to go through the technical sessions without the benefits of those reasons and without that insight. And again, that, in my view, is problematic. It places all of the parties at a disadvantage and creates a less effective process.

Similarly, there has been a long outstanding request for a ruling on what information will be provided to the board versus what information will be put on the public registry. There has been no decision issued on that. That is a particular concern from a natural justice and procedural fairness point of view, because I would imagine that information will start to flow back to the board from these technical sessions. But the parties have not received any assurance about whether that will be done in a transparent way, whether they will know exactly what information flows back to the board, and whether or not it flows back to them with any commentary, categorization or other comment from board staff. So I would certainly like to put on the record that in the NSMA's view, it's critical that a decision be made on that particular matter within... prior to any information going to the board from these technical sessions.

Finally, I guess a general comment about process. In my experience, representing the North Slave Metis Alliance, within the structure of this process, this process is not sensitive at all to the needs and the capacities of aboriginal communities. We find it difficult at times to have adequate time to get comment back from the leaders of this community, let alone the members of the community. And aboriginal consultation requires consultation with the community. This process is not sensitive to that requirement in any way, shape or form. There needs to be planning done to allow time between steps that will facilitate community consultation within the aboriginal communities.

I think it's also important, just while we're on the topic of consultation, to recognize that the courts have sent us all a very strong message, that consultation doesn't mean sitting around in a meeting room and just being physically present. It means listening. It means understanding. It means taking effective steps to address the concerns that have been raised. It means doing all of that in good faith. And it also means doing it in a way that is sensitive to the needs and capacities of the particular aboriginal community. That includes ensuring, if necessary, that there is funding available to ensure adequate participation and consultation. So I certainly echo Kevin's comment about wanting to see a change in this process where parties actually have some funding to participate.

Still on consultation, I think the other thing that was disturbing about the technical sessions from the point of view of an aboriginal community, I have yet to see government step in and take its responsibility to consult. In fact, I have seen a resource company make more efforts than government in that regard. And frankly, that is astounding considering the current state of the law. I don't mean to

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suggest that the NSMA is suggesting De Beers does not have those obligations. However, the case law is quite clear that the obligation begins with the fiduciary, and that is government. And I would certainly invite all of the participants here from government to consider that and take appropriate steps between now and March. Otherwise, they are creating a situation where this board's entire process has been jeopardized.

Finally, just looking ahead, and Vern, I appreciate your comments that this is a new experience for the board. I appreciate the comments that it's a learning experience. But I would like to offer that in those situations, often the most effective approach then is to listen to the constituents. Hear them about the needs that they have for the process, and attempt to accommodate that and work with those parties. Unfortunately, to date in this process, there has tended to be more of a focus on sticking to the work plan. I would hope that as we progress forward in this process, there will be a more flexible attitude exhibited, less of a focus on whether or not the work plan sets a particular deadline or not, and more of a focus on whether or not those deadlines meet the needs of the parties and the aboriginal communities around the table. In particular, I would certainly echo Kevin's concern about the number of days set for the hearing. Frankly, based on my experience with these kinds of hearings, and I don't mean the Mackenzie Valley Environmental Review Board, but administrative processes, the number of parties we have around this table, the complexity of some of the issues, even if we were sitting until midnight daily, I would not anticipate that this hearing could possibly be concluded within four days in a way that would allow everybody adequate time to raise their issues. And I guess I would just like to close by taking my hat off to the parties, because what I saw happen at the start of this process two weeks ago, I saw a lot of experts, a lot of expertise, a lot of bright people realize that the process that had been set up did not work for them. And instead of walking away from the table, and instead of wasting too much time pointing out that the process was not sensitive to the parties around the table, they put their heads together and made the process work. They recreated it. And thankfully, it was somewhat effective. I would hate to see the parties being left to take that leadership role in the hearing itself, and I would certainly hope that the pre-hearing conference for the hearing itself would be more organized than the pre-hearing conference for the technical sessions, and that it will not be a situation where the parties have to step in and take that leadership role again.

But with that, thank you to all of the parties around the table. I think you made the process work.

**MR. BILL KLASSEN:** Thank you, Janet. David Gilday.

**MR. DAVID GILDAY (ECE):** David Gilday, from the GNWT. Like the others, we would like to thank the board for the opportunity to participate in this process. One thing I would like to make clear is that with the transcripts – and I say with the transcript because we want to ensure that we don't miss anything – that we will undertake to make sure that the commitments that we've met are addressed,

that the outstanding challenges that have been brought forward are also addressed, and in fact, that we strive to ensure, as people have requested, that the GNWT at least does hear what's said here, and makes sure that it gets to the parties who have the opportunity to deal with it.

That said, we are really very pleased with the... I think the new opportunities that have arisen here for partnerships, moving forward and developing certainly the labour market but the whole gamut of resource development in the Northwest Territories. And we're pleased to have set a new standard for commitment and we'll make sure that we hold Jason accountable for that hundred or two-hundred year commitment.

But more seriously, we're really pleased and we hope that we can set a new standard with partnerships with the company and certainly through the mine training committee, that both De Beers and ourselves sit with, and that we get some very positive results from the development. Thank you.

**MR. BILL KLASSEN:** Thank you, David. We're approaching ten... not ten o'clock. It's not that late. Ten to five, and we do need to adjourn by five o'clock. So not seeing any other hands, we'll ask De Beers to give their final comment, and then look to Rachel to identify someone to lead us in our closing prayer.

**MR. JOHN MCCONNELL (De Beers Canada):** John McConnell. I'll just make a couple of quick comments, because I'm hoping we have you back in March, Bill, so we wouldn't want you to lose your head today here at five. I certainly echo Janet's comments that, you know, her and I get along on most things, this one in particular. I think it was very encouraging to see that despite the process getting off to a very rough start, the participants did sort of take control and roll up their sleeves, and I think we've had a very fruitful couple of weeks of exchange.

In terms of comment on the process, I would suggest we accomplished more in this two weeks than we did in six months of answering upwards of up to 2500 IRs. So perhaps that's a lesson learned for the future.

I'd also like to recognize the survivors here. I think from my team, that Robin and Colleen, I think Louie's been here for the whole thing, and certainly Florence, Bob Turner, and Rachel. So I think the fact that those three have been here for the whole thing really points out to myself and De Beers the importance of protecting the environment. You know, we've had many drop-ins over the past few days. I think Mike used to refer to it as the new cast of Characters every morning, but there were a few, particularly those at eight or ten, that were here all the time. I'd also like to thank Rachel for arranging for the elders to be here. I think Michelle and Isadore were also here every day. And we certainly appreciate their stories. And again, it underpins the importance of protecting the environment.

I'd just like to ask Richard to say a couple of things.

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**MR. RICHARD MOLYNEUX (De Beers Canada):** Thank you. Richard Molyneux, De Beers Canada. I'd firstly like to make an observation, that in the relatively short two days of being here, the single most used and abused word has been commitment. And I'd just like to point out that it's something that we have used ourselves, but there's nothing like putting your money where your mouth is. I'd like to suggest that De Beers already has something of a proven track record in both Canada and the North. We've been in this country exploring like no other organization for well over 30 years. We've already invested in exploration more money in the North than any other company. We have had here in Yellowknife and continue to maintain a permanent exploration office. It sits here, and not like other companies, in Vancouver. We have a demonstrated track record in terms of things like responsible environmental management on our projects throughout Canada. We've already made significant social investments in parts of Canada.

I'd like to say that for me, that's really only the start of what we would like to make is a meaningful contribution to the development of the North. And certainly part of our presence here will always be responsible environmental management, commitments to sustainable development, commitments to meaningful consultation, and I understand the importance of the word meaningful, and very definitely maximizing benefits to the Northerners and to the aboriginal peoples of the North. This will be primarily through the choices that we will offer them; choices in terms of direct employment, choices in terms of indirect involvement through perhaps other opportunities and industries.

I'd just like to say that I've never come to the North when I have not gone away having learnt something. And it's always opportunities to listen to people like the elders from the aboriginal communities to bring their wisdom, that I've certainly learned to appreciate. And I certainly would like to extend my compliments to the chairman over the last couple of days, and to the board and to all the other participants for what I think has been a very positive contribution to these proceedings. Thank you.

**MR. BILL KLASSEN:** Thank you. Rachel, we've spoken about someone offering the closing prayer. So I'm wondering whether, if there isn't someone else from the Yellowknives Dene First Nation, whether you might do that for us.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** If we sat here until nine o'clock, they'll come back, because that's when bingo starts.

-- Laughter

**MR. BILL KLASSEN:** Yeah, we have to be out of here so they can set up for bingo.

**MS. RACHEL CRAPEAU (Yellowknives Dene First Nation):** They ran away. Anyway, I'm trying to debate who should do it. I'll help you. Okay. Let's do the closing prayer. I'll do the prayer that my mom taught me when I was about five.

-- Translation not available

Thank you.

**MR. BILL KLASSEN:** Okay. These technical sessions are now adjourned.

-- ADJOURNMENT

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