

NORTHWEST TERRITORIES WATER BOARD  
PUBLIC HEARING

APPLICATION FOR WATER LICENCE BY  
CADILLAC EXPLORATIONS LIMITED  
PRAIRIE CREEK, N.W.T.

February 23, 1982  
Fort Simpson, N.W.T.

- 0932

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NORTHWEST TERRITORIES WATER BOARD PUBLIC HEARING ON THE APPLICATION  
FOR WATER LICENCE BY CADILLAC EXPLORATIONS LIMITED, PRAIRIE CREEK,  
NORTHWEST TERRITORIES.

Mr. W.A. Case, Vice-Chairman, Northwest Territories Water Board  
called the meeting to order at 10:30 a.m. on February 23, 1982.

MR. W. CASE: Ladies and gentlemen, I'd like to call our Hearing to  
order please.

Well, before getting down to the business at hand, I first  
wish to apologize to you for our lateness. It seems that in Yellow-  
knife, early in the morning, it's very difficult to get cabs and we  
had difficulty rounding up our Water Board members at the scheduled  
time.

Now, secondly, I just want to explain that this is a new  
Hearing. As most of you are aware, there were two Hearings held  
last year concerning this application, but because of circumstances  
beyond the control of the Board we found it necessary to set a new  
Hearing. What happened, actually, was that during the summer the  
membership of the Board changed and we ended up without a quorum to  
rule on this application. And there was another complication. The  
tapes of one of the Hearings got fouled up a little bit and a portion  
of the transcript was unusable. So those two factors led the Board  
to make the decision to start all over again to ensure that the terms  
and conditions of the Northern Inland Waters Act were followed cor-  
rectly and that there would be no complications arising.

Now the third thing I want to say before we start is that some of you may wonder where Mr. Warner is. Mr. Warner is Chairman of the Water Board and he is now on a working vacation in Costa Rica, and I know our sympathies are with him.

About 15 years ago all political parties in Canada realized that the environment in which all Canadians live and work had become an issue above politics in the traditional sense. The Northern Inland Waters Act was one of the laws passed by Parliament to protect the environment of Canada, particularly the environment of the North. The Act created the Northwest Territories Water Board and directed it to hold Public Hearings, like this one, to make sure that Northern waters were protected and used wisely. The Board has substantial powers but can use them only to conserve, develop and use the water resources of the Northwest Territories. Political, social, economic, or other concerns which arise from a water use proposal are beyond the Board's mandate and must be dealt with in other forums. Water is the only business of the Board - the best use of water resources for the benefit of all Canadians and for the people of the Northwest Territories in particular.

The Northern Inland Waters Act gives the Board power to approve, reject, or approve with suitable conditions and limitations, applications for water use or waste disposal projects, such as the one before us today. This application, made by Cadillac Explorations Limited, is for an application for water use and waste disposal for mine and mill use associated with the Cadillac Explorations Limited project on the east bank of Prairie Creek, 27 miles upstream from its confluence with the South Nahanni River.

This Hearing lets the Board and the public hear from the applicant, government agencies which have studied the proposal, and concerned citizens who have opinions about the effects this proposal could have on the waters of the Northwest Territories.

After this Hearing is over, transcripts are made of everything which has been said here. Then the Board's Technical Advisory Committee studies those transcripts and the written submission made here, and makes recommendations to the Board. Those recommendations are open for review by the applicant and interested intervenors. Before it makes a decision, the Board takes all these opinions into consideration.

If the Board decides to approve the water use proposal, it draws up a licence and then sends it to the Minister of Indian Affairs and Northern Development. The Minister can accept or reject the licence, but he cannot change the conditions in it. No water use proposal can lawfully be put into operation until the Minister gives his approval of the licence.

This Public Hearing today is a vital part of the licencing process because the Board is particularly concerned to hear from the people who use the water resources to support their way of life. The Board realizes that knowledge of water is not confined to consultants, government officials, or academics. The Board believes that to get the entire picture it must have the help of those who have lived on rivers, lakes, marshes, and streams from time past remembering.

I now would like to introduce to you the members of the Water Board. On my far right is Dr. Otto Schaefer. Dr. Schaefer



was educated in medicine, and for more than 20 years has been involved with the Native people of the Northwest Territories in the fields of health and nutrition. Dr. Schaefer is a member of the Order of Canada.

Next to Dr. Schaefer is Mr. Art Redshaw. Art was originally from Ontario and was educated there in agriculture and engineering. He is presently Assistant Regional Director, Renewable Resources Division, Department of Indian and Northern Affairs in Yellowknife. Mr. Redshaw has lived in the Northwest Territories with his family for the past ten years.

Next to Art is Charlie Kennedy. Charlie was born in Fort Smith and educated in Fort Smith and Fort Resolution. He spent three years trapping east of Fort Smith, and for three years he lived and worked in Tuktoyaktuk and Inuvik. He is also a Past President of the ... past resident of Hay River. Charlie's now back in Fort Smith where he is a member of the Town Council and actually is Deputy Mayor. Charlie is also Past President of the Fort Smith Metis Association and the Fort Smith Hunters and Trappers Association.

On my left is D'Arcy Arden. D'Arcy was born on Great Bear Lake and educated in the Northwest Territories. He commenced his working career when he joined the Royal Canadian Mounted Police at Great Bear Lake and assisted the Police there for several years. Since that time he has taken an active part in mining exploration and development. Mr. Arden lives at Prelude Lake, just out of Yellowknife, and is a lifetime resident of the Northwest Territories.

On D'Arcy's left is Don Gamble. Don was born in Halifax and has a degree in Civil Engineering and a Master's degree in Environmental Resource Engineering. He is presently the Director of Policy

Studies for the Canadian Arctic Resources Committee.

Next to Don is Bill Lyle. Bill was born at Fort Ross in the NWT. He was educated in Aklavik, Inuvik, Yellowknife, and in Alberta, where he also worked for awhile. Bill was a member of the Legislative Assembly of the Northwest Territories. He is a member of the Small Business and Eskimo Loan Fund. He is President of the Federation of Arctic Co-ops and he's also the General Manager of the Co-op at Cambridge Bay.

My name is Bill Case and, as I indicated earlier, I was selected by the Board members to sit in for Mr. Warner and act as Chairman for this Public Hearing. I was born and educated in Edmonton. I first came North in 1943, working on the river boats for NTCL, and have been coming back ever since. I'm a Mining Engineer by profession and I have spent the last 24 years in various mining operations in the Yukon, Northwest Territories, and northern Manitoba. I am presently the Senior Mining Engineer for Cominco's Northern Group in Yellowknife.

Now on the table to our left here, as our support staff, Mrs. Jo MacQuarrie, Executive Secretary; George Carter, our Legal Advisor; Andy Cullen, Controller of Water Rights. Behind me is Ronne Heming of Outcrop, who's looking after all these gadgets 'round here and taping the proceedings. And by the door, at the far end of the hall, is Mrs. Dorothy Wight, who is Secretary to the Board.

Now, before I continue, are there any preliminary objections to be considered by the Board at this time?

Okay. The procedures we will follow at the Public Hearing are the same as we have followed at all our other Hearings. First of all I will ask the applicant, Cadillac Explorations Limited, to make their presentation. Then I will open the meeting to questions to be directed to the applicant. Next, individuals who have submitted a formal brief will be given an opportunity to present that brief. We have notice of several briefs, I'll just read them to you so you'll know what's coming up. We have a joint presentation, or brief, by the Department of the Environment and the Department of Fisheries and Oceans. We have a separate brief by the Department of Fisheries and Oceans. We have a brief from the Dene Nation and the Metis Association of the NWT; a brief from the National and Provincial Parks Association of Canada; a brief from the Water Resources Division of the Department of Indian and Northern Affairs; and the last one, a brief by the Renewable Resources Division of the Government of the Northwest Territories. Those are the ones of which I know at this time.

MR. L. MORRISROE: Mr. Chairman, Lawrence Morrisroe of Cadillac. As you will note, according to your Regulations, all these briefs are supposed to be in ten days, you know what I mean, previous to the Hearing. And at the time of the ten day period there were only the two briefs, one from the Parks and one from the water situation. We got a copy of another one that came a few days later, which was sent to us by our solicitor in the mail, and this morning there's another brief that ended up on our desk here from the Dene, which I don't think is quite fair to Cadillac to give us a brief at the last hour here and

expect our consultants to read it, reply to it, you know what I mean, and everything intelligently. So I want to point out if you're going to hear these briefs here this morning at the last hour, which I don't think is really fair, we'll have to let our consultants, we'll get them read and they will reply accordingly to you. Maybe they can do a first-class job, I don't know, but I want to point it out. If there's some problems, you'll know the reason.

MR. W. CASE:           Very good, Mr. Morrisroe. The Board understands your concerns and we'll take note.

MR. J. BAYLY:           If I could just say for the record, the brief of the Dene Nation which has been referred to by Mr. Morrisroe was filed the Monday following the ten day cut-off point, if we can call it that. The brief was taken to the Water Board office on the Friday and the office was closed, actually, slightly before five. As a result of that we got a telephone call from the solicitors from ... in Yellowknife of Cadillac Mines. They requested a copy of the brief. A copy was offered to them. They were aware of it. I understood they had picked one up and sent it to Cadillac. If they haven't received it, they were certainly aware of it nine days ago.

MR. W. CASE:           Okay, thank you for your explanation, Mr. Bayly.

                          Just a couple more points as far as procedure. The next item will be, the meeting will be open to anyone, including Board Members, who wishes to ask a question of the applicant or any of the intervenors. And, finally, the applicant will be given an opportunity to respond to any points raised, any summing up they wish to do.

To keep the discussions orderly, people in attendance who wish to ask questions are asked to raise their hand and obtain permission from the Chairman before speaking. Each speaker is asked to identify himself or herself and, if applicable, to indicate the organization which they represent. I would ask that you come up and speak into the microphone if you have questions in order that we can ensure we have the questions on tape before the verbatim transcript of the proceedings ... for the verbatim transcript of the proceedings which will be prepared after the Hearing. And you might imagine we're very sensitive. We want to make sure we get everything on tape.

Okay, I think we're ready to go, and I would now ask Cadillac Exploration for their presentation, and perhaps, Mr. Morrisroe, you would like to introduce your people.

MR. L. MORRISROE: I'm Lawrence Morrisroe of Cadillac, Chairman of the Board. I'd like to introduce you to Gerry Hamilton which is President of the Company. Gerry is a Mining Engineer by profession. And I'd like to introduce you to Norman Guild of Ker, Priestman who looks after the hydraulics and so forth, which is a graduate engineer in that department. And Mr. Ron Emes which is another member of the Cadillac organization which looks after a little bit and a bit of everything. And then I'd like to introduce you to Murray Bath of Kilborn Engineering, and I'd like to introduce you to, of Golder, Bryan Fletcher of Golder Engineering, and also Wayne Dwernychuk of Beak Consultants. So I think that we'll let Norm here start it off.

MR. N. GUILD: Mr. Chairman, gentlemen of the Board, ladies and gentlemen of the audience.

The purpose of this Hearing is to obtain public response to a water licence application filed by Cadillac Explorations Limited for their Prairie Creek mining property. This Hearing is the third Public Hearing held in Fort Simpson to review Cadillac's water licence application, the other Hearings being held on the 21st of April and the 20th of May, 1981. Rather than discuss only the technical aspects of the licence application, we have chosen to review the total project in order that a full understanding by those present may be obtained. A cross-section of consultants working on the project is present to answer any specific questions that might arise.

As Mr. Morrisroe has pointed out, the members of the panel representing Cadillac Exploration Limited are Mr. Lawrence Morrisroe, the Chairman of Cadillac; Mr. Gerry Hamilton to my near left, who is the President of Cadillac; Mr. Ron Emes who is also a member of Cadillac Explorations; Mr. Murray Bath of Kilborn Engineering who is responsible for the engineering design of the mine and the plant; Mr. Bryan Fletcher who's responsible for the geotechnical aspects and tailing disposal for the project; Mr. Wayne Dwernychuk of Beak Consultants who's responsible for wildlife, aquatics and vegetation; and myself, Mr. Norman Guild, of Ker, Priestman & Associates with responsibilities in hydrology, waste disposal and environmental matters.

Perhaps we could have the first slide, Wayne. Is it possible to have the lights dimmed?

The Prairie Creek Mine of Cadillac Explorations is located, as shown on this slide, 100 miles west of Fort Simpson, 60 miles northwest of Nahanni Butte, 100 miles north-northwest of Fort Liard, 300 miles west of Yellowknife, and 120 miles southeast of its nearest

mining neighbour, CanTung. Cadillac is adjacent to Praire Creek, a tributary of the South Nahanni River, and is approximately twelve miles north of the Nahanni National Park boundary. The Funeral Range, Headless Range, and Tundra Ridge of the Mackenzie Mountains form the prominent peaks of the area.

The South Nahanni River flows southeast to Nahanni Butte where it joins with the northeasterly-flowing Liard River which, in turn, joins the Mackenzie River at Fort Simpson.

A winter road constructed early in 1981 now joins the property with Fort Simpson and centers north, east and south by way of the Liard and Mackenzie Highways. This road will facilitate the mine and mill construction as well as future hauling of metal concentrates to market. A small airstrip also provides year-round access to the site.

The project has been described in a series of three reports to which all the aforementioned consultants have contributed. The first report, submitted to the Department of Indian and Northern Affairs in May, 1980, outlined the preliminary concepts and environmental impacts of the winter road. It was followed shortly after by a similar preliminary report covering the mining development. In October, 1980, a final environmental evaluation was submitted which covered the state of knowledge up to that date. Included in the October, 1980 report was an outline of all known aspects of the development, the environmental setting, and the potential impacts of the mine and access road. A considerable amount of work has been carried out subsequent to October, 1980 and we will endeavour, in this summary, to outline all activities to date.

With this introduction, the individual activities will now be described, beginning with the mine/mill then moving on to the winter access road, the environmental aspects, and the socio-economic status. Obviously it is not possible to provide highly detailed information in this brief summary. Rather, emphasis will be given to issues relative to the water licence application and to those items we believe are of most interest to those participating in this Hearing. There will be an opportunity for questions if more information is desired concerning any particular items.

We'll now address the mine and mill. The Prairie Creek project of Cadillac Explorations Limited consists of an underground lead-zinc-silver mine, a mill, and associated camp. Also present is an airstrip.

A six-year mine life is envisaged, although there is a strong possibility that this may be extended after further exploration.

The second slide please.

The Cadillac mill has been designed to treat 1000 tons of ore per day. Compared to other mines in the Northwest Territories it is a moderate-size operation. For example, Pine Point is an 11,000 ton per day mine, whereas Terra is around 200 tons per day. However, there are mines in British Columbia as large as 75,000 tons per day, which are large by any standard.

Cadillac is represented there by the shaded box.

Of the 1,000 tons per day mined and processed, approximately one-third will be recovered as metal concentrates shipped to market,



one-third will be returned to the mine as backfill, and one-third will be delivered to a tailings pond at the site.

Slide three please.

This is a picture of the project site in the year 1980.

Could we have the next one please.

This is an aerial view of the site in 1981.

The next slide.

Another view, 1981, showing in the foreground the tailings impoundment area.

Could we also have the next slide please.

An artist's conception of the plantsite layout has been prepared. It can be seen that the operation is surrounded by high mountains and lies adjacent to Prairie Creek which flows in a southerly direction. Harrison Creek enters Prairie Creek alongside the mine. Other features which can be seen are the lower mine portal, the upper portal is not visible but approximately that location; the mill; concentrate storage areas; the camp buildings; the airstrip; the fuel storage area with impoundment berms; the tailings pond and the reclaim barge which supplies approximately 83% of the mill water requirements; a settling pond for treating plantsite runoff; a mine water treatment plant; various service buildings; the road to the airstrip and to the winter road; and alternate sites for tailings.

The purpose of the tailings pond is to retain the inert, non-acid-generating ground rock material which will be generated as waste in Cadillac's milling operations.

Additional wastes from the operation are those normally generated from any mining development and will include sewage, garbage, air emissions from the mine and mill, mine waste rock, mine water, and excess reclaim water. Sewage will be treated in a secondary treatment plant, complete with an ultra-violet irradiation system to disinfect the effluent prior to its discharge to Prairie Creek. Combustible garbage will be burned and incombustible refuse will be compacted and landfilled at a location which is approximately 2200 feet downstream of the millsite and which is above the floodplain of Prairie Creek. Emissions to the air will include mine ventilation, diesel generator exhaust and emissions from standard mill equipment such as crushers and an assay laboratory. Dust abatement equipment is to be employed on those emissions which require it. No thermal drying or smelting operations are to be carried out. It is not expected that these wastes will generate any difficulties whatsoever with proper design and careful housekeeping.

Quantities of waste rock will not be large and this material will find use as mine backfill and in road construction. Drainage from waste rock and from the mine is not expected to be acidic due to the preponderance of carbonate minerals in the host rock. Actual tests conducted on samples of waste rock indicated that its ability to consume acid was seven times as great as its ability to produce acid.

The next slide please.

Mine drainage water will be collected in an underground sump at the 2840 foot level of the mine. Tailings pond reclaim water

will also be directed to this sump and the combined flow pumped as process water to the mill circuits. Pond reclaim water in excess of mill requirements will be directed to an effluent treatment plant prior to discharge to Prairie Creek.

The next slide please.

The questions of safe storage of fuels, oil and gasoline, has been given a considerable amount of study. Fuels are to be stored in an area well protected from floodwaters and surrounded by impermeable dykes on an impermeable base, such that if a tank ruptured ... such that if a tank rupture occurred, the spill would be contained. Facilities for recovery of spilled materials would also be provided.

This slide shows the existing fuel tanks on the property site, and the dam that has been constructed to contain any spills that might occur.

In addition, bulk cyanide storage will be located well above the floodplain of either Harrison or Prairie Creek.

Cut-and-fill stoping will be utilized as the mining method, thereby maximizing the volume of mill tailings returned to the mine.

Next slide please.

The mill process currently envisaged is a selective flotation of lead and zinc concentrates employing methods and chemical reagents which are standard in the industry. The lead and zinc concentrates will be stockpiled for annual shipment over a winter road in covered trucks.

The tailings pond design and plantsite flood protection works have been developed on the basis of detailed engineering

survey, hydrological analysis and geotechnical studies of surface and sub-surface soils in the areas of concern. A number of alternate tailings pond sites were rejected because of engineering, environmental or economic factors.

The next slide please. This slide show where three other sites were preliminarily investigated for tailings disposal. One site, T1, was at the, slightly further up Murray, that was site T4, putting a dam across that arm of the valley and alternately on the other side was T5. There was a consideration at one point of a tailings impoundment area by putting a berm across the mouth of the valley as well. These were three alternate sites that were ultimately rejected.

Could I have the next slide.

The site chosen for Cadillac's tailings pond is located on a wide section of the Prairie Creek floodplain, immediately northwest of the millsite and offers an impermeable retention area of approximately 25 acres with one million cubic yard storage capacity. The site is underlain by an impervious layer of natural clay, 20 to 30 feet thick. The tailings pond enclosure is formed by this natural clay bottom, the bedrock of the Prairie Creek valley wall and by embankments, constructed with an impervious clay core, extending along Prairie Creek and adjacent to the campsite. The embankments vary from 29 to 43 feet in height and the downstream face of the embankment fronting to Prairie Creek is protected by a layer of rip-rap armour stone to an elevation three feet above the maximum possible flood level. The proximity of the pond to the plantsite facilities

... facilitates close monitoring of the tailings disposal system and short pipeline lengths for the reclaim and tailings facilities.

Now the rip-rap is not in place in that slide; it's currently being placed.

The next slide please. The slide represents work that was conducted last year, the trimming of the slopes and you can notice the clay core in the foreground. The clay core is 13 feet thick.

Could we have another slide. This is also a picture of trimming the clay core; it's looking on the face fronting to Prairie Creek, on the back of the slope fronting Prairie Creek.

The next slide please. The large pile of rock in the middle of the picture represents the size of the rip-rap that is going to be placed on the outside of the embankment fronting Prairie Creek and the stake that you can see in the foreground is, in fact, about three feet high; so it gives you an idea of the size of those rocks.

Golder Associates have provided full-time resident engineering services to Cadillac from the start of tailings pond construction in June, 1980. The pond is now 90% complete.

Several design modifications have been incorporated into the final pond configuration as a result of additional information obtained during construction. The horizontal width of the clay core of the tailings pond embankments was altered from 8 feet to 13 feet to accommodate the particular units of construction equipment used for the project. However, the overall cross-section of the embankments remained unchanged. It should be noted that the pond would be

rendered impermeable by a two to three foot thickness of clay and that the actual thickness of the core is based on construction feasibility, not impermeability. Based on its estimated permeability of  $10^{-9}$  centimeters per second, it would take in excess of 5,000 years for water to pass through the 13 foot thickness of the clay core.

The final constructed shape of the tailings pond was altered slightly and the curves straightened for ease of construction and to allow two way traffic at the back of the dam, with no traffic on the embankments. Both the base of the pond and the crest of the embankments were raised by 8 feet to balance the amounts of clay, sand and gravel required for construction. Given the average base level of the natural clay encountered in construction, the height of the embankments, from the crest of the embankment to the base of the pond is unchanged and the total storage volume of the pond is also essentially unchanged.

Limited areas of frozen ground were encountered during construction in the backslope area, along the valley wall. These areas are thought to be buried areas of frozen material that resulted from minor slides and previous construction activity, as opposed to permafrost. In addition, as any natural runoff entering the tailings pond will have to be treated prior to release, it has been decided to line the entire backslope, at considerable cost, with an exposed synthetic liner of 36 mil reinforced hypalon. This liner will be keyed into the clay core of the embankments and the clay base of the pond. The liner will prevent the migration of relatively warm process water into the backslope, limit the volume of runoff water entering the pond and

assure the total impermeability of the tailings pond. It should be noted that, in addition to the backslope, one small section of the embankment in the northeast corner of the pond will be lined, as weather conditions precluded the construction of the clay core to specifications, in the time available, in this area. A drainage system will be incorporated in the constructed liner to collect runoff water from behind the liner.

Seven piezometers and settlement plates will be installed in the pond embankments to monitor the long-term performance of the embankments. Water samples can be taken from these piezometers, as well as the backslope drainage system, to verify the integrity of the tailings pond.

A second potential tailings impoundment area, located approximately one-half mile downstream from the mill, has been identified for future use if mine life were to be extended.

The next slide. The T3 area is in the bottom right-hand corner of the ... and in back of it my ... up and in the lower corner.

The tailings pond embankments adjacent to Prairie Creek and the flood protection dykes of the plantsite have been designed as river training structures and, accordingly, have been provided with rip-rap armour along the faces of their slopes and at their toes.

Could I have the next slide, please.

In order to ensure that flood protection works proposed for the Prairie Creek project were adequate, it was necessary to compute both the 100-year and the maximum possible flood flows for Prairie Creek in the vicinity of the minesite. The slide now being projected

on the screen shows the values computed for the 100-year flood and the maximum possible flood, their relationship to the average and maximum recorded flows in Prairie Creek, and slope protection works provided for the tailings pond embankment.

You'll note the average flow is 204 cfs; the maximum recorded flow to date is 6,600 cfs; and our design accommodates a maximum possible flood of 38,000 cfs, with an additional freeboard of three feet.

It should be noted that, although the maximum recorded flood to date is 6,600 cfs, rip-rap has been placed to a height three feet above the MPF level of 38,000 cfs. The additional three feet freeboard could actually accommodate a flood of approximately 60,000 cfs. In addition, it should be noted that there is approximately 14 feet from the top of the rip-rap to the crest of the embankment. Therefore, by conservative selection of design flows and slope protection works, the long-term integrity of the tailings embankment has been ensured.

Plantsite flood protection dykes are designed to accommodate a 100-year flood flow in Prairie Creek with the rip-rap placed to a height of three feet above flood level.

Flood flow calculations were made after detailed review of all the hydrological data available for the area, discussions with Water Survey of Canada officials in Fort Simpson and Edmonton, discussions with the DIAND hydrologist in Yellowknife, and a review of hydrological studies undertaken in the Yukon by Ker, Priestman & Associates Limited personnel.



I'd like now to address the actual water licence application itself. Perhaps we could have the next slide.

Since the Hearing is concerned principally with the water licence application, a description of the application filed for water use in July, 1980, will be given.

The application was filed to request a licence for the use of 205,000 Imperial gallons per day from either the ground and/or from Prairie Creek. This quantity was considered to be required for domestic needs in the camp and for industrial usage in the mill and mine. The re-use of water from the tailings pond and the mine drainage sump was inherent in the calculated requirement.

Further engineering work carried out during the fall of 1980 caused a revision to be made to the estimated water requirements. It was then requested that the licence authorize the use of 250,000 Imperial gallons per day on average, but 750,000 Imperial gallons per day during short periods when unusual circumstances required it. The average water requirement is expected to be less than 200,000 Imperial gallons per day, in practice. Current plans call for the extraction of groundwater from a well, rather than from Prairie Creek.

Could I have another slide, please.

As noted earlier, water from the tailings pond and mine workings will be reclaimed for use as process waters in the mill. However, an imbalance will exist between the mill water requirements and the tailings pond inflows which will necessitate a discharge to Prairie Creek. In addition, the project's secondary sewage treatment plant will also discharge its effluent to Prairie Creek. Cadillac is

committed to ensure that both these discharges will be of good quality after treatment and have no impact on the aquatic resources of Prairie Creek or other downstream waters.

Subsequent to the Public Hearing of the 20th of May, 1981, discussions were held with members of the Technical Advisory Committee of the Water Board and it was agreed that Cadillac would not discharge industrial effluent to Prairie Creek unless the flow in Prairie Creek was at least 20 times as great as the rate of effluent discharge. In addition, Cadillac agreed to upgrade the quality of its industrial effluent in accordance with available and practical treatment technology. The effluent quality levels expected after treatment are presented in Table 1, which is shown on the slide present.

To further minimize the impact of industrial effluent on the receiving waters of Prairie Creek, Cadillac is proposing to release almost all of its effluent during time periods when Prairie Creek flows will offer dilutions well in excess of the required 20 to one minimum dilution value.

By careful monitoring of the Prairie Creek hydrometric gauge, together with on-site effluent analysis, stringent control over effluent discharge will be maintained.

Could we have another slide, please.

To better illustrate the effect of dilution on effluent quality, a slide has been prepared which graphically follows a 0.1 milligram per litre concentration of cyanide from the end of the effluent pipe at Prairie Creek to the mouth of the South Nahanni River. The following concentrations and associated dilutions will be noted.

Prairie Creek at the end of the effluent pipe, concentration is .1 milligrams per litre, and dilution is, of course, 1. Prairie Creek at Harrison Creek, the dilution would then be 370, and the concentration would be 3 ... .0003. By the time it had reached the mouth of Prairie Creek the dilution would be 630 and the concentration would be .00016. By the time it entered the South Nahanni, the dilution would be 26,000; and by the time it reached South Nahanni at Nahanni Butte it would be 28,000 to one. Now these are based on annual flows.

By way of comparison, the maximum acceptable concentration of cyanide in drinking water, as we've noted on the slide, is .2 milligrams per litre.

So at Nahanni Butte, the concentration is .0000036 milligrams per litre in comparison to .2.

Could I have the next slide please.

A slide has also been prepared to put into perspective the total quantities of heavy metals and suspended solids that will be introduced by the industrial effluent, on an annual basis, to the waters of Prairie Creek. The data is presented in tabular form and is included as Table 2 of this document. It's also shown on the slide presently being shown.

It will be noted that the existing, pristine waters of Prairie Creek annually convey approximately 23,000 pounds of heavy metals and four million pounds of suspended solids to the South Nahanni River. Cadillac's industrial effluent will be introducing annually an additional 1600 pounds of heavy metals and 27,400 pounds of suspended solids, resulting in minor increases of 7% for heavy

metals and .7% for suspended solids in the total natural loadings of Prairie Creek.

A requirement of water licence issuance is the submission, by the applicant, of a Contingency Plan which demonstrates the applicant's state of readiness to deal with spills of hazardous materials and which outlines the spill prevention measures that are proposed for the mining development. Cadillac's Contingency Plan is currently in preparation and will develop the framework proposed in the Environmental Evaluation submitted by Ker, Priestman & Associates in 1980.

Cadillac's ability to react to a spill of hazardous material has already been tested during the spring of 1981. In early June, a leak was detected from the bottom of one of the original bolted steel fuel oil tanks still being used at the project site. Site personnel immediately informed the appropriate Government agencies and commenced clean-up by pumping dry the leaking tank and trenching around the spill area to allow fuel saturated soils to drain to the trenches for subsequent recovery. When all fuel oil capable of recovery had been collected, the remaining soils of the spill area were excavated to a depth of approximately one foot below contamination level and removed to the tailings impoundment area.

It is Cadillac's understanding that Government agencies ... Government agencies were satisfied both with the methods used for spill clean-up and the professional manner in which the company dealt with the problem.

It should be mentioned that none of the bolted ... original bolted steel tanks are now in use at the minesite, and that all fuels have been transferred to recently installed welded steel storage tanks.

We'll now address effluent treatment. The next slide, please.

Although mine drainage water will be re-used, together with tailings pond reclaim water, to the maximum extent possible in the mill process circuits, it will be necessary to discharge an average of 302,000 Imperial gallons per day of excess water from the system to Prairie Creek.

This excess water will comprise a mixture of mine groundwater seepage, mine washdown and dust suppression water, water draining from backfill and reclaim water from the tailings pond. All these flows will be collected in an underground sump at the 2840 foot level of the mine and water will be pumped from this sump for use in the milling process. Excess pond reclaim water will be discharged, after suitable treatment, to Prairie Creek. This treatment is necessitated by the presence in the water of residual flotation reagents as well as traces of heavy metals resulting from the contact of the water with the minerals in the ore.

A water treatment plant is being designed to treat the excess water in order to oxidize cyanide and to precipitate any heavy metals present. Treated effluent, meeting the requirements of Cadillac's water licence, will be discharged at a rate which will ensure adequate dilution in Prairie Creek.

As it may be possible to re-use the treated effluent as a replacement for the mill freshwater requirements, provision will be made also to return the effluent to the mill circuits.

A large portion of the suspended solids is expected to settle out, either in the tailings pond or in the mine water sump.

The feed to the effluent treatment plant is, therefore, expected to consist of slightly turbid water containing small quantities of residual flotation reagents and heavy metals in solution. The treatment method to be employed will be the alkaline chlorination process. This process is presently in operation at a number of mines in British Columbia and the Northwest Territories, and is considered the best available technology which has actually been proven under practical operating conditions. The following paragraphs briefly describe the process.

The next slide, please. The slide shows the schematic of the proposed alkaline chlorination plant.

The plant feed will be pumped into an agitated tank where hydrated lime will be added to control the pH. From this tank, the water will overflow to a series of three agitated treatment tanks of sufficient volume to give 90 minutes of residence time. Calcium hypochlorite will be added continuously to the first treatment tank, while pH and oxidation-reduction potential will be measured in the second. Lime and calcium hypochlorite addition rates will be automatically controlled according to the values of pH and ORP.

The overflow from the third tank will be pumped into a Lamella thickener where metal hydroxides and other suspended solids will settle out. Treated effluent will overflow the thickener to Prairie Creek after any residual chlorine present has been destroyed by the addition of sodium metabisulfite. The underflow from the thickener will be pumped to the tailings impoundment area via the final tailings pumps in the mill. Flocculant will be added to the

thickener feed as required to assist settling of solids and to achieve acceptable overflow clarity.

Samplers and flowmeters will be incorporated into the plant to allow constant monitoring of performance. In addition, the final pH and chlorine residual levels in the effluent will be measured.

The effluent treatment plant will have a capacity adequate to treat an entire year's production of effluent in seven to eight months of operation. During the winter months, when flows in Prairie Creek are at their lowest, effluent will be diverted to, and stored in, the tailings pond. Discharge of effluent to the creek is expected to be possible, at reduced rates, during April, with maximum output being achieved from the beginning of May to the end of November. During December, the rate will again be reduced, probably ceasing altogether during January, February and March. During periods when the surface of Prairie Creek is frozen over, effluent will be discharged beneath the surface of the ice.

Based on available hydrographic data for Prairie Creek, this method of operation will ensure immediate dilution of the effluent by a factor of at least 38, and for most of the operating year by a factor of several hundreds.

Provision will also be made to divert all treated ... untreated effluent to the tailings pond during periods when the treatment plant is unavailable due to routine maintenance or breakdown.

Run-off ... the settling pond. An area of approximately two acres has been set aside to collect all run-off from the project

site. Run-off waters flowing through the pond will deposit their loadings of suspended solids prior to their discharge to Prairie Creek. Emergency provisions will be made to permit addition of flocculants to the pond, should natural settlement processes be overstressed during periods of excessive run-off. It will also be possible to return pond water to the tailings impoundment for additional treatment.

By implementation of good transportation, storage, materials handling and mill operating techniques, the introduction of contaminants to the plantsite surface waters will be controlled.

In order to optimize the design of the treatment plant, and to identify any modifications to the basic process which may be required, it will be necessary to test actual samples of the effluents. Since these samples will not be available until after the mine and mill come into operation, the effluent treatment plant cannot be constructed until approximately one year after mill start-up. During this year, while testing and design are in progress, all effluents will be stored in the tailings pond. After completion of the treatment plant, the excess water in the pond will be withdrawn and treated before discharge. The opportunity will also be taken during the first year of mill operation to confirm the flowrate of the mine drainage water.

The schedule described will ensure that the treatment plant has the capability of handling the volume of the effluent generated by the mine and mill and the plant ... and that the plant will produce a final discharge of acceptable quality. In addition, since



technology in this field is constantly changing, the delayed start will ensure that the most up-to-date information from other operations is incorporated in the plant's design.

It is probable that the Cadillac mill will be equipped with a modern on-stream analysis system. This is a well-established technology, and experience at other operations indicates that its adoption results in more efficient use of mill reagents. This means that reagent levels in the effluent are reduced, thus simplifying the effluent treatment operation. In addition, it is planned to provide on-site laboratory facilities which will permit day-to-day monitoring of the effluent treatment system.

It is also significant to note that Cadillac is presently carrying out additional metallurgical testwork aimed at reducing the quantities of cyanide required at Prairie Creek. While it is too early to say whether the work will be successful, some promising results have been obtained. Effluent cyanide levels would be reduced, making operation of the treatment plant simpler and more efficient.

Next slide, please. We now address the subject of the winter road.

As noted earlier, a 100-mile long winter road has been constructed between the Liard River and the minesite for transportation of equipment to the plant and for the return haulage of concentrates to market.

The winter access route heads generally southeasterly from the mine, crossing in turn the eastern portion of the Mackenzie Mountains, the Mackenzie Plain, the Nahanni Mountains and the western

portion of the Interior Plateau prior to crossing the Liard River and joining up with the Liard Highway, about 20 miles northeast of Nahanni Butte. The accessibility of the mine will be enhanced by the completion, to all-weather standards, of the Liard Highway between Fort Nelson and Fort Simpson in the near future.

The only streams of any size near the proposed winter road are Prairie Creek, which is paralleled at the western end, and the Liard River, which is crossed at the eastern end. Smaller streams include Grainger River, Fishtrap Creek and Tetcela River.

During the operational phase of the mining development, lead and zinc concentrates will be shipped over the winter road and the Mackenzie Highway to Enterprise, and thence to market via CN Rail or, alternatively, via the Liard Highway to Fort Nelson and onto BC Railway.

Subsequent to a field survey, the winter road construction was carried out during the fall and winter of 1980/1981 under the direction of a geotechnical engineer. Road grades were primarily less than 5%, with minor sections grading 5 to 8%. In order to protect sensitive soils, those portions of the road overlying muskeg were constructed during the winter when the ground was frozen. The route ... the route selection avoided north aspect slopes whenever possible to minimize permafrost disturbance. In other areas, insulation of exposed permafrost was provided by layers of gravel.

As the access road has been constructed for winter use only, many of the environmental considerations relative to all-weather routes are not pertinent. For this road, no permanent bridges or culverts were installed and water crossings have been carried out on snow or

ice bridges. Traffic occurs over frozen ground, hence organic deposits and vegetation are not disturbed. Due to the restricted period of use, December to March, wildlife contacts are minimized. Whenever possible, existing seismic lines or winter roads have been utilized.

I'll now address the wildlife and aquatic resources.

Since March, 1980, Beak Consultants have been responsible for the portion of the Prairie Creek environmental assessment dealing with terrestrial and aquatic resources. Preliminary work in 1980 was based on three sources of information: 1) literature; 2) site visit by study team members in April, 1980; and discussions with government personnel. Later surveys of both the winter road and the mine/mill area in July and August, 1980, provided the basis for a more complete assessment, as reported in the Environmental Evaluation of October, 1980.

Additional wildlife and vegetation studies were carried out during the months of January, March, June, and July, 1981, together with comprehensive aquatic studies in March, April, May, and September, 1981.

I'll now address the wildlife and vegetation portion of the work.

Terrestrial studies had several distinct elements but the principal focus was the potential impact of the project on ungulates, that is sheep, moose and caribou, and their habitats. The key element in the habitat analysis was vegetation.

The first initial reconnaissance was undertaken by Beak Consultants Limited in April, 1980. While no wildlife were observed,

a general picture emerged with respect to wildlife capability by reference to resource maps, literature and consultation with persons familiar with the area.

Another slide, please. This one represents the July, 1980 results of that wildlife study.

Detailed field studies were initiated in July, 1980, with the objective of determining summer distribution and abundance. During the July survey, Dall's sheep proved to be the most abundant ungulate with 64 animals observed within the 100 square mile study area centered at the mine. In addition, twelve sheep were observed in the Nahanni Mountains within three miles of the winter road. Only scattered observations were made of caribou and moose throughout the study area, but it was recognized that winter would provide a more advantageous time for surveys of these species.

Can I have the next slide, please.

Wildlife surveys in early July, 1980, were also intended to provide information on raptors and waterfowl. Cliffs in the study area, some of the Folded Mountain, were flown to determine the presence of cliff-nesting raptors. No nests were found near the minesite and two Golden eagle nests in the Nahanni Range ranging from 1.2 to 2.4 miles north of the winter road were recorded. Wetlands within 1.2 miles of the proposed road were surveyed with the prime interest being the identification ... the identification of use by Trumpeter Swans. Six swans were observed but no sign of breeding activity was evident.

Vegetation surveys in July, 1980, concentrated on the mine, mill and camp sites, and preferred tailings pond locations. Vegetation

communities along the proposed road alignment were also identified using aerial surveys supplemented by ground sampling. For each of the sites surveyed, general vegetation communities were determined and species representative of each community were noted together with species considered to be rare or of restricted range. Some emphasis was placed on disturbed areas and plants that were colonizing in these areas.

The next slide, please. This slide represents the results of the January to March, 1981 wildlife surveys.

Winter aerial surveys for wildlife were conducted in January, 1981, and March, 1981. The January surveys were confined to the mine/mill study area. During the January survey, 17 Dall's sheep were observed and of these, 14 were to the east of Prairie Creek in the drier windswept areas of the Mackenzie Mountains. These sightings were widely dispersed and ranged from between half to five miles from the road or minesite. Five caribou were observed five miles west of the minesite, while only one moose was observed six miles north of the road.

The March survey included both the mine/mill study area and a ten kilometer wide corridor encompassing the length of the winter road. Linear transects were flown in the lowland areas while contour surveys were flown in mountainous areas. 45 Dall's Sheep were observed in windswept areas to the east of the mine/mill site in the Mackenzie Mountains and 32 were identified in the Nahanni Range. One group of 13 caribou were observed north of the winter road, 1.6 miles, and the Grainger River. 16 moose were sparsely

scattered along the 100 mile corridor of the winter road, and only one was observed in the mine/mill area.

The next slide, please. This slide represents the results of the June, 1981 wildlife surveys.

In June, 1981, aerial surveys were conducted in order to define calving and lambing areas for caribou and sheep as well as grizzly bear denning sites. During these surveys, 74 woodland caribou and 45 Dall's sheep were observed. Caribou cows with calves were observed primarily on open ridge tops to the east and west of Caribou Flats, near Folded Mountain, east of the minesite and on both sides of the winter road through the Mackenzie Mountains. Potential lambing areas were identified on a preliminary basis using references outlining the requirements of lambing areas together with observations of ewes and lambs during these surveys. No grizzly bear dens were identified, although two grizzly bears were observed in the mine/mill study area during June surveys.

In general, the June surveys showed a wider distribution of both caribou and Dall's sheep in the mine/mill study area and a notable increase in caribou sightings relative to January and March studies... March surveys.

The July, 1981 program consisted of wildlife and vegetation components. Can I have the next slide, please. It's the one the helicopters used for these studies.

The objectives of the vegetation components were to identify, map and characterize vegetation cover within the mine/mill study area and along the highway corridor in a manner that would facilitate delineation of wildlife habitat. The objectives of the wildlife

component were to identify, delineate and classify habitat units for Dall sheep, woodland caribou and moose.

Vegetation mapping identified a total of eleven vegetation types in the mine/mill area and along the winter road. Of these eleven units, eight were considered lowland and three highland.

The lowland units consisted primarily of large areas of black spruce forests and some mixed deciduous coniferous forests. Fire has had the greatest influence on the character of these lowland areas, influencing regeneration and overall vegetative mosaic.

The highland units included a sparse spruce forest flanking lower elevations, the subalpine shrub zones, and the alpine tundra zones.

Preliminary wildlife habitat classification maps were developed based on the above vegetation descriptions as well as existing literature, aerial survey results and browse and pellet group surveys. It was determined that Dall's sheep habitat was found only in the highland vegetation units which were located in the Mackenzie Mountain Region and the Nahanni Range.

Could I have another slide, please. This represents one of the caribou that were observed.

Caribou utilized both highland and lowland vegetation types. Lowland and highland sites with abundant available shrubs and lichens were considered important as winter range. The Mackenzie Mountain Region and the Nahanni Range were considered summer range. The most heavily utilized summer areas were the alpine tundra and subalpine shrub.

Moose habitat was found only in the lowland areas. The lowland floodplains of the Liard River and Fishtrap Creek were considered the most important units. Much of the remainder of the lowland areas was considered to be only moderate winter and summer range.

After careful review of both the 1980 and 1981 wildlife and vegetation studies, the following conclusions have been reached.

Dall sheep are the ungulate species which are believed to be the most susceptible to disturbance. Although winter impacts are considered minimal, there is circumstantial evidence that lambing may occur near the minesite during the spring and summer months. However, it is important to note that Dall sheep continued to raise lambs in close proximity to the minesite during the spring and summer of 1981, a period of unusually high construction activity.

Suitable caribou habitat is available in the project area. However, based upon limited observations, there is no evidence that any part of the study area might be an important winter range. In addition, no specific calving area has been identified and it's concluded that caribou calving is a widely occurring event in the Mackenzie Mountain portion of the study area.

Moose are widely dispersed throughout the lowland areas along the winter road and, to date, only 17 sightings have been recorded. Browse surveys have indicated a slightly higher use remote from the road indicating either the avoidance of the road by moose or the existing ... existence of better habitat some distance from the road.

In summary, wildlife studies conducted to date have identified scattered populations of ungulates within the vicinity of both



the mine/mill complex and the corridor of the winter access road. Dall sheep have been considered as the ungulate species most susceptible to disturbance but also have been noted to co-exist with the mining development over a period of ten to 15 years, and especially during the major construction activities of 1981.

Mitigative measures which are currently proposed include the avoidance of suspected nursery areas by ground and aerial traffic, the limiting of aircraft activity in the minesite during May and June, the control of firearms at the site, the control and suppression of fires by on-site fire-fighting equipment, incineration of all combustible garbage, the restriction of public access to the winter road by guard controlled gate, and the establishment of reduced speed zones and warning signs along the winter road in areas of significant ungulate utilization.

We'll now address aquatics. Next slide, please. The slide shows electroshocking in Prairie Creek.

Aquatic studies were initially undertaken in April and July, 1980. Objectives of these field programs were to assess fish habitat and determine utilization of available habitat by resident and/or migratory fish in terms of species composition and relative abundance. Analysis of water samples and trace metals in fish tissue were also undertaken to assist in the determination of baseline conditions. Sampling sites included Prairie Creek and Harrison Creeks near the minesite and streams in close proximity to the winter road alignment.

The next slide, please. This slide shows many of the stations in the Prairie Creek area where samples were collected.

In addition to fisheries, a study was undertaken which examined benthic invertebrate communities, that is bottom-dwelling insects, inhabiting the above-mentioned aquatic systems. These data complement water quality information and facilitate an assessment of the time factor in water quality studies since invertebrate communities that colonize and perpetuate in any given area do so over an extended period of time. As a consequence, basic community structure is a reflection of water quality prior to and including the actual time of sampling.

Data from the April/July, 1980 programs indicated that fish habitat within Prairie Creek was relatively similar at various sampling stations. Due to low productivity, lack of instream/stream-side cover and limited pool formation, utilization by fish was thought to be minimal. A few Arctic Grayling, Whitefish, Bull Trout and Slimy Sculpin were captured and identified in Prairie Creek. Although no barriers were noted downstream, between the minesite and the South Nahanni River, the lengthy areas of steep gradient and the lack of holding areas were believed to have discouraged fish movement to the upper regions of Prairie Creek.

Fish populations in aquatic systems associated with the winter road ranged from a zero fish capture in some locations to a comparatively diverse capture in the Tetcela River.

The next slide, please. This represents Tetcela River.

Trace metal analyses in sculpin and Bull Trout revealed no excessive concentrations of either cadmium, copper, arsenic, lead, mercury, or zinc in muscle tissues.

Baseline water quality sampling in Prairie Creek, ground-water at the minesite, and streams along the winter road demonstrated no unusual conditions.

Benthic invertebrate studies undertaken during the July, 1980 period indicated that aquatic insect populations in Prairie Creek near the minesite were very sparse. Other streams along the winter road supported large populations of invertebrates with the greatest number of organisms being collected in a tributary of the Ram River and Fishtrap Creek.

Additional aquatic baseline studies were undertaken during the winter and spring of 1981. In March, 1981, sampling for water quality conditions upstream and downstream of the minesite, under the ice, was performed on Prairie Creek. Streams crossed by the winter road alignment were also examined.

Could I have the next slide, please. This represents the Grainger River.

Based on observations made during this period it appeared that the Grainger River and Tetcela River possessed an overwintering potential due to the presence of flowing water under ice and the presence of a relatively high dissolved oxygen concentration. However, all small streams, including tributaries of the Grainger and Tetcela Rivers and the Sundog Creek and Ram River tributaries, crossed or paralleled by the winter road were completely frozen and, therefore, exhibited no overwintering potential.

The next slide, please. This slide of Fishtrap Creek.

Fishtrap Creek supported free water under the ice but possessed very low dissolved oxygen concentrations. Prairie Creek contained

flowing water in March, 1981, with a high dissolved oxygen content and was considered as possessing some overwintering potential particularly in deep pools in downstream reaches.

In April/May, 1981, a ground and aerial reconnaissance was made of streams crossed by the winter road which revealed conditions prior to and following break-up of these aquatic systems. Observations indicated minimal disturbance to aquatic habitats in terms of a temporary increase in suspended sediment loads. However, the duration of this condition was such that no sustained impact would be present. No barriers to fish movement were in evidence.

Fisheries studies in May, 1981, indicated that Arctic Grayling utilized the Grainger River, the Tetcela River and a Sundog Creek tributary for spawning. Northern pike also inhabited the Grainger River. Within the Prairie Creek system, Grayling did not appear to migrate upstream of the Nahanni Park boundary. Trace metal studies revealed low levels of arsenic, copper, lead, zinc and mercury in fish muscle tissues.

Benthic invertebrate data for Prairie Creek and select road crossings, as in 1980, indicated low productivity. Numbers of organisms were too low to facilitate reliable interpretations.

In September, 1981, further aquatic studies were undertaken in Prairie Creek. Objectives were to quantify spawning habitat of fall spawners, determine relative numbers and distribution of fall spawners and document migration of spawning fish past the minesite.

This investigation revealed the presence of numerous areas that could be considered suitable spawning habitat upstream of the

minesite. In these areas congregations of Mountain Whitefish and Bull Trout were observed. Prairie Creek, downstream of the minesite, exhibited only limited potential spawning habitat. No fish congregations were observed. Where groups of fish were noted, no actual spawning activity was observed. No data were available which suggested migration of potential spawners was occurring past the minesite. It was projected that Bull Trout may exist as a year-round resident in Prairie Creek, given the presence of potential overwintering habitat in this system.

The aforementioned studies have enabled project impacts to be identified and have facilitated the selection of appropriate mitigative measures such as treatment of all industrial effluents from the mine/mill complex and the construction of project fuel tanks within impervious containment dykes.

Reclamation. It is, of course, of significant interest to Northern residents and government agencies to know what the mine will look like and what impacts the operation will have on the environment after mine shutdown. The objective of the reclamation program at Cadillac will be to restore the land to a condition which will be aesthetically pleasing and safe, and which will pose no threat to the water quality of Prairie Creek.

Final reclamation at the minesite will encompass stabilization of unstable rock slopes, provision of permanent and well-protected surface drainageways, further rip-rapping, if necessary, of dykes along Prairie and Harrison Creeks in order to protect against flood waters, sealing of abandoned mine portals, removal of buildings,

equipment, vehicles, fuels, etc., and the establishment of a vegetative cover on disturbed areas.

Seed plots will be established during the operating period of the mine in order to determine suitable seeds and their nutrient, water, and long-term survival requirements. Re-seeding of areas not subject to on-going disturbance would be initiated prior to shutdown.

On the basis of studies carried out to date, the only residual impact anticipated after mine abandonment would be the visual presence of the tailings impoundment. However, over time, the visibility of this landscape alteration will diminish as reclamation efforts take effect. At no time during or after the period of mine operation are any significant deleterious effects upon Nahanni Regional Park expected to occur.

Reclamation, waste disposal, environmental management and contingency planning will be the direct responsibility of an Environmental Technician who will report directly to the Mill Superintendent. Therefore, these matters will receive the full-time attention of a technical person who will liaise with other mining personnel, government agencies and the public to ensure satisfactory environmental protection.

Socio-economics. It is estimated that the mine workforce will be around 221 persons, including contract services. There will be a maximum of about 150 workers in camp at any one time.

All personnel will operate on a rotating basis with the schedule being 19 days in followed by nine days out.

Cadillac has had extensive discussions with the Government of the Northwest Territories and other interested parties over a period

of approximately one year. Development work related to the project has already involved the hiring of some local labour and has led to contracts being awarded to local contractors.

It is recognized that the major concerns regarding the project are related to employment for Northern residents, business for Northwest Territory firms and the avoidance of problems for the people living in and around the areas of activity.

In order to meet these concerns, Cadillac is prepared to enter into an agreement with the Government of the Northwest Territories that will set the framework for the operation. Although awaiting further amendments from the Minister, a copy of the tentative agreement, as it now stands, will be provided to the Board.

Basically, Cadillac has committed itself to the following obligations and procedures.

The Company is ready, willing, and prepared to hire interested Northern residents at all levels within the operation. The Company will, in co-operation with C.E.I.C. and the Government of the Northwest Territories, implement a recruiting program geared to Northern residents. This program includes the hiring of a Northern expediter-hiring agent, based in the recruiting area, who will have the authority and resources to cover the recruitment areas.

The Company identifies two zones as being suitable and practical for Northern hire. These zones are 1) from the B.C. border north to Wrigley and including the communities of Fort Liard, Nahanni Butte, Fort Simpson and Jean Marie River; and 2) from the minesite east to Fort Smith, including such communities as Hay River, Fort Smith, Fort Providence and Yellowknife.

Within these zones the Company's hiring agent, based at a suitable location, will actively promote job opportunities to Northern residents, both directly and through the training programs available.

The Company has recently had a first meeting with the Government of the Northwest Territories with the objective of opening discussions with both the C.E.I.C. and the Government of the Northwest Territories to discuss training and development and to identify, at the earliest possible stage, candidates suitable for inclusion in 1) pre-job training programs with conditional letters of hire; 2) apprenticeship programs; and 3) appropriate on-job training programs.

The Government of the Northwest Territories' TERIS Program would be involved in this phase of the program.

The Company also intends to encourage those Northern residents who participate in the construction phase of the development to take appropriate training, supported by the Company, to facilitate on-going employment at the project site.

The Company is prepared to design and implement a cross-cultural sensitization program for both supervisors and new employees on an on-going basis. In this connection, it is the desire of the Company that, from the Northern resident employees, there will be appointed a representative, or representatives, to liaise with the on-site management.

The Company recognizes the need of Northern residents for flexibility with respect to rotation and, to the extent that prudent and safe operation of the mine permits, will agree to special rotation cycles for Northern residents, as arranged by the mine management.



The Company intends to promote opportunities for Northern business and has held discussions with the Department of Economic Development and Tourism to develop a Northern business opportunities plan, broadly in line with the Cullaton Lake Gold Mine memorandum prepared by the Department of Economic Development and Tourism, Small Business Development.

The Company is prepared to organize community information programs with appropriate departments of the Government of the Northwest Territories. In this regard, the Company understands that officials of interested departments of the Government of the Northwest Territories will assist in the information program design and implementation. In addition, a Native Northerner hired to handle the recruiting-expediting in the communities will also carry out information exchanges with local residents.

It is worth repeating the basic principles of Cadillac's Management Policy and Job Training Manual which is currently being written.

1. Our operations will provide opportunities for employment, growth and development.

Our intention is to employ, whenever possible, the people from the immediate area. We will provide training and development programs that will enable employees to acquire the knowledge and to develop the skills necessary to operate the mine and the mill efficiently and to maintain a high level of productivity.

2. It is also our intention to make the fullest and the most effective use of our employee's knowledge, skills and general competence, and to reward them fully for their contribution to the success of the enterprise.

3. Our employees will be paid on the basis of what they are qualified to do as a result of the knowledge and skills which they have acquired through training and performance on the job.

4. We will make a continuous effort to establish and maintain the most direct, informal, open and cordial communications with our employees. For this purpose, we will establish a communications program, to be known as the Employee's Forum, where management will inform employees of any matters affecting their work, their safety and their general welfare.

It is our hope that these types of meetings will serve to promote effective communications and relationships in the day-to-day operations.

5. We fully recognize that in spite of the best efforts of all concerned there will arise, from time to time, some misunderstandings and, perhaps, even some conflicts. We will establish an informal complaint procedure which will be used to review, clarify and solve such problems quickly and equitably.

MR. B. CASE: Mr. Guild, the hour is noon. About how much longer do you think you'll be?

MR. N. GUILD: Ten minutes.

MR. B. CASE: Perhaps we should adjourn for lunch. I don't want to rush you.

MR. N. GUILD: Actually, there's only about three pages to go. If I could complete ...

MR. B. CASE: Carry on. And I'm not, Mr. Morrisroe, I'm not trying to chop you or your people off but we do have to check into the hotel

and have a bite to eat. So carry on, Mr. Guild, and then we'll adjourn for lunch.

MR. N. GUILD: Thank you.

Item 6. The Company fully recognizes, over and above its economic and financial commitments, it carries some important social responsibilities. To this end we will endeavor to establish and maintain effective relationships with the surrounding communities and their institutions.

It is our intention to work together with our construction general contractor at the construction stage of the mine plant to acquire skilled and semi-skilled workers who have received training at the site and are familiar with the equipment to be used.

As there is a definite overlap in the construction completion and start-up procedures, the initial training given workmen at the construction stage will be very valuable to Cadillac.

Tentative production trainees will be placed, whenever possible, on the construction workforce to assist in construction and receive some advance on-site training so they can become familiar with the site prior to actual production.

It will, therefore, be necessary to refer to the contractor's training plan as well as our own.

The principles outlined above will be used to form the basis of the Company's approach to good human resources management and community relations practice.

In order to put these basic principles into effective practice Cadillac will, with the services of a qualified training consultant, institute the following inter-related programs and practices.

One, a training, development and counselling program. This program is aimed at not only the operator training but also supervisors and management personnel for the development of skills necessary to perform effectively.

Two, the community relations workshop. This program will provide a forum for communications between the business, government, education, recreation and cultural representatives of the area on matters of mutual interest.

Three, an employees' forum. The employees' forum provides an opportunity for the management and employees to exchange views about Company policy and practices on a regular basis.

And four, an informal complaint procedure. Complaint procedures will be developed such that an employee with a grievance may take it to any level of management he chooses in order to resolve the problem in a speedy, acceptable manner.

Even though agreements in principle have been reached with the Government of the Northwest Territories, it is recognized that changes can occur. Problems might arise that were not expected and some problems that were expected might not arise. Consequently, the approach taken with the Government of the Northwest Territories, and the principle basic to the recruiting ... the resulting agreement, is that a flexible approach must be followed. In this light, Cadillac has agreed to establish and maintain a close liaison and information exchange with the Government of the Northwest Territories so that if and when the situation changes appropriate responses can be planned and implemented.

Finally, it is interesting to note that during 1981 a total of 58 residents of the Northwest Territories were, at one time or another, on the Cadillac payroll and that total earnings were in excess of \$420,000. Of the 58 employees, 42 were residents of Fort Simpson and represent approximately 12% of the male working population of the Village.

The final summary. In conclusion, this Hearing has been called to review the water licence application filed by Cadillac Explorations Limited for their proposed mining development adjacent to Prairie Creek. We have outlined not only the technical aspects of the application, but also the development plans, the practices for water management and waste disposal, the environmental baseline studies which have been conducted, and the socio-economic matters of hiring, training, and personnel policy. We feel that the project is environmentally sound and, provided that construction and operation of the facilities are carried out as recommended, the mine will have a negligible negative impact on the water resources of the project area in both the long and the short term. Similarly, we are confident that the wildlife and other resources of the region can be protected and that the mitigative measures which have been integrated into the design, construction and operating phases of the mining development will minimize project impacts. A framework has been prepared to provide flexible and positive opportunities to Native Northerners, other Northern residents, and local businesses. Cadillac is committed to proceed under the principles which have been outlined and, on this basis, we believe the project will be an asset to the North and be a significant contributor to its prosperity.

Thank you.

MR. B. CASE: Before we adjourn, Mr. Morrisroe, will you be calling on any of your other support people to continue with your presentation or will we get on to questions after?

MR. L. MORRISROE: I think that they'll be here just to answer any questions.

MR. B. CASE: So this is the end of your formal presentation?

MR. L. MORRISROE: That's our formal presentation, right.

MR. B. CASE: Very good then. Well we'll adjourn then until 1:30 and then we'll get onto the next item which is questions of the applicant.

MR. B. CASE: Ladies and gentlemen, it's now just past the hour of 1:30. I'd like to call our Public Hearing to order again. Before carrying on with the normal routine of our Hearing, there are a couple of things I want to mention.

First of all we have had indication of a couple of more written briefs to be submitted today; one from Celine Antoine and another one from Lewis Menicoche. We also have a list of two, four, six, seven people who wish to make verbal presentations to the Board and I suggest that we, after the formal presentations have been made we just carry on with the verbal presentations. So that will come a little later on in our program.

MR. L. MORRISROE: Mr. Chairman, have you got copies of those last submissions?

MR. B. CASE: No, sir.

MR. L. MORRISROE: There's no copies that are available?

MR. B. CASE: There's no copies here yet, to my knowledge.

MR. L. MORRISROE: Very good.

MR. B. CASE: There's one other thing I wanted to say before we carry on. The last part of Cadillac's presentation dealt with the socio-economic impact of the Prairie Creek mine. Now these matters are very important to Cadillac and they're very important to the people of the Mackenzie and Liard Valleys, and also, of course, they are of great interest to the individual Board members as individuals. However, the Board, as it is constituted, has no authority to deal with social or economic or political concerns; and our field is water use and the depositing of waste and this just re-affirms what I said at the beginning of our Hearing.

The next item on the agenda for this Hearing is questions of the applicant. Anybody in the public or the Board, the floor is now open for questions and I would ask that you rise and identify yourself to the Chairman and then carry on with your questions of Cadillac.

MR. D. STENDAHL: Mr. Chairman, I have several questions.

MR. B. CASE: Would you come forward please, and identify yourself.

Talk into the microphone.

MR. D. STENDAHL: Yes, my name's Doug Stendahl; I'm with Water Resources and I have several questions for the consultants. The first question is, I'm wondering if the geo-technical consultant might explain how the slumps, the slumping in the tailings pond on the east side may have occurred, and what is the likelihood of this occurring in other areas of the tailings pond?

MR. B. FLETCHER: My name's Brian Fletcher with Golder Associates. The design of the tailing embankment, in specific terms, the inside of the embankment where the clay seal is, the safety there is contingent, or at least one of the parameters that relates to the factor of safety of that, of the inside slope, is the thickness of materials above the base of the clay. Okay, is that clear? If you over-thicken that, it will fall down, and that's what happened.

MR. D. STENDAHL: So, I'm just wondering if the area that slumped was, you know, takes into consideration in all the areas where this was over-built or over-constructed?

MR. B. FLETCHER: Okay. All of the areas, with the exception of that one area, are built to specifications.

MR. D. STENDAHL: I see. Okay. I have another question, if I may. It's regarding the treatment system and following one year of operation of the mine you've indicated that the treatment system will have been evaluated for a one month's time using a close, a closed loop recirculation of the effluent. The question that I pose to the consultants is, what plans do you have if it is then found after one month's time of testing of the effluent treatment system that the effluent is not suitable for discharge? In other words, is, another part of this would be, is there holding capacity available in the tailings pond to store effluent and if so, for what duration following this period when you anticipate that you can discharge to Prairie Creek?

MR. M. BATH: My name is Murray Bath, Kilborn Engineering (B.C.) Limited. With the proposed effluent treatment plant being completed in April or May, 1983, there will still be, we expect, a few feet of freeboard



available in the tailings pond sufficient to allow us to trial operate the treatment plant for the one month period that you mentioned. However, should the effluent at that time prove to be unacceptable, there is, realistically, no other holding area where effluent could be stored. However, our intention is to carry out sufficient testing and to design the effluent treatment plant sufficiently conservatively that, we believe, the possibility of effluent not being acceptable is very slight indeed. Our approach will be to do sufficient test work that we can have a very high degree of confidence in the treatment plant being able to do its intended job.

MR. D. STENDAHL: Okay. I have one more question. I'd like to direct it to Norm Guild; and he mentioned in his submission for Cadillac, he mentioned about chemical storage. My question is, what accommodation has been made for storage of toxic or hazardous materials on the site?

MR. N. GUILD: Okay. I'm just going to re-direct that because some decisions have been made on that in the last day, in fact, and perhaps, Gerry, you'd like to address that.

MR. G. HAMILTON: I'm Mr. Hamilton, from Cadillac. And to answer your question, we, in the last few days, have had some discussions on the site as to the storage of the chemicals and we were discussing this with our consultants at the present time and we'll be making a submission to Mr. Cullen's office with respect to how we hope to contain any spills from such chemicals.

MR. D. STENDAHL: Okay, thank you.

MR. B. CASE: Thank you, Mr. Stendahl. Further questions? Yes, Mr. Gamble.

MR. D. GAMBLE: I'd like to ask just a couple of general questions so that I understand the context within which to take the statements in this submission. Mr. Guild, this submission was read by you. It's indicated on the front cover that it's your company that prepared it, and yet through here we see reference to words like "we" and so on. Is that Ker, Priestman's undertakings, or is that Cadillac?

MR. N. GUILD: Norman Guild; Ker, Priestman. It's Cadillac's undertaking.

MR. D. GAMBLE: So every, all the statements in here are Cadillac's and not necessarily your company's.

MR. N. GUILD: That is correct.

MR. D. GAMBLE: Does your company have any on-going commitment to Cadillac after start-up?

MR. N. GUILD: At the present time we are, Norman Guild; Ker, Priestman, at the present time we have an on-going commitment with Cadillac to assist them in all environmental matters.

MR. D. GAMBLE: And that's open ended, is it?

MR. N. GUILD: It's open ended at the present, yes.

MR. D. GAMBLE: In your submission, you didn't address, directly anyway, the water quality criteria that had been suggested in various drafts that were circulated to you, I understand, by Mr. Cullen. Do you intend to do that later? To comment on them in some detail?

MR. N. GUILD: Norman Guild. The actual table that we gave within the summation is our latest, sort of, proposal with respect to effluent quality relative to the graphs that we'd received to date. I see from copies of other submissions that we received today, I only received them today, that there are other proposals being put forward

by both the Department of Environment and by DIAND Water Resources and I haven't had too much time to review all the figures. But certainly we'll be reviewing those and comparing them to our own in the near future.

MR. D. GAMBLE: I guess we'll get to those later on. But I'm wondering if you could tell me exactly where in this submission here these numbers are? Is that page 13?

MR. N. GUILD: Yes, that's correct.

MR. D. GAMBLE: And the letter that you sent to Mr. Cullen, dated January the 20th, outlined some numbers as well.

MR. N. GUILD: Yes.

MR. D. GAMBLE: You gave two tables here which you had a suggested table, an alternative one you called it, and then you had a second alternative which was presented in tabular form. Which, is this then another third alternative then you've provided today?

MR. N. GUILD: Norman Guild. No, that alternative presented in the brief is alternate one of that letter. We are still prepared to meet alternate two. However, to include that in the brief was, we felt, was too complicated. So our alternate one would be the levels that we felt we could meet based on if we could only use 20 to one dilution in Prairie Creek; our alternate two was proposed if we were allowed to make use of somewhat higher dilutions in Prairie Creek. And I believe the submissions that I've seen today from Department of Environment address that subject as well with respect to the ability to use dilutions greater than 20 to one. So really, there are two alternates that we proposed in that letter to Andy Cullen; alternate one which

is the same as Table 1, page 13 of the brief, and alternate two is simply an extension of that alternate one based on being allowed to use greater than 20 to one dilution in Prairie Creek. In fact, most of the factors are a factor of two to 40 to one dilution would satisfy all our requirements.

MR. D. GAMBLE: Don Gamble again. So this alternative one in your letter, which is the same as Table 1, is predicated on a 20 to one dilution? You will not discharge unless there's a 20 to one dilution, is that correct?

MR. N. GUILD: That is correct.

MR. D. GAMBLE: One of the concerns, as I understand it from Parks Canada, and one that is shared by other people, is that the water quality be maintained at the Park boundary. Do these numbers, in your opinion, on Table 1 on page 13 of your brief, will that achieve that objective?

MR. N. GUILD: The levels that we were proposing were based on using Department of Environment water quality guidelines, originally they were 1979 guidelines, and by placing our treated effluent into Prairie Creek, certainly by the time it would reach the Park boundary the DOE water quality guidelines would be met.

MR. D. GAMBLE: That doesn't answer my question though. Would the existing water quality at the Park boundary be maintained?

MR. N. GUILD: If one, the water quality would be unimpaired at the Park boundary. However, by placing an effluent into the Prairie Creek we are adding something to the water. And that something is still in the water. But what we're saying is by the time it gets diluted with the water in Prairie Creek and by the time the water reaches the Park boundary there'll be no impairment from that water to aquatic life.

MR. D. GAMBLE: But there will be a change in the background water quality?

MR. N. GUILD: With these levels there would be a very minimal background change, but not enough to be above the guidelines set by the Department of Environment.

MR. D. GAMBLE: And those guidelines are what, again?

MR. N. GUILD: They were guidelines, aquatic, guidelines for aquatic life, set in 1979 by the Department of Environment. They are very very stringent with respect to water quality.

MR. D. GAMBLE: Well, we'll have to come back to this, I guess, when we hear from Parks Canada and from DOE, but it's one thing that I do want to explore. We've got two proposals from you and I understand, from looking through some of the other briefs, there are other numbers floating around as well. And somehow, if it's possible in a forum like this, I'd like to try and see where the, where we can reach consensus; and where there are differences, what those differences are. So that we come away from the meeting here today with some idea of exactly what the difficulties are, so the Board then can concentrate on those and try and resolve them.

I've one other question for now, related to this brief, and this goes back to my original question of whose undertakings, or whose statements these are. On page 16 of the brief, you're seeking to describe Cadillac's ability to react to the spills of hazardous materials and through this section in general, if I understand it correctly, you're seeking to assure the Board and the public that the mine will be operated in a safe way that won't be harmful to the environment and will meet the standards that are going to be imposed.

I have, and I believe they're both on the Water Register, an Inspection Report by a Mr. Tilden, of Environment Canada, concerning the oil spill of June the 3rd, 1981. I also have a recent Inspector's Report, dated February the 11th, 1981; it was, the letter dated, was that date sent to Cadillac. Both these reports indicate something that's quite different than what you're stating in this brief. And I'll just cite two examples, and I'd like you to respond to them and perhaps later you could look through both reports and tell me if there are other things in here which would help the Board understand the apparent differences in what your brief says and what these Inspectors seem to be saying.

For example, in the report from EPS, on page 3, the Inspector refers back to some statements that you made on behalf of Cadillac on June, at a previous meeting related to this mine. And at that time you said, and he quotes, "Fuel storage facilities at the Prairie Creek site are located within a dyked impervious area complete with an integral recovery pumping system." The report from EPS states, right after that, "This above statement is either an out-and-out lie, or based on highly erroneous information. Either way it is not true." And he's seeking to describe in here, and that's just one example, of the differences between what the Company is saying and what the performance is.

The same type of problem arises in this February the 11th, 1981, sorry, 1982, report where they describe the fact that the existing authorization is not being complied with, with respect to minewater discharge. They go on then to describe the same thing exists with

effect to the discharge of sewage treatment plant effluent, and they say, in particular, in that respect, "The treatment system in place is not producing an effluent suitable for discharge."

Now these are the kinds of things that cause me some difficulty in trying to match assurances that are being provided with actual performance.

MR. L. MORRISROE: Well, Mr. Gamble, are we on 13 now when the oil spillage, or are we over on the other?

MR. D. GAMBLE: Well, you take your pick. I just cited these as two examples that were causing me some difficulty, and I was just seeking from Mr. Guild, or whoever, some explanation that might help us put these into some better perspective perhaps.

MR. G. HAMILTON: Mr. Hamilton from Cadillac. I'd like to address your questions, if I may. First of all, with reference to the oil containment in the June, 1981, reference. The present oil storage facility, permanent facility, was built during the summer of 1981; the impervious dykes and the pumping system that were installed was commissioned late in the fall of 1981, and at presently, the fuel that is being taken into the site is being put into the permanent facility and all of the previous facilities that we used for the storage of oil are now, have been taken out of service. And in that respect, I believe that the statement that we have the containment that's required and that's been accepted by the respective agencies that those conditions have been met.

MR. D. GAMBLE: Well I'm sorry, I wasn't, I didn't mean to imply that you had not fixed the situation. What I was seeking to describe by these

two examples was that we were being told one thing when another thing was apparently happening. And I was, in particular, referring to previous statements that Mr. Guild had made which apparently is in, at variance with the facts as this Inspector saw them. And I was, in that way, trying to come back to some of the assurances that were given here, in particular on page 16, and wondering if there's some explanation of why we could accept these things today when the performance in the past would question whether or not they're reliable.

MR. G. HAMILTON: I believe that at the time those statements were made by Mr. Guild that he that time was referring to the design that Cadillac was carrying out on the permanent facility, and the spill that was referred to was a spill from the original facility that had been installed. And I believe that Mr. Guild was referring, as I say, to what was being designed as the permanent installation. And I believe the same thing applies also to your question with reference to the, our sewage treatment plant. At the time that that statement was made the sewage treatment plant had not been installed, but the design of the plant was such that it would meet the specifications that Mr. Guild referred to.

MR. D. GAMBLE: Have you read this, have you seen this report of Mr. Tilden's about the oil spill?

MR. G. HAMILTON: No, I have not.

MR. D. GAMBLE: Maybe I could give it to you and you could read it and we could talk about it later. And I'd like to do the same thing with this recent Inspector's Report of 1982. If you haven't read that perhaps that would help you. And, again, I'm not interested right



now in discussing a lot of historical things. What I'm seeking to do is to try and understand what changes the Company might have made, what different sort of approach, so that these kinds of things won't happen. And, in particular, one of them has even happened this month. Because they related directly to the concerns related about water quality and the insistence by certain people that this Board, through the licence, seek to guarantee water quality standards.

MR. N. GUILD: Norman Guild. Don, I'd just like to confirm that any references I made to fuel storage was for fuel storage that was, in fact, constructed during the summer of 1981. I was fully aware that the existing storage tanks on site were not within an impervious containment area, and for that reason we were having them re-designed and relocated.

MR. D. GAMBLE: Okay. I'd like you to look at these and comment on them, if you would.

MR. B. CASE: Any more questions, Mr. Gamble?

MR. D. GAMBLE: Not for now.

MR. B. CASE: Do you want to pass those on to ...

MR. G. CARTER: (Not audible).

MR. D. GAMBLE: They're from the Water Register.

MR. B. CASE: Mr. Stendahl.

MR. D. STENDAHL: Yes, Doug Stendahl, Water Resources again. I'd like to make reference to that Inspection Report, which I wrote February 11th, or whatever the date was, I can't recall. I would like to indicate that following indicating these concerns to the Company they directly contacted myself and indicated that they were taking measures to deal with these two items. With regards to the minewater, it is now being

lined in the sump in the adit, which is what we requested. And the second thing I'd like to indicate is regarding the sewage treatment plant. They have now brought in their consultants to look at the system and it has been indicated that this type of system requires some aging, and this is a possible reason why it was not operating. And if it continues, Cadillac indicated to me, that they would be not disposing of the sewage into Prairie Creek and would pump, or divert, the sewage into the tailings impoundment. So I would just like to make that comment.

MR. B. CASE: Thank you. Any more questions from the floor to Cadillac? Any questions you want to ask? Mr. Gamble.

MR. D. GAMBLE: I'd like to clarify once more why I brought these two examples up. There has been a great deal of concern by a lot of parties, including Parks Canada, about the ability of the water licence to guarantee that certain things will not happen and affect the water quality within the Park. It seems to me that one of the most fundamental things that we have to be aware of, at least in writing the licence, is whether or not the Company is, on its own, has the ability to anticipate problems and respond accordingly so that they don't happen and we're in a reactive position. Because it will be too late in certain circumstances. Now both these incidents imply to me that the Company does not have that ability to anticipate problems; that there's something wrong somewhere and I don't mean to imply that they are not able to respond once a problem is brought to their attention. They certainly, from what you say, have been able to do that. What I was hoping is that somehow we would get to a point

where this kind of thing wasn't even necessary; where the writing of this kind of report wouldn't be necessary to prompt the Company into action.

MR. B. CASE: Is that all, Don? Questions from the floor? Mr. Daniels.

MR. T. DANIELS: Terry Daniels. Point of order, Mr. Chairman. I guess, as an observer here, it disturbs me somewhat to have heard the proponant here, the word "lie" used in terms of making his application. You know, I don't know the legal implications of that, but I, that to me seems to me to be a serious allegation and one that perhaps is not in the proper place, proper form here at this Public Hearing. Thank you.

MR. B. CASE: Okay. More questions? Go ahead.

MR. D. SUTHERLAND: Mr. Chairman, Dave Sutherland with Environmental Protection Service. Environment Canada and Parks Canada have a number of questions. I'd like to introduce the gentlemen that are with me. Richard Nancarrow, who is with the Environmental Protection Service in Yellowknife; and Mel Falk, who is with Parks Canada in Winnipeg.

MR. M. FALK: We have a number of inter-related questions which ...

MR. B. CASE: Excuse me, would you identify yourself each time you ask a question, please.

MR. M. FALK: Mel Falk. We have a number of inter-related questions which necessitates us being here together. I'll lead off with the first question, directed towards Cadillac. In reference to their statement in the summary, page 11, which states that, "Cadillac is committed to ensure that both these discharges will be of good quality after treatment and have no impact on the aquatic resources of Prairie Creek or other downstream waters."

Now, in reference to that statement, I would ask that representative from Cadillac define, more precisely, what "no impact" means, for clarification purposes.

MR. N. GUILD: Norman Guild. Basically, as I mentioned to Don Gamble, we believe that we can reduce an effluent that once introduced into Prairie Creek will not raise the background levels of Prairie Creek to a level which would cause any impairment to the aquatic life, based on levels set by the Department of Environment in 1979.

MR. M. FALK: Okay, in actual fact, there would be an impact. I think that everything we do, in some regard, causes an impact. It's a matter of definition, and this is what I was trying to get at.

MR. N. GUILD: Okay, well that's our definition of no impact.

MR. M. FALK: Mel Falk, again. In this light of no impact, and from what you're telling me, is what you're telling me, can you measure that?

MR. N. GUILD: If we actually work out the levels after dilution which would be introduced into Prairie Creek, one could certainly measure a very, very small increase in background levels. So it is measurable, but we're into the sub-decimal places.

MR. M. FALK: Mel Falk. I just want to draw the parallel here to Parks Canada's stated position which briefly states that there be no measurable change in water quality at the Park boundary as a result of upstream developments. Now your definition of no impact, and Parks Canada's position, are they one in the same or are they different?

MR. N. GUILD: Norman Guild. Well perhaps I could ask you what your definition of non-measurable is?

MR. M. FALK: Fine. I would say that any statistical, statistically significant increase over background, or baseline.

MR. N. GUILD: Norman Guild. Well statistically significant, in our view, would be a level which would impair the aquatic life, and what we are saying is we believe that our effluent, once introduced into Prairie Creek waters, diluted by the waters, would not, in fact, cause any statistically significant impairment of the water.

MR. M. FALK: Okay. I'll pass this on now to Dave.

MR. D. SUTHERLAND: I just want to be clear that ... Dave Sutherland ... I just want to be clear that I understood you. Did you say, then, by inference, that in fact your levels would not cause a statistical change in the water quality at the Park boundary?

MR. N. GUILD: Norman Guild. No, by virtue of the fact we're introducing certain amounts of heavy metal to the water, there would be an increase. What I'm saying is that there would not be an impairment of the water with respect to aquatic life that would be statistically significant.

MR. D. SUTHERLAND: I think this question was asked perhaps in a different way, but I'd like to repeat it. If the effluent quality levels presented on page 13 of your submission were accepted by the Board in the licence, and following the design of the treatment plant it was found that the licence limits could not be met, what action is the Company prepared to take to achieve compliance?

MR. N. GUILD: I'll repeat again what we said earlier. One is that we have a period of one year in which we plan to do extensive test work to endeavor to ensure that the treatment plant will produce an acceptable quality of effluent. By virtue of the pond balance, we have a

period of a month, perhaps if we're lucky, two months, to do closed loop cycling of the effluent with the tailings pond. If, at that point, we have an effluent that cannot meet the discharge levels then at that time we will have to consider that obviously the fact that it cannot be released from the pool yet. I can't say any more than that.

MR. D. SUTHERLAND: Would that be a commitment then, from the Company, that in fact if that, if this was the eventuality that they would be prepared to shut down the operation?

MR. N. GUILD: By virtue of the licence which would have been issued by that time, there are criteria set in the licence that restrict the quality of the effluent. Obviously, if we cannot meet these requirements, regardless of commitment on Cadillac's behalf of shutting down, the regulatory authorities will shut us down. I believe that's the process that's in place for handling such an emergency.

MR. D. SUTHERLAND: Another aspect of this question is, is there any alternate forms of treatment processes which you are considering, in addition to what you have outlined to the Technical Committee and to the Board and than are contained in your proposal?

MR. N. GUILD: Yes, we are giving consideration to other processes. I'll allow Murray Bath to perhaps expound a little bit on that.

MR. M. BATH: Murray Bath, Kilborn Engineering. Yes, we are well aware of work which has been done by various organizations throughout the country on improving the present technology that's available for treatment of effluents of this sort. We're presently making a study of alternative methods. There are a number which we believe are

possible improvements on the alkaline chlorination treatment which has been proposed up to this time. We are in the process of arranging with Cadillac to retain the services of a consultant who is an expert in the field of effluent treatment. We hope this will ensure that the very best technology is brought to bear on the problem. We're considering, as I said, other alternatives including possible replacement of the alkaline chlorination treatment as one possible alternative, or the addition of subsequent steps to alkaline chlorination to ensure that the effluent itself is of the highest possible quality. This would involve, for instance, as one example, and this is by no means a commitment, but possible use of activated carbon as a de-chlorination system at the end of the alkaline chlorination train. Without going into a lot of detail, the answer to your question is yes.

MR. D. SUTHERLAND: Perhaps a related question. Mr. Guild, in your letter to Mr. Cullen of January 20th, 1982, you indicate that two alternatives were presented for treating and discharging effluent. In the second alternative, for a dilution rate of 20 to one, you proposed to reduce levels of arsenic, copper and cadmium compared to those presented in, on page 13 of today's submission. Can you indicate how you, what measures you were going to take in order to reduce these three parameters in that alternative.

MR. N. GUILD: Our fundamental concern in the section in that letter was that we would be able to consistently meet the levels that had been previously suggested; and for that purpose we recognized by taking our sampling on a regular basis we may at certain points in time

throughout the year find that our levels were higher than the minimum levels given in the first column that you're referring to. However, we would then be able to hold the effluent to such a point as dilutions were greater and then release the effluent at that time, or we would reduce our quantity of effluent so that dilutions would be higher. So there was not an intent there that there's a difference in the treatment method between alternate one and alternate two. We simply were going to reduce the amount of discharge of the effluent so that the dilutions were available higher than 20 to one.

MR. D. SUTHERLAND: Is it correct for me to assume then that what you mean is that the numbers in alternate number one in column number one of that table are the numbers that you are designing to treat to?

MR. M. BATH: Murray Bath, Kilborn Engineering. I'd like to remind people here of the fact that the, there is disagreement even today amongst experts in the field of effluent treatment as to exactly what each process can achieve. There is continual advance in the field of effluent treatment technology; there's, for example, a new process which has just been announced by Inco Metals in fact which offers, we believe, considerable promise and which we will certainly investigate further. Therefore, it's difficult to say that we are designing or not designing to a particular level. What we are basing our statements on is the published and available information on what processes already in place can or cannot do. However, there are a number of improvements to the basic process which can be made; they're established and proven technology and they're widely used in other branches of industry than mining and some of these have very definite



applications to the process, or to the problem in hand, and we will bring consideration of these processes into our design for the effluent treatment facility at Prairie Creek.

MR. N. GUILD: Excuse me, Dave. In column one, what we were intending to do was simply state the levels that we were endeavoring to meet, and we believe we could meet some of the time. However, we needed the additional dilutions available to permit us a range of values throughout the year.

MR. M. FALK: I have a question regarding fish, and I refer to the summary, on page 31, and I make these more as comments but I would hope there would be some response from Cadillac. I make them since I have a background in fisheries biology and these things, I just can't get them out of my blood. First of all, with respect to fish migrations past the Prairie Creek minesite, what is in the bottom paragraph on page 31. I just wanted to try and clarify this. For example, if indeed upstream in Prairie Creek is important, I'm not saying critical or vital, but important spawning areas for the fall spawning species that were mentioned there, Bull Trout and Mountain Whitefish, to get to those spawning grounds they would have to pass by, or through the downstream reaches in Prairie Creek. So I would say that if indeed the upstream reaches are important for these fish species, so are the downstream areas. And it would appear to be a little bit misleading when you say downstream of the minesite exhibited only limited potential spawning habitat, but in actual fact that reach of the stream may be just as important to those species as the actual spawning habitat.

As far as overwintering of fish in Prairie Creek, this has been stated before more discussions, but it's a known fact that fish

do overwinter in Prairie Creek in pools further downstream, this has been verified by Parks Canada personnel that work in the Park.

The final comment is that there is a problem with Arctic Grayling and it, on page 31 again, in the second paragraph, it says that Grayling did not appear to migrate upstream of the Nahanni Park boundary. If they are on a spawning migration, this particular species would move before, during, and after, very close to break-up in the spring. And it is very difficult to find these little beasts at that period during spawning, and as a result very little is known about their reproductive behavior during that period. So it's very easy because of a delay in getting a field season off the ground and to get nice water the spawning migration may be over and done with.

So if anybody wants to comment on that it's fine.

MR. W. DWERNYCHUK: Yes, Wayne Dwernychuk, Beak Consultants. With regard to Grayling, the statement was made that it did not appear, making reference to the fact that we have no information to that effect that they are moving. With regard to the limited spawning area, the definition of spawning that we used was the actual act of spawning. I recognize the fact that in order to get to a spawning area you could interpret the information the way you did. I'm not disputing that at all. But the over-flights that we did do, the landing, and the study of the substrates in the various areas, I'm sure you've seen the report, the intimation being that the habitat for the actual act of spawning was of a lesser quality than that, those habitats upstream of the minesite.

MR. M. FALK: Okay, that's fine. I think those reports are most interesting and perhaps if they can be at least registered with the Board, I

think that would be, maybe help to resolve this. I don't know if they're on it or will be.

MR. W. DWERNYCHUK: I don't really, what was your, did you have a question there, hidden somewhere?

MR. M. FALK: I just thought that the data may be of interest to the Board members. Mel Falk speaking again. Because the summary, I'm not drawing any criticism, it's just that the summary is possibly misleading from the actual data which are contained in those reports, and I think that those reports are quite factual.

MR. N. GUILD: There is a complete compendium I've prepared of all the work that's been done on Prairie Creek and it was submitted, five copies were submitted to the Water Recorder two to three weeks ago.

MR. M. FALK: That's fine. Thank you.

MR. B. CASE: (Not audible).

MR. D. GAMBLE: I missed the point you were making there, Mel. What exactly is the summary are you referring to here?

MR. M. FALK: Well in this summary, on page 31, regarding fisheries. It's very difficult to summarize a large volume of data into several paragraphs.

MR. D. GAMBLE: Okay, fair enough.

MR. M. FALK: I just thought that the benefits were there and if those reports are indeed registered with the Board, that's fine.

MR. D. GAMBLE: Yes, okay.

MR. L. MORRISROE: Mr. Chairman, I'd just like to give a word about Parks. Mr. Morrisroe of Cadillac. Just to bring the Board a little bit of history, and also these younger boys that are in Parks. This here

mine was started back in 1966 or seven, which we got a licence from the government at that time to turn around and go to work and to develop a mine. And back in 1966 and 67, 70, we spent five million dollars, you know what I mean, developing this mine. That's before there was any Parks or anything in the area. When the Federal government decided to turn around and put in a Parks in this area, they covered the whole area; the first outline of the boundary covered the whole mine. So what the Department of Indian Affairs and so forth in Ottawa, we pointed out to them now if this here Park goes ahead, are you going to give us the right, you know what I mean, to mine in the Park? They said we had to have that before we'd put a submission in to the government in regards to the Park. We said that we either had to have the right to mine in the Park or we should be compensated, you know what I mean, for the money that we'd put into the Park. They said well at the time we didn't feel like, you know what I mean, that we'd ever make a mine. Well I referred them to the consultants, you know what I mean, for their opinion and they came back and they changed the border of the Park and they left us out of the Park, you know what I mean, as it is today. And they said that they wasn't prepared to compensate us, you know what I mean, for in the Park.

So now I think that the Water Board should take this into consideration and I think Parks Canada, and I'm going to answer Mr. Gamble's question here. When you come along under a situation like this in later years and say now we want, you know what I mean, to be no impairment, no change, you know what I mean, when it hits that

Park boundary. When we're turned around, good enough to turn around and tell you that we're prepared to meet the 1979, you know what I mean, the Environment's quality of the water. And I don't think that because the Park is there that there's any reason that Cadillac should be expected to turn around and do any better than any other mine, you know what I mean, in the Territories in these here qualifications. So I think that you're trying to penalize us and it wasn't us that put the Parks there; it was Parks Canada that put the Parks there. So I just thought that I would bring this to the attention of everybody here today that doesn't realize, you know what I mean, the background. And I'd like the Board to understand the situation. Thank you.

MR. B. CASE: Thank you, Mr. Morrisroe. Dave, have you more questions from your triumvirate?

MR. R. NANCARROW: I have a question regarding the sewage treatment plant ... Richard Nancarrow. The report by DIAND Water Resources Division would indicate that the plant is not working very well, if at all. Could Cadillac tell us how they intend to rectify this situation and to monitor in the future to ensure that it doesn't happen again; that effluent quality is maintained.

MR. G. HAMILTON: Mr. Hamilton of Cadillac. We had a, as has been mentioned earlier by Mr. Bath, we had a consultant come up to our site and take a look at, along with the manufacturer of the plant that we have installed. We found that there was a deficiency in the plant which has been corrected; the effluent is now being monitored bi-weekly, or twice a week rather, and the results of those analyses are being

forwarded to the Water Resource people and we have an understanding with the Water Resource people that they will be looking for improvement in the quality of that effluent over the next four weeks and if not, then we have to, it will become under their powers to close our sewage treatment plant down. And we are quite confident from what we have found from our consultant that we will overcome the problem and the plant, other than the aerobic portion of the plant, is working well. The ultra-violet system with which we had some problem with the electronics in it is being returned to the manufacturer and should be back on site and installed next week. But we are monitoring it; we'll monitor it daily, or whatever frequency we have to, in order to indicate to the authorities that we are getting improvement in the quality of the effluent.

MR. R. NANCARROW: One of the problems that's identified in the literature with this particular type of plant is operator training. Do you have people that are qualified to operate this type of plant on site, and to monitor it?

MR. G. HAMILTON: Yes, we have. While this consultant was on site he prepared for us, and gave to our operators, instructed our operators in the procedures for the maintenance of the plant, for the operation of the plant, and for monitoring it. And those procedures have been instituted.

MR. R. NANCARROW: Thank you.

MR. M. FALK: Just to clarify one item that was, I believe, mentioned before; I just wanted to clarify. If the minewater discharge from Prairie Creek project, is that going into a lime pit now, or is it going into the ground with no treatment?

MR. G. HAMILTON: The present discharge from the mine workings is collected underground and directed into an underground sump on the lower level of the mine. Lime is added prior to that underground effluent, that underground water going into the sump. There's settlement in the sump and then that is taken across and through gravity flows out through the portal and it is the intention that before the end of March, when our tailings dam will be completed, that that effluent will then be piped in behind the tailings dam and will continue to be piped behind the tailings dam as long as the mine is in operation. The only reason it is not going behind the tailings dam at the present time is because the dam is not completed.

MR. M. FALK: Thank you.

MR. G. HAMILTON: The water is being monitored, the effluent is being monitored that's being discharged in the mine.

MR. R. NANCARROW: This is a question relating to the hypalon liner. How are you proposing to protect this exposed liner against ice damage?

MR. B. FLETCHER: Brian Fletcher, Golder Associates. The hypalon liner is on the back slope of the tailing pond and a little bit on the east embankment, about 150 feet of it. Protection of the liner from ice damage, I'm assured by the supplier and the manufacturer, is not a problem. That's the entirety of my knowledge about ice damage to hypalon liners at this point. If, in fact, ice damage is a problem, or has been shown to be a problem in cases where hypalon has been used, the sort of protection that I would envisage would be to place a boom along the perimeter of the embankment where the hypalon liner is. That's a minor thing, I think, to do. So if, in fact, you can

show that hypalon liners are subject to ice damage that's the measure that we would take.

MR. R. NANCARROW: One of the things that I've seen is that they are subject to failure if there's a void underneath them. They are brittle at lower temperatures and they are subject to ice damage, from what I've seen.

MR. B. FLETCHER: Brian Fletcher, Golder Associates. The issue of voids underneath the liner, in this particular case, I think, should be a non-issue since there are measures being taken to assure that the liner is in contact with the ground underneath it at all places by placing weighted bags, or whatever, at intermittent spacing along the length of the liner.

MR. R. NANCARROW: I understand you're using crushed rock with a filter cloth over top of it. Is that crushed rock, or is it, are you quarrying the rock?

MR. B. FLETCHER: The rock that's being used in the central section of the embankment, or the backslope, which is what you are referring to, is mine waste which is crushed, or which will be crushed.

MR. R. NANCARROW: The filter cloth will be sufficient to protect the hypalon liner against damage?

MR. B. FLETCHER: That's why the filter cloth is there, the only reason why the filter cloth is there.

MR. R. NANCARROW: Is this type of liner resistant to ultra-violet radiation?

MR. B. FLETCHER: Yes, it is.

MR. R. NANCARROW: That's all the questions.

MR. D. SUTHERLAND: Mr. Chairman, Dave Sutherland. I have a couple of questions relating to reduction in water use, specifically with the industrial



process. In Figure 2 of your submission, in the water balance flow sheet, it is indicated that it is hoped to replace fresh water usage of 50 gallons per minute for drilling and dust suppression with mine drainage water. How do you propose to do this, and when would it be possible to start that?

MR. G. HAMILTON: Gerry Hamilton, from Cadillac. At the present time we are not using fresh water in the mine for dust suppression; we are using mine water. To date it's not posed any problems with any of our equipment; our main concern is our rock drills where there are, there's a great deal of tolerance in a rock drill and we're concerned about solids in the drills. So far it hasn't posed a problem to us. We do not have any fresh water being supplied into the mine, other than potable water, at the present time and we have no intention now to change unless we run into problems.

MR. D. SUTHERLAND: In your drawing number 100-10-10 which was submitted to the Controller of Water Rights on February 12th, it was indicated that the industrial effluent discharge rate will be lowered from a maximum of 400 gallons per minute to 300 gallons per minute in the period of 1988 to 89. How does, how do you propose to achieve this reduction in effluent discharge?

MR. M. BATH: Murray Bath of Kilborn Engineering. Any reduction in the actual rate of discharge during those later years would result, or would have to come from an increase in the period over which discharge took place. We believe we've been very conservative in the table shown on that drawing which shows the discharge levels for the various times of the year. In fact, if we maintain the dilutions which have previously been discussed, we should be able to discharge small

quantities of effluent even during the winter months, and this, I believe there is a statement to that effect on this drawing. While it's not the intention to discharge during those winter months if it's not necessary, nevertheless it could be done while still maintaining the dilutions previously discussed.

MR. D. SUTHERLAND: Is there a potential for further mine seepage water to enter the workings as you develop further workings?

MR. G. HAMILTON: Gerry Hamilton, Cadillac. From our observations to date in our operation we would consider the Cadillac Mine to be a relatively dry mine. Most of the water that we're having does not come out of the ore body; it comes out of the surrounding rock. The ground is tighter as we go down and we would expect that we would not increase the water quantity by any future development of the particular zone that we are looking at and are working on at the present time.

MR. D. SUTHERLAND: One final question on minewater. Is there any measures being contemplated or assessed for reducing the quantities of ground water that are entering areas that would be backfilled in future to reduce the amount of contamination from the tailings or tailings effluent?

MR. G. HAMILTON: Gerry Hamilton of Cadillac. The reason, first of all, one of the reasons that we are using a backfill system is to reduce the amount of waste that has to be stored on surface. At the present time, we have indicated in our submission that we expect that one-third of the material, the waste material, or the total material extracted from the mine would be re-introduced to the mine as backfill. At the present time percolation studies are going on to see

if we cannot increase this quantity. We'd like to be able to put as much of it back into the mine as we possibly can. In order to introduce it to the mine, it's introduced as a slurry, a high density slurry, and there's a certain amount of seepage that comes down through, percolate down through the backfill and that, again, is collected in the sump and treated in the effluent plant. It would certainly be our intention to introduce the slurry at as high a density as we possibly can to minimize the amount of effluent that is mixed, that forms part of this slurry in order to reduce the amount of water that we have to collect in the mine and the amount of water that we have to treat coming out of the mine.

MR. L. MORRISROE: Mr. Chairman, Laurence Morrisroe of Cadillac. I'm probably the only one that's got enough history, enough history on Cadillac to really know; like most people here today think that the water that's coming out of the mine now at Cadillac was developed from us developing the mine. That's not the case. Back in 1968, 69, on the north side of Harrison Creek, this here mine used to seep out of the mountain and come out of there like a spring, into Harrison Creek. And that happened until we turned around and developed the 3150 level. When we got back under the 17th cross-cut on the 3150 level, that's when the water took off and came back down then through the 3150 and that quit seeping down through on the north side of Harrison Creek. And then we had the water that came down the 3150 until we turned around and put in the 2850 level. And when we got down to the 2850 level then the water came down under that one and was running out where it is today. Then the water quit running out of the 3150 level.

So the same water's running out of there today that ran out of there before, you know what I mean, it wasn't there.

That's all. I just wanted to bring you up the history of that minewater that's out of there. It came out of there before we were there. We didn't develop any water.

MR. B. CASE: Thank you, Mr. Morrisroe.

MR. L. MORRISROE: I can appreciate that that's in their mining and so forth, that we've dirtied it up a bit which we're hoping to correct in the pit that Mr. Hamilton was telling you about.

MR. D. SUTHERLAND: Yes. I guess the only comment I have is that the reason that we're concerned, I guess, about minewater entering the areas that are going to be backfilled and the fact that after the mine starts to backfill and after the operation is shut down the water that naturally entered these areas will now enter these backfilled areas and be exposed to finely ground material and, I think, potentially increase, or increase the potential for contamination of that water that does leak.

MR. G. HAMILTON: Gerry Hamilton, of Cadillac. I'd like to comment on that. We have indicated in our submission that in the time of abandonment, and it's a pretty standard practice in the mining industry, that all openings to the mine are sealed and, therefore, any waters that would drain out of any of the portals, at the present time or in the future, that would be sealed and in the tailings area introduced to the mine, into the mine, the bulk of the heavy metals have been extracted in the form of concentrates and we would like to think that our metallurgists will be brilliant enough to give us as high a recovery as

possible. So I don't think that that particular aspect should pose a problem in the future.

MR. D. SUTHERLAND: I think I'll leave it at that. Thank you Mr. Chairman.

MR. B. CASE: Thank you, gentlemen. Further questions to anybody from Cadillac?

MR. J. BAYLY: Mr. Chairman, my name is Bayly; I represent the Dene Nation and Metis Association and I have some questions for the applicant. One of the things I'd like to do first, if I may, is I would propose that the transcripts of the former Hearings that were held in April and May, which have been referred to from time to time already in this Hearing, and I expect will be referred to again, be made exhibits to this Hearing. I say that on the basis that no one questioned that the evidence given or taken down was in any way inadequately taken down by Ms. Heming and her equipment; just that there were certain omissions, and I would propose that they be filed as exhibits with the possibility that anyone that wants to qualify, add to, or change anything that they have said as a result of things they may have learned, I'd certainly have no objection to. But I think they do provide some background and they will also provide some evidence to the Board from people who gave evidence both for the applicant and for others, in April and May, that may not be available today.

MR. L. MORRISROE: Mr. Chairman, I'd like to respond to Mr. Bayly's request. It was Mr. Bayly and the Dene that requested this meeting be held, and it was an understanding with Mr. Warner, when the meeting was set up, that the other two meetings that we had had nothing to do with this one; there'd be no, none of the information brought into

this one. This meeting stood strictly on its own. And so I object to anything being brought into the other meeting because we didn't prepare; we didn't bring any arguments of Mr. Bayly's at that time into this meeting today, and I don't think we should accept any of the information at the other two meetings for that reason.

MR. B. CASE: Mr. Bayly, I don't believe that the transcripts of those two meetings is available, at this time, here. Am I correct?

MS. J. MACQUARRIE: (Not audible)

MR. B. CASE: Those transcripts are part of the public record?

MS. J. MACQUARRIE: Yes, they are.

MR. B. CASE: Then we can't take them out of the public record.

MR. J. BAYLY: You're saying, Mr. Chairman, they are part of the public record?

MR. B. CASE: That, according to Mrs. MacQuarrie, yes.

MR. J. BAYLY: Do I take it, Mr. Chairman, that you propose to treat them say as things that are, other things that are on the Water Register at present?

MR. B. CASE: I really don't think we have any alternative, Mr. Bayly.

MR. J. BAYLY: Yes.

MR. B. CASE: They're there; they're public knowledge.

MR. J. BAYLY: That's what I was basically asking. That we don't assume that those two meetings never were, just as the applicant doesn't seem to have thought of them as never having been, that they open up in their first paragraph by referring to two Hearings already having been held.

MR. B. CASE: I, as a member of the Board that have to adjudicate with this matter, I would find it very difficult to differentiate the

information gained from those Hearings and this Hearing. I mean, certainly, new information, yes, that is submitted at this meeting, but the very great bulk of the information submitted is repetitive, and it's very difficult. But it's a matter that this Board will discuss tomorrow at its regular meeting on just how we should proceed.

MR. J. BAYLY: I'm satisfied with that at this time, Mr. Chairman. I expect Mr. Morrisroe may feel that I'm trying to have my cake and eat it too, but I am trying to make the process one which will allow the Board to take advantage of all the information that may be before it in reaching the proper decision on this licence.

MR. B. CASE: I just would like to ask our legal advisor if he has any comments on this?

MR. G. CARTER: Yes, I think it's highly improper that the transcripts be treated as evidence at this Hearing. This is a new Hearing. There were people on the Board who are no longer on the Board. There were remarks by members of the Board who are no longer there. All these things enter into it. No, a new Hearing should be a new Hearing, completely; just ignore the transcripts at that time. You see, there were representations made by people who are not here, or may not be here, and the applicant is entitled to know the case and hear the case that's going to be presented at the Hearing. That's why a new Hearing starts fresh. You cannot, in my submission, you cannot incorporate the transcripts of the previous Hearing as evidence in this Hearing.

MR. B. CASE: Nevertheless, Mr. Carter, they still are part of the public record.

MR. G. CARTER: Oh yes, they are.

MR. B. CASE: Okay, thank you.

MR. J. BAYLY: Mr. Chairman, my concern is just how the Board is going to treat them so that, because it may be that the applicant has to know what case it has to meet, but I think the public has to know what presentations it must make and whether a wide or narrow view will be taken of what is available to look at. And I realize that the Board looks at things, often, that aren't within the Hearing process, through the assistance of their Technical Committee, for example.

MR. G. CARTER: Mr. Guild, you appear to have made your full submission. I would advise you to make your full submission and assume that the Board will not look at the previous transcripts.

MR. J. BAYLY: Mr. Chairman, I just wonder what I'm to assume from the light of what both you and your Board Counsel have said.

MR. B. CASE: I think perhaps, Mr. Bayly, it would be proper at this time for us to adjourn for coffee, and the Board will meet for five minutes to discuss this matter.

MR. J. BAYLY: Thank you, sir.

MR. B. CASE: I'll now call this Hearing back to order.

Mr. Bayly, the notices of this Hearing that were sent out by the Board on February 3, 1982, to all interested parties stated



that this would be a new Hearing. The first paragraph of the notice reads as follows:

"Please be advised that the N.W.T. Water Board is conducting a new Hearing on Cadillac Mining Explorations' application for water use and waste disposal at Prairie Creek, N.W.T."

In addition, the third paragraph of the notice states:

"Any issues which you may wish the Board to consider must be presented at this new Hearing."

The Board has, therefore, decided that the transcripts of the previous Public Hearings concerning this application will not be introduced as evidence at this Hearing. Nevertheless, the transcripts of the previous Hearings are part of the Water Register and are, therefore, part of the public record.

MR. J. BAYLY: Thank you. I think I understand your ruling, Mr. Chairman, and I will just direct my questions to Mr. Guild who can re-direct the questions to others, as we did at another time which we won't mention here.

(Portion of this presentation not recorded or noted).

... and you further say a small airstrip also provides year round access to the site.

My question, in light of that, needs also as background a letter dated November 21st, 1981, over the signature of Laurence C. Morrisroe of Cadillac Explorations Limited, to Andrew Cullen, the Water Controller. The letter is one in which Cadillac request land use permits to make their operation function properly in an ordinary way at Prairie Creek. And there are three things sought. One, to

upgrade 25 miles of road to permanent road status as opposed to winter road status. Second, to build a 5500 to 6000 foot airstrip on Sundog Flats; and third, to put in two permanent bridges over Prairie Creek.

And my question is, which should we treat, or should the Board treat, as the proposal of the applicant with regard to the haulage of concentrates and bringing in of supplies needed to work the mine? The one in your evidence which you have just read in, or the proposal in the November 21st, 1981, letter to Mr. Cullen?

MR. L. MORRISROE: Laurence Morrisroe of Cadillac. I think that we've got to let the Chairman make these decisions today as this is a water meeting. In our submission here we've covered the whole proposal generally, where we talked about the moose and the caribou and the roads and all situations. But this meeting is strictly a Water Board meeting, so I think it's understood we're going to stay strictly to the water, so I think it's up to the Chairman to make that decision; if we're talking about a road and so forth that hasn't got anything to do with the water, I think that should be eliminated. So anything, maybe it's a bridge that we're talking about over Prairie Creek, if they feel that's going to affect the water that could be talked about, but anything outside of water here today, I object very strongly. I don't want to be here until two o'clock in the morning talking irrelevantly about the birds and the bees.

Thank you. So I'll leave that to you, Mr. Chairman.

MR. B. CASE: Yes, I would like to just bring up, or clarify this a little bit, Mr. Morrisroe. If the construction of new roads or airstrips are involved, they could very well be matters of water use to which

the Board must direct its attention. And I think that it would be in the interests, certainly of the Board in making its decisions, to determine whether, in fact, the proposals that were made in the letter of last November are the current plans or not, because Mr. Bayly has a valid point. They could be classed, I'm not saying they would be, but they could be classed as water engineering matters.

MR. L. MORRISROE: I'll accept that. What's at that November, the letter, that's the intentions.

MR. B. CASE: But to my knowledge, at this time, an application has not been filed to cover this; an application for water use has not been filed to cover the new road and airstrip or whatever you have in mind.

MR. L. MORRISROE: No, it hasn't.

MR. B. CASE: Well that being the case, this Board wouldn't be considering any new matters until we receive applications covering that work. And if they proceed with that work without the necessary licence or water authorizations, well they would be in violation of the Act.

MR. J. BAYLY: I take it though, Mr. Morrisroe, that your present plans are the ones outlined in the letter, if I understand your response to Mr. Case. Is that correct?

MR. L. MORRISROE: That's our intentions, yes. You understood it.

MR. J. BAYLY: Would it be fair to say that those would be your preferences to upgrade that portion of road, to build the new airstrip, and to put in the necessary bridges to connect your minesite with the proposed new airstrip.

MR. L. MORRISROE: It might help you this way, Mr. Bayly. When we first made the application to put this mine in place, and that first 22 miles

of road, we had the right, you know what I mean, of a permanent road to that airstrip. So really all that we're talking about in that situation is that new airstrip that we found might be advantageous to us. But that first 22 miles of road was considered that we had all weather road privileges.

MR. J. BAYLY: And would you confirm to me, Mr. Morrisroe, that, in fact, I've read this correctly; that the, where you'd prefer to build the airstrip is on what is called the floodplain of Sundog Flats.

MR. L. MORRISROE: Yes. That's why the application will have to go to the water people.

MR. J. BAYLY: And the road to connect your mine to this proposed airstrip would parallel Prairie Creek for some distance and have to cross some tributaries of Prairie Creek over that 25 miles. Is that also correct?

MR. L. MORRISROE: No, yes it would, yes.

MR. J. BAYLY: And so in that sense it would be very close to the creek we've been talking about.

MR. L. MORRISROE: Yes.

MR. J. BAYLY: And, in fact, the two permanent bridges would be ones that you would propose to have crossing Prairie Creek to enable you to get from one, from Sundog Flats to the minesite.

MR. L. MORRISROE: No.

MR. J. BAYLY: I'm just quoting here from point c in the letter in which it says, "put in two permanent bridges over Prairie Creek and build road two miles south of camp on the east side of Prairie Creek."

Have I misinterpreted that, or do you really, or have you changed the requirement to build permanent bridges over Prairie Creek.

MR. L. MORRISROE: Well that's under review also.

MR. J. BAYLY: So this is something that ...

MR. L. MORRISROE: We haven't made a permanent application yet for that.

MR. J. BAYLY: Have you made any applications for it to other authorities other than the Water Board.

MR. L. MORRISROE: No.

MR. J. BAYLY: And I take it that the reasons for this, among others, are to enable you to, not just to bring in supplies and to haul out concentrates, but also to possibly open up seven promising looking zones of mineralization along the route. Is that correct?

MR. L. MORRISROE: Well, we plan on more exploration in the area.

MR. J. BAYLY: And if you had that exploration in the area, and these were promising sites, would they extend the life of the mine beyond the six years you're presently proposing to this Board?

MR. L. MORRISROE: Well I hope so, or we wouldn't plan on spending the money.

MR. J. BAYLY: But let me put it to you this way, Mr. Morrisroe. Am I right in assuming that it would be impossible to open those up, develop them and mine them within the six years, if you decided to do that?

MR. L. MORRISROE: Not at the present size of our plant.

MR. J. BAYLY: So that would have to follow the present removal of the ore from the partly developed minesite?

MR. L. MORRISROE: That's right.

MR. J. BAYLY: So, Mr. Guild, then when you say on page 4 that a six year mine life is envisaged, although there is a strong possibility that this may be extended after further exploration, am I correct in

saying that that statement takes into account, among other things, the statements made in Mr. Morrisroe's letter of November 21st about the possibilities of other zones outside the present minesite being developed?

MR. N. GUILD: I'm not familiar with which zones may be developed first, or in what order, but certainly that was the intent of that statement; that it was hoped that there would be a mine life beyond six years and it was envisaged that there would be other zones developed. And for that reason that I stated another tailings impoundment area had been identified, namely T-3.

MR. J. BAYLY: And that's the one, I take it, which is downstream below Harrison Creek and below the present complex as it's been built to date.

MR. N. GUILD: That's correct.

MR. J. BAYLY: John Bayly again. Would the proposal then be to remove concentrates, using the airstrip, or would it continue to be the proposal to remove them by way of part-permanent road and part-winter road to the Liard Highway?

MR. G. HAMILTON: Gerry Hamilton of Cadillac. The intention at the present time, in our present planning, is that all our concentrates will be removed by road. And in the planning that we're doing at the present time, and working with the various government departments and agencies who are interested in our project, and have jurisdiction in our project, we are presently preparing for them, both for land use and whatever information we can put together ...

MR. J. BAYLY: I'm sorry, could you repeat that last statement. I missed it when the chair moved.

MR. G. HAMILTON: We are in the process of preparing for the people with whom we have to work in the various agencies and for the general public what our long-term outlook for Cadillac at Prairie Creek may be. As most people are aware, there are numerous zones there which you referred to. We would hope, as Mr. Morrisroe has stated, that through our exploration that we will be able to further develop Prairie Creek, extend its life. What will happen as a result of that exploration we do not know at the present time.

MR. J. BAYLY: Then if I can refer you to the report that accompanied Mr. Morrisroe's letter, which was also on the Water Register, Mr. Chairman, a report from Norex Oilfield Consultants called Cadillac Explorations Limited Prairie Creek Project, Northwest Territories, Airstrip, All-weather Road, or Haul Road, I ask you if this statement then has not yet been adopted by the Company. In the third paragraph of the first page of that report it states, "Another contributing factor to the desirability of a larger strip, serviceable in practically any weather, night or day, is the importance of a steady cash flow. The valuable copper-silver concentrate could be airlifted out affording a constant return so necessary to any private endeavor. In this case, nine months is a prohibitive period to wait for a return on an investment without the contributing factors of exorbitant interest rates and tight money situations."

And my question to you, Mr. Hamilton, because I'd understood you were going to be airlifting the silver concentrates and the copper included in that, even using your smaller airstrip. Do you need the new airstrip to take any of the silver and copper concentrates out?

MR. G. HAMILTON: Mr. Hamilton, from Cadillac. To answer that question, our recent investigations of the economics, the practicality of producing a copper concentrate; we have two problems with reference to copper concentrate. One being metallurgically it is difficult to produce. And economically, the reagents that have to be used to produce the copper concentrate are expensive. Therefore, the cost of producing the copper-silver concentrate, the economics are based on the price of silver metal. With the market being as it is at the present time, as we forecast it will be in the future, it is our intention, at the present time, not to produce a copper-silver concentrate. We will only produce two concentrates; a lead concentrate and a zinc concentrate. So, therefore, we will not be airlifting concentrate out.

MR. J. BAYLY: So that former proposal which we had heard of about half a year ago that you might be airlifting those concentrates out has been abandoned because of the market price of silver and the cost of the reagents and processing at the site at the present time.

MR. G. HAMILTON: And another major factor is the technical difficulties in producing the concentrate.

MR. J. BAYLY: Let me ask you this then. In order to airlift any concentrates out then, do you require a larger airstrip so that you can take out either the zinc or the lead concentrates?

MR. G. HAMILTON: It's not our intention to airlift either lead or zinc.

MR. J. BAYLY: Then would it be fair to say that the Company has not adopted the paragraph I read to you from the Norex report as yet?

MR. M. MORRISROE: Excuse me, Mr. Bayly. I think in all fairness, you've got the report and you've read it, and if you'll read the other information



that Norex put in regards to the airport, outside of hauling the concentrates, I think they put the safety factor of having the larger airport.

MR. J. BAYLY: Mr. Chairman and Mr. Morrisroe, I accept that. I'm just trying to find out what the economics are of putting a proposal for 25 miles of permanent road, for an airstrip which is much larger and probably more difficult and more expensive to get at, and I can only ask one thing at a time.

MR. L. MORRISROE: Are you proposing then that the only reason we're putting in that 20 miles of road was just for the airstrip?

MR. J. BAYLY: Mr. Morrisroe, I'm not proposing anything. I'm inquiring as to what the reasons are for this airstrip. It appears from the answers given by Mr. Hamilton that no concentrates are proposed to be taken out, and that changes some of my understanding. The next question I have, and perhaps you can answer it, is the main or only reason for this airstrip the question of safety of personnel and ease of moving in and out of that country by air whenever you need to?

MR. L. MORRISROE: Well, as I said, that report that went in and everything is for observation. The application has never yet been made and it may change yet. We haven't made a permanent application on that what you're reading.

MR. B. CASE: Mr. Bayly, in view of the fact that we haven't received an application from Cadillac with respect to either the road or the airstrip, I think we should, it's been made clear that Cadillac have put this on ice, at least temporarily. I think perhaps you can carry on ...

MR. J. BAYLY: I have no need to pursue it further, Mr. Chairman. I just wanted to make sure I was being fair to Mr. Morrisroe. He seemed to want to go in to the other possible reasons for the airstrip and I thought it was fair for the Board to bring those out.

MR. B. CASE: Well, in view of the fact that, as I say, we haven't received the application, carry on with any other questions you have, sir.

MR. D. GAMBLE: Just before we leave this I wonder if I could just ask one question. The reference had been made that nobody's really applied to do this, yet the covering letter says that it is a request for permits. Has that then been withdrawn?

MR. L. MORRISROE: No, we never made the application and we never paid the fee.

MR. D. GAMBLE: So, well the first sentence here says, "Cadillac requests", this is addressed to the Department of Indian and Northern Affairs, the Controller of Water Rights. It says, "Cadillac requests land use permits to make their operations functional properly, in an ordinary way, at Prairie Creek." And they then, you go on to describe things which Mr. Bayly has quoted. In fact, then, have you withdrawn this letter and this request?

MR. L. MORRISROE: That's right.

MR. D. GAMBLE: Okay, that's all I wanted to know.

MR. J. BAYLY: Mr. Guild, if I could refer this back to you and perhaps it will go on to one of the engineers involved in this part of the process. On page 5 you make reference to sewage being treated in a secondary treatment plant complete with an ultra-violet irradiation

system to disinfect, pardon me, the effluent prior to its discharge to Prairie Creek. I wonder if, first of all, that process could be described and compared with the chlorination process which was earlier suggested as the way in which Cadillac would treat its sewage.

MR. M. BATH: Murray Bath, Kilborn Engineering. I'm no expert on sewage treatment, but I'll attempt to answer your question in a few words. Ultra-violet irradiation is an alternative to chlorination for disinfection of sewage, along with lozonation which is a third alternative. The ultra-violet process has the advantage of adding nothing whatsoever to the effluent, in contrast to chlorination in which, of necessity, there is a residual chlorine in the treated effluent. The method has been shown to be as effective as chlorination in disinfecting sewage.

MR. J. BAYLY: This is, as I understand your statement on page 5, only part of the sewage treatment process. It is the disinfectant part. Is the other part similar to what you would do with a chlorination disinfectant, and if so, what is involved?

MR. M. BATH: Yes, it is similar and it's a process referred to as extended aeration. It involves holding relatively large volumes of sewage in a tank which is exposed to agitation by air.

MR. J. BAYLY: We had some reference today, I think Mr. Hamilton it came from you, sir, that there have been some problems with the system and presently the ultra-violet disinfectant part is being repaired. Can you tell me what is being done in the meantime for the camp and the sewage that it is generating while the work is going on at present? I don't think it matters who answers, Mr. Chairman, it's just that

the reference I make was to Mr. Hamilton's earlier answer, I believe, to Mr. Sutherland's question.

MR. M. BATH: Murray Bath, Kilborn Engineering. The plant is presently being operated without the ultra-violet unit, of necessity. The extended aeration system is operating. Because of previous problems, which have been referred to earlier in this Hearing, the system is building up to its normal operating condition at the moment. Of necessity, this takes a number of weeks because of the nature of the biological processes which occur in the treatment plant and, as Mr. Hamilton previously mentioned, over the next few weeks the operation of the plant is being carefully monitored and the results reported to Water Resources people.

MR. J. BAYLY: Is undisinfected sewage being discharged into Prairie Creek at the present time?

MR. M. BATH: I'm not certain. I haven't been to the site for some time.

MR. J. BAYLY: Is there anybody on the panel that can answer that? I didn't hear an answer, Mr. Chairman, but I don't know whether that means yes or no.

MR. M. BATH: As far as I know there is sewage being discharged into Prairie Creek partially treated, at the present time.

MR. J. BAYLY: Does that mean that it has not been through a disinfectant process prior to discharge?

MR. M. BATH: That's correct.

MR. J. BAYLY: Can you tell me how many men are presently at the camp and either give me the figure, or estimate the rate of discharge of sewage into Prairie Creek at present?

MR. M. BATH: The number of men, I understand, is of the order of 150, and the rate of discharge would be of the order of five or 6,000 gallons per day.

MR. J. BAYLY: Can you tell me when you expect the piece of equipment that provides the ultra-violet breakdown to be back, installed, and operating?

MR. M. BATH: I believe Mr. Hamilton mentioned earlier that it would be back during the coming week, perhaps during this week, during this week. It's being expedited and will be installed as soon as it's possible.

MR. J. BAYLY: Can you tell me for what period of time this sewage has been being discharged into the Creek at this approximate rate, without the disinfecting?

MR. M. BATH: Approximately the last week, or perhaps as much as nine days.

MR. J. BAYLY: On the same page, there's a reference to combustible garbage will be burned and incombustible refuse will be compacted and land-filled. Mr. Guild, I understand that on the Prairie Creek mine-site there are presently a number of transformers which are spent, or not usable, that are being stored. Is that correct?

MR. G. HAMILTON: Gerry Hamilton of Cadillac. That is, there are some transformers on site that are being stored at the present time awaiting installation into our plant.

MR. J. BAYLY: So these are new pieces of equipment rather than spent pieces of equipment.

MR. G. HAMILTON: That is correct.

MR. J. BAYLY: Can you confirm to me, Mr. Hamilton, that during July of this year one of these transformers spilled certain liquids from its capacitor at the minesite?

MR. G. HAMILTON: Gerry Hamilton of Cadillac. I believe you are referring to our capacitor that was on site which the liquid, some of the liquid from the capacitor was spilled. This, it was recognized that the liquid in the capacitor, which is referred to as a PCB, which we all know about, this was cleaned up. I believe there's presently on the site we have four drums of this material which was sampled by the environmental people. On Friday morning of last week we had a report back from them advising us that the sample taken from the bottom of the pit that we had cleaned out, the bottom of the pit, the rest of it being what we thought was all the contaminated material. A sample had been taken from that and on Friday we were advised that there were still traces of contaminants there and suggested that we would, and was recommended to us that we take an additional four or five barrels. That has been done. And I assume that the, either we will be asked to, or the environmental people will take another sample. As far as that material in drums, that has been placed in the drums are concerned, arrangements have been made with the proper organization for the removal of that from our site and the disposal of the same.

MR. J. BAYLY: I take it then that there was this quantity spilled at the site and that you have been in touch with Mr. Sutherland and others from the Environment Protection Service over the handling of that material from the time of the spill. Is that correct?

MR. G. HAMILTON: That is correct.

MR. J. BAYLY: There is reference at page 38, item number 4, in which the Company has adopted the Ker, Priestman statement, "We will make a continuous effort to establish and maintain the most direct, informal, open and cordial communications with our employees. For this purpose we will establish a communications program to be known as the Employees Forum where management will inform employees of any matters affecting their work, their safety, and their general welfare."

Mr. Hamilton, in relation to the spill of the PCBs, can you tell me whether it was people employed either by Cadillac or their contractors who were involved in the cleaning up of those PCBs, or the fluid that contained those PCBs?

MR. G. HAMILTON: Gerry Hamilton of Cadillac. Firstly, I'd like to point out that the statement that you refer to is a Cadillac statement; it's not a Ker, Priestman statement. Cadillac have not adopted the Ker, Priestman statement; we have retained Ker, Priestman as a consultant to work with us and among the group of us who prepared this brief, we elected to have Ker, Priestman assemble all the data for us. So the statement is a Cadillac statement, not a Ker, Priestman.

MR. J. BAYLY: Thank you, Mr. Hamilton. I hadn't understood that fully from your answer in interchange with Mr. Gamble. But in any event, that being a Cadillac statement, I wonder if you could address the question of the clean up of that material?

MR. G. HAMILTON: With respect to your question on the clean-up, at the time of the spill our contractor was on site and our contractor did the clean-up for us, and his people were aware of it.

MR. J. BAYLY: Can you tell me what sort of protective equipment, or clothing, was provided to the employees who were involved in cleaning up the PCB-containing liquids?

MR. G. HAMILTON: I'm sorry, I cannot answer that question. I was not present on the site at the time the work was done.

MR. J. BAYLY: Is there anybody on the panel who can address that?

Can you tell me whether the employees of your contractor were informed of the nature and possible hazardous qualities of the PCBs that they were cleaning up at the time?

MR. G. HAMILTON: Gerry Hamilton of Cadillac. I would assume that they had been informed. I cannot swear to it; as I say I was not there nor were any members of the panel.

MR. J. BAYLY: Mr. Chairman, I wonder if that's information that could be provided to the Board and as well to the intervenors I represent? They're most interested in following that up to find out if people were exposed to these dangerous chemicals at the time of that clean up.

MR. B. CASE: Mr. Hamilton, would it be possible for you to find out from the contractor who did the clean up, the details that Mr. Bayly has requested?

MR. G. HAMILTON: Mr. Chairman, we'd be pleased to do so. If I may, I would like to point out that the particular capacitor which leaked, and leaked this contaminant, the total quantity of liquid in the capacitor was probably not any more than one and a half gallons, if it was that. I doubt whether it was that much. But it's something that we were very knowledgeable about and I'm quite sure that the clean up was done in the proper fashion.



MR. M. BATH: I'd just like to say something, Mr. Chairman. Murray Bath of Kilborn Engineering. I should point out that that particular piece of equipment which we've been discussing was brought to site from the Churchill mill which was purchased and dismantled and reassembled at Cadillac, by Cadillac Explorations. It was brought to the Prairie Creek site inadvertently during the move. There was no intention whatever of bringing PCBs onto the site. None of the other electrical equipment on site has PCBs in it. There is no intention whatever of bringing any further PCBs onto the site.

MR. J. BAYLY: Mr. Chairman, I accept that. It's just a concern that I've raised. It's a matter that is on the Water Register, by the way, filed February 17th, 1982, by way of a letter from David Sutherland to Mr. Hamilton. So I think the Company has been made aware of it.

MR. B. CASE: Your request is quite in order, Mr. Bayly, and Mr. Hamilton has agreed to get that information, and if he would forward that to the Board we will get it out to all the interested parties.

MR. J. BAYLY: Thank you very much, sir. Just before I leave this subject, I understand then that that piece of equipment, in its damaged condition, will be removed from the site entirely, rather than be put into the land-fill site that you propose for uncrushable garbage, if I can call it that.

MR. N. GUILD: Yes, it will be; it has to be.

MR. J. BAYLY: Referring now to items on pages 5 and 6 of your presentation in which you say that the tests you have conducted on samples of waste rock indicate that the ability to consume acid is seven times as great as the ability to produce acid. Can you tell me whether we're talking about within the minesite as presently proposed, or does this include

areas of mineralization that have been looked at and seen as at least promising by Cadillac?

MR. N. GUILD: No, these are samples taken from the existing opening, zone 3.

MR. J. BAYLY: Then we're not in a position to say whether there will be any acid-generating problems with other zones that might be opened up during the life of the mine?

MR. N. GUILD: Not definitively at this point in time, no.

MR. J. BAYLY: On the same page there's reference to bulk cyanide storage well above the floodplain of either Harrison or Prairie Creeks. What wasn't given to us in your formal presentation in any event was the nature of that protective storage method and the actual location of the cyanide storage site.

MR. G. HAMILTON: Gerry Hamilton of Cadillac. I believe I mentioned earlier that plans are being prepared now for submission to Water Resources for the method and the installation that we intend to, or we suggest should be used in order to protect in the event of any, provide protection in the event of any case of any spill of such reagents.

MR. J. BAYLY: Is it still your intention then to bring in the cyanide in drums with plastic liners in them in a pelletized form?

MR. G. HAMILTON: That is correct.

MR. J. BAYLY: And when you refer to bulk storage, are you talking about storing it within these drums, or transferring it from those drums to other containers?

MR. G. HAMILTON: Gerry Hamilton of Cadillac. The particular reagent will be stored in the drum until such time as it is used. It will not be transferred.

MR. J. BAYLY: So bulk storage involves a place where you would keep enough drums of the cyanide compound to supply the mine's needs from year to year?

MR. G. HAMILTON: That is correct.

MR. J. BAYLY: Do I understand then that you are still working out with the various government agencies, particularly the Water Resources people, how you would protect that from in any way getting into the waters of either Harrison or Prairie Creeks?

MR. G. HAMILTON: We, as I stated, we are submitting our recommendation to the Water Resources and subsequent to their confirmation of our method, or an alternative method, once we have had the approval to store it in a manner that's acceptable to Water Resources, that is the way it will be stored.

MR. J. BAYLY: Have you developed then your own recommendation, and if you have I wonder if you could tell us how you would propose to, at least at this initial stage, to store and protect that material?

MR. G. HAMILTON: Very briefly, what we are proposing that adjacent to our tailings dyke we would prepare an impermeable foundation with an impermeable dyke around it, and with a sump in the inside so that if there is any spill that any of that contaminated material can be pumped back in behind the tailings pond.

MR. J. BAYLY: When you say impermeable, have you a substance or a liner or a kind of rock or clay in mind that you would want to use to line the berms or dykes around this storage area?

MR. G. HAMILTON: There are various types of liners that are available from industry and one of those will be selected and suggested to the Water Resources.

MR. J. BAYLY: I gather you haven't picked one then that you would prefer, as yet, from the syntax of your answer.

MR. G. HAMILTON: That's correct.

MR. J. BAYLY: Referring now to page 7 and following where you've discussed in your presentation the tailings pond. And in reference to the questions asked of you by Mr. Stendahl, the Cadillac witnesses and Mr. Stendahl were talking about an occasion when there was slumping within the tailings pond. And I wonder if, since the rest of us don't know as much about that as the two of you seem to, if you could expand on what happened and I understand Mr. Fletcher's answer is that the method has been found to correct that, but I'd like to know what the incident was and have it described to us.

MR. G. HAMILTON: I think that Mr. Fletcher stated earlier that the liner on the inside of the tailings dyke is constructed of clay, to make it impervious. And the particular section in which we had this particular clay carries about a 30% moisture content.

MR. J. BAYLY: How much moisture content?

MR. G. HAMILTON: About 30% moisture in the clay. And that clay, when it's put in place, is compacted and having the moisture content that it has the clay is designed to go on at a certain thickness, if you go over, if that thickness is exceeded the clay will tend to slump. The particular section in question was put in late last fall when the weather conditions weren't ideal for compacting the clay. And just prior to Christmas it was noticed that this failure had occurred. The on-site engineer who'd been resident on site during the construction, I recall the representative had been there all the time, he immediately

notified us of this, notified his principals in Vancouver, and steps were taken, discussions were held, and steps were taken to rectify the situation and it has been corrected and it is completed as of yesterday.

MR. J. BAYLY:           What is the critical difference between the depth of clay that will and the depth of clay that will not slump?

MR. G. HAMILTON:       It's the angle of repose. The clay was designed to support itself on a two to one slope. Because it was overbuilt, the slope exceeded two to one; instead of sitting like this it was sitting like that and it wouldn't support its own weight and it slid off.

MR. J. BAYLY:           Then you're not talking about thickness, you're talking about angle of repose which is critical.

MR. G. HAMILTON:       What happened when the dyke, when the clay was being placed, as it came up to the top, the thickness, the clay layer or the thickness was not retained at 13 feet. So we had an overweight on the outside of it. Instead of having it sitting on a two to one slope, it was on less than two to one, it wouldn't carry its own weight, the top part sluffed off, the bottom didn't move.

MR. J. BAYLY:           I've been involved in discussions we won't discuss regarding this clay, I understood that it was impermeable to water and what I'd like explained is how something which is impermeable to water has a 30% water content. What that means.

MR. G. HAMILTON:       I'll leave that one to you, Brian.

MR. B. FLETCHER:       Brian Fletcher, Golder Associates. It's not easy to explain something that simple.

MR. J. BAYLY:           I'm sorry to be so simple.

MR. B. FLETCHER: Clay is formed of, a mass of clay is formed of many, many very, very small particles, so small that you need an electron microscope to see them individually. And when they deposit themselves, or when they're deposited in a lake such as the Prairie Creek valley at the location the Cadillac Mine was when those clays were deposited, they fall into a sort of a card house structure, you might say. Okay, lots of spaces in between the individual particles. Now since they're deposited in water, the water is still there in between the particles. And a 30% water content for a clay is not really terribly high. You can have clays with water contents of 100% or more, but it's the bonding between the particles that gives the clay its integrity and makes it stiff.

MR. J. BAYLY: So that if the, we must think of the clay as a composition of water and the solid particles and it's that that creates the impermeable barrier. Is that what you're telling me?

MR. B. FLETCHER: No, the permeability of a clay is dependent upon the size of the particles that make up the clay mass, and this particular clay has a very low permeability; about .000000001 centimeters per second, which is a very very impervious clay. The water content has no relevance whatever to its permeability.

MR. J. BAYLY: When you work this clay then, as you have been doing I take from Mr. Hamilton's answer, throughout the winter, you're dealing with these particles and presumably frozen water within it. Is that correct?

MR. B. FLETCHER: That is one of the reasons why the section of the embankment that failed was not rebuilt using clay, is because you should not,

in fact you cannot effectively work a material like that when it's frozen.

MR. J. BAYLY: Can you tell me then what that section that has been repaired is made of if it's not made of clay.

MR. B. FLETCHER: It's been, as stated in the submission that Mr. Guild read this morning, that I believe that section is about 150 feet long and that is being rebuilt using sand and gravel and will be covered with the hypalon liner which will be continued around the corner and down that part of the embankment.

MR. J. BAYLY: So that was the only part, I understand, that was built when the water in the clay was frozen. There's no other part of this tailings pond that was built except when the water was thawed out in the clay.

MR. B. FLETCHER: None of it was really built, even that section, when it was frozen but it could not be repaired using clay because there's no way that you could keep it unfrozen. All of the entire embankment was built in non-freezing conditions.

MR. J. BAYLY: John Bayly, again. Can you tell me why it was decided then to replace the material in this slumping area with something other than clay if what was involved was to wait until the next summer season to repair that portion? Was it a question of time?

MR. B. FLETCHER: It was a question of time, yes.

MR. J. BAYLY: And just on the question of the permeability of the clay, how slowly or quickly water penetrates through it, is that projection based on a formula? How do you know that it takes 5000 years for water to pass through 13 feet of this clay?

MR. B. FLETCHER: Brian Fletcher, Golder Associates. The measure of the permeability of a clay can be approximated by determining the sizes of the particles that make it up. And there are little equations and empirical relationships in soil mechanics that can give you an order of magnitude, at least, of the permeability of the clay. And in this particular case it's about  $10^{-9}$  centimeters per second and time is equal to distance divided by velocity and permeability being a velocity, we come out with 5000 years to go through that thickness of clay.

MR. J. BAYLY: So you base it on a particle size, no matter what the material, and you work out a formula based on the rate at which water will travel through some material with a larger particle size that you can perhaps actually measure and, using the formula, come up with this figure. Am I correct; am I following you?

MR. B. FLETCHER: If you're referring to an earth material, yes, you are correct.

MR. J. BAYLY: I take it we are referring to earth materials, both of us.

MR. B. FLETCHER: You just said any kind of material, no matter what it is.

MR. J. BAYLY: I apologize, I mean within soil mechanics.

MR. B. FLETCHER: Alright.

MR. J. BAYLY: Mr. Guild, and this may not be for you, but there's reference here to the piezometers and settlement plates to be installed in the pond embankments to monitor the long-term performance of the embankments. And that you say that, "Water samples can be taken from these piezometers as well as the backslope drainage system to verify the integrity of the tailings pond."



First of all, what's a piezometer and what does it measure?

MR. B. FLETCHER: Brian Fletcher, Golder Associates. A piezometer is a device that you put into the ground and it measures the water pressure. And one of the ways that you monitor the performance of an embankment, such as the embankments at Prairie Creek, or any kind of a dam, is to install piezometers at various locations that are critical to the performance of the thing, or whatever criteria you want to use, is to put piezometers in, measure the hydrostatic or just would be the piezometric pressures, and you can determine that way how the thing is behaving with respect to water flowing through it.

MR. J. BAYLY: Even with these piezometers I take it that there is a certain rate of leakage which, if it did occur, would not be detected by these instruments. Is that fair to say?

MR. B. FLETCHER: If there was leakage through the embankment, then these would, they would detect it.

MR. J. BAYLY: To what level of sensitivity? If you lost a gallon a day, a hundred gallons a day, a thousand gallons a day, would those be detectable?

MR. B. FLETCHER: It doesn't measure rate of flow. It measures pressure, water pressure which is related to the level of water in the embankment.

MR. J. BAYLY: I understand that. So it would measure that if water was coming in from the Prairie Creek side as well as if water was moving through from the tailings pond side?

MR. B. FLETCHER: Yes it would. But the tailings are going to be higher than Prairie Creek ultimately, and that's when, if there are any leaks, they will be detected.

MR. J. BAYLY: So leaks prior to that time ...

MR. B. FLETCHER: ... would be the other way around.

MR. J. BAYLY: ... would be the other way around, or you would expect them to be the other way around.

MR. B. FLETCHER: They would be the other way around.

MR. J. BAYLY: Gravity?

MR. B. FLETCHER: Just gravity.

MR. J. BAYLY: Mr. Guild, getting on I think to your area of expertise, and that is the behavior of rivers and the prediction of floods and precipitation, you've stated at page 9 that you have computed the 100 year and the maximum possible flows, and that in doing so you have made a detailed review, as you say at page 10, of all the hydrological data available for the area as well as certain discussions with the various officials. As I understand, and correct me if I'm wrong, I'll just refer here to the forbidden document but just to what it said rather than who said it. Is it true that for precipitation data at the minesite you had, at the time of making your calculations, one year's data?

MR. N. GUILD: Yes, that is correct.

MR. J. BAYLY: And is it true that you used that data and correlated it with data from longer term stations at Tungsten and Fort Simpson?

MR. N. GUILD: Yes, that is correct.

MR. J. BAYLY: And is it true that the data from these other two stations, respectively Tungsten and Fort Simpson, provided you with data for eight and eleven years respectively?

MR. N. GUILD: Yes, that's correct. Except for Tungsten; Tungsten didn't have that period of record. Tungsten did not have that period of record, to my understanding.

MR. J. BAYLY: Your understanding is that Fort Simpson had somewhere between eight and eleven years of data for you to use.

MR. N. GUILD: Fort Simpson had a longer period of record, and the eleven years of record was Fort Nelson. And since then, of course, there's been two years added to that, because that was 1977 data, which we have obtained by the way.

MR. J. BAYLY: And with regard to flood flows, is it correct that you had Prairie Creek data of about five years in extent?

MR. N. GUILD: Yes, that is correct. We since have received two more years, so we now have seven years of data.

MR. J. BAYLY: Now would you, with the amount of data that you have to give you the history, or the history in a wider area, would you agree with me that this amount of data is a bit sparse?

MR. N. GUILD: The data is sparse, and we are pleased now to have the additional two years. There is a subtle difference between five years of record on Prairie Creek and seven. It may not sound too much, but statistically it is. So we have a better knowledge of the Prairie Creek flows now than we had when we initially developed our design curve. And the data has tended to show that our design curve is actually quite conservative compared to what we had worked out with five years of data.

MR. J. BAYLY: On the basis of the data that you have, how do you predict both 100 year flood and a maximum flood for the area? What method do you use?

MR. N. GUILD: We used several methods. First method was to take the flow records from Prairie Creek, extrapolate them on probability paper to give us our return periods greater than the years of data that we had,

in other words, the ten year, the hundred year. And we did the same with the data records that we had on the South Nahanni which is a larger catchment area with a longer period of record. From that you deduce the run-off per square mile. Now for each of these river systems and from that we computed a design curve of, to be used in the Prairie Creek area.

Now we also looked at dimensionalist factors similar to those used by Dillon in their regression analysis for the Liard Highway. Ours were more conservative. Just a matter of interest, for example Dillon, for a 50 year, had a multiplier of 1.3; and 100 year, a multiplier of 1.5. Our corresponding multipliers are 1.5 and 1.7. So from that we came up with a design curve for the ten year return flood on Prairie Creek, and then by using these dimensionalist factors we came up with a flood flow for the 100 year event on Prairie Creek.

At the same time we attempted correlation of the flows on Prairie Creek with other watersheds in the area, but we didn't get a good correlation so we did not use that method.

We also looked at Dillon and used their regression equation in there, and compared the results derived from their equation with ours and found them to be very similar in terms of the flows that we derived. We also looked at the Prairie Creek area itself from the point of view of old flood levels, and it really only told us that the flood banks right now, there is no evidence of floods being higher than that. So our floods we believe could be higher than that.

So that was the way we worked out the 100 year flood. Now the maximum possible flood is derived on an empirical basis because

with the lack of data in that area; now we reviewed our statistical analysis proposed by Hershfield for the maximum possible flood. And part of that equation is to take the maximum flood peaks that exist on Prairie Creek and you take a standard deviation from these and use a factor on a split standard deviation and come up with a projected maximum possible flood for the area. That factor we reviewed with B.C. Hydro, who had done a considerable amount of work in an area south, on the Peace, and they developed a range of factors. So we reviewed with them what we felt was a representative factor for this area, and we used that factor in the equation, and that's how we derived the maximum possible flood.

We also compared it with another method that was developed in the Yukon Power Study. We used 25 year flow event and used an empirical multiplier on that as well. It gave a lower factor than the one that we had used, and we went with the higher value. And that value was 38,000 cfs.

MR. J. BAYLY: I take it when you are looking at a maximum possible flood, or a 100 year flood, you're concerned with water level. Am I correct?

MR. N. GUILD: We're concerned with water level but also water velocities because you have to use the water velocities in your cross section to design the rip-rap armour that's to be provided for the tailings embankment and for the plantsite dykes. So it's a function of depth and velocity.

MR. J. BAYLY: So that it isn't just a question of more water, it's more force because of larger volumes of water, pushing them.

MR. N. GUILD: With a larger cross section, the larger flows, the velocities are going to increase. Yes. And that's something obviously they

recognized and you have to derive those velocities to properly design the protection along the banks of the tailings impoundment.

MR. J. BAYLY: And have you designed these banks around the tailings pond for the one in 100 year flood, or for the maximum possible flood?

MR. N. GUILD: The tailings impoundment dykes are designed for the maximum possible flood, with three feet freeboard above that. The plantsite dykes are designed for the one in 100 year.

MR. J. BAYLY: Referring to pages 12 through 15, which contain the various tables that relate to effluent discharge, as I understand that, your evidence at the top of page 12 is at least in a tentative way, Cadillac Mines and the Technical Advisory Committee agreed that a one to 20 ratio of minewater effluent, sorry, mine effluent and to Prairie Creek water was a satisfactory level to shoot for, within the licence maximum allowed discharge.

MR. N. GUILD: In relation to a certain quality of effluent, that is correct. The minimum dilution would be 20 to one. We have proposed that we'd like to have the ability to discharge at slightly higher levels at slightly greater dilutions, namely in a range from about 20 to 40 to one. But certainly the minimum dilution is 20 to one.

MR. J. BAYLY: Well if I look at the table you generated on page 15, and I look at the average flow in cubic feet per second for Prairie Creek, and the average flow of effluent, and I divide the effluent flow into the Prairie Creek flow, I come up with a ratio of approximately one to 364. Would you agree with that?

MR. N. GUILD: Yes, approximately, that's the figure we have in one of the previous tables, it was 370, the dilution of Prairie Creek at Harrison Creek on page 14.

MR. J. BAYLY: Yes.

MR. N. GUILD: That's right.

MR. J. BAYLY: Now if we have a ratio on an average of one to 364 or one to 370, and that provides us with, for example, 7% above background heavy metals added to Prairie Creek at the point of discharge, if the ratios are actually permitted up to one to 20 can we expect that at times the heavy metal increase over and above background will be 280%?

MR. N. GUILD: No.

MR. J. BAYLY: And can you tell me why that isn't the case. Is there something wrong with my mathematics?

MR. N. GUILD: These figures that are given in this table are average pounds per year that would be introduced into the system by the effluent as it's introduced into the creek. Now when one dilutes this quantity, you derive at levels in the creek that are very very close to the background levels. And so the multiplying that you were doing is in error.

MR. J. BAYLY: I feel like a mathematics student that can't understand his algebra teacher, but my concern is that there may be times when you are exceeding, right at the point of discharge, the amount that is going into the creek in relation to background because you are discharging up to one-twentieth, 5% of the amount of Prairie Creek that's going by and that your effluent discharged will be, you will be trying to keep that at a constant level with regards to suspended sediments and heavy metals.

MR. N. GUILD: The lower limit of the 20 to one actually, under most conditions, as I said in the text, the period in which we're proposing to

discharge is basically from, reduced in April and then at full level from May through November and reduced in December. Dilutions in that period, the minimum dilution that's probably going to be available then is going to be 38 to one and with some periods throughout that where the dilutions are going to be up to 600 to one. On these actual figures that are in the table here, and that's the calculation you should be doing, you should be taking these figures here and apply that dilution to them and compare them to the background levels. And you'll not find there's that percentage multiplier that you were referring to.

MR. J. BAYLY: Am I not correct though that you want to have enough latitude to be able to either dilute to 5% of perhaps 2½% of effluent to Prairie Creek if you are required to do so.

MR. N. GUILD: No, the dilutions, generally our dilution, our dilution available throughout the year are quite adequate for the purposes that we require. The only problem occurred when there was a period when there could only be 20 to one dilution. As I say, most of the time there's going to be 38 to one and greater. And we proposed certain effluent levels which we believe we could meet most of the time, but there was a certain point in time where we thought we might get fluctuations in our effluent quality whereby we would have to make use of instead of 20 to one dilution, 40 to one dilution. And that was where we proposed a second set of levels in a letter that Don Gamble had been referring to.

And the other thing is that the effluent that we are introducing to Prairie Creek, we can control how much we put out. We don't



have to put out 400 gallons a minute. We can cut it to 200 gallons a minute. If there was only 20 to one dilution for 400 gallons a minute we can cut our flow by half to give us the extra dilution that we require.

MR. J. BAYLY: But it will be, as I understand, contained within this 302,000 gallons per day that you feel has to be discharged into the creek. It goes through the processes prior to discharge. Am I correct?

MR. N. GUILD: Our estimate right now is the 302,000 gallons per day which is .56 cfs.

MR. J. BAYLY: Yes. And if I understand your evidence, if you store that for too long you'll run out of capacity in your tailings pond so there comes a point where you either have to stop operations or continue discharging, and that's why you're seeking to be able to discharge up to a certain concentration so you have that maneuvering room. Is that fair to say?

MR. N. GUILD: Well we have to by the pond balance. The way we will operate the pond, we have to discharge that amount of water, on an average basis, throughout the year. Now .56 cfs is, in fact, 210 gallons a minute which we have to discharge from the project over the whole period of one year. What we are proposing to do at the moment is discharge at increased rates over a reduced period in the year at which time there are greater dilutions available in Prairie Creek. As I said, that period that we will discharge which is maybe nine of the twelve months, dilutions are minimal of 38 to one and can be as high as, well they can be a lot higher, but they're as high as 600 to 700.

MR. J. BAYLY: Mr. Chairman, I'm going to leave this point with the Board because I think I've gone as far as I can with my limited knowledge of this, but I raise it as a concern so that the licence, if one is written, does not permit at certain times discharges which will build up above background certain concentrations of either suspended solids or heavy metals, and leave it at the concern stage at this time.

MR. D. GAMBLE: Mr. Chairman, just before Mr. Bayly leaves, I wonder if I could just ask one follow-up question while it's in my mind. Mr. Guild, could you describe for me how this would be done in practice. You're describing a system of discharge keyed to the flow rate in Prairie Creek. And, in fact, how do you see this will be done? On a daily basis? Who will get the information? How will the feedback be provided? How would it be supervised? What sort of records would be kept? I'm obviously fishing here because I'd like to know how the licence should be written, but if you describe for me how you see it done, it would help a lot.

MR. N. GUILD: That is a subject that we have given quite a lot of consideration to. If we go to the period of April, next year, when we do the closed loop testing on the plant, you can envisage the effluent reaching the plant and being returned to the tailings pond. So we have a closed loop. Now before we discharge there is a hydrometric station on Prairie Creek and that is the station we were going to use to determine the flow in Prairie Creek. Now that can be done on a monthly, weekly, or daily basis. Obviously if the flows in Prairie Creek are reasonably constant, you would extend the period from daily to weekly. But we can measure the flow in Prairie Creek. So that's the first thing we must know.

The other component is that we are going to have on-site lab facilities whereby we can take a sample of the effluent that's coming from the plant, in the closed circuit. We would take that effluent, analyze it, and from that we would then know the parameters that would be in the effluent discharge, and as I've indicated in that letter that you have, there were three parameters that we were concerned with the respect to having the ability to dilute more than 20 to one. And those were arsenic, copper, and cadmium. So obviously these parameters would be analyzed. If, in fact, they were up at the higher range where we would need to discharge at 40 to one, we would, together with the flow information we had from the hydrometric gauge, be able to adjust the rate of flow of effluent to ensure that the flow from the treatment plant provided 20 to one dilution so that this effluent quality could be met. And there are flow meters to be provided on the effluent treatment plant so that we know exactly what flow is going through it.

So these are three components, the flow meter on the treatment plant, an on-site lab that can do on-site analysis, and also the hydrometric gauge on Prairie Creek which can tell us the flow in Prairie Creek.

MR. D. GAMBLE: This is going to require some individual, probably to, pretty well full time, is it not?

MR. N. GUILD: Yes, as I've indicated in the submission, and under the reclamation section, I believe page 34, Cadillac are going to employ full-time, an environmental technician for the project. And this will be one of his responsibilities, along with monitoring that's

going to be required under the water licence, and also supervise area spill contingency. So that has been recognized in the personnel make-up for the project.

MR. B. CASE: Anything more, Don?

MR. D. GAMBLE: Well maybe I could just put a comment on the record so that I remember it later, that is that it seems to me that the way this is done, and particularly the record keeping is going to be quite important. And I don't mean just to assure compliance but also because these licences generally for a new mine are of fairly short duration and we'll want to learn from this and it would help us a great deal in issuing any subsequent licences. So I guess what I'm trying to flag here is that at some point I'd like to come back and think about how this, we could put into the licence certain record keeping requirements that wouldn't be particularly onerous on the Company but would provide us with the kinds of assurances and data that we need in the longer run.

MR. N. GUILD: I'd just like to comment on that. One of the services we usually supply to mining clients is, in fact, we would be drafting up forms for them so that it would simplify the monitoring process, and it's a very important function, is that the correct forms are there and the correct steps, and the correct data presentation is very important. That'll be one of our functions for Cadillac anyway. I mention that for the record too.

MR. D. GAMBLE: Well we should get together on that.

MR. B. CASE: Anything more now?

MR. D. GAMBLE: No.

MR. B. CASE: Mr. Bayly, do you want to continue.

MR. J. BAYLY: Yes sir.

MR. B. CASE: Do you want to break for a coffee?

MR. J. BAYLY: I was just going to say I take it that the fact the After Eight mints are being passed around doesn't mean my cross examination's dragging. But I'm prepared to break now and ...

MR. B. CASE: Is the coffee ready over there? Not yet? Well, somebody holler when the coffee's ready.

MR. J. BAYLY: Shall I continue then, sir?

MR. B. CASE: Yes, go ahead.

MR. J. BAYLY: Just before we leave this area, page 13 refers with an asterisk to maximum average concentration in the projection of expected effluent quantity and quality. I wonder if the term maximum average concentration could be explained as you understand it, Mr. Guild.

MR. N. GUILD: Maximum average concentration is actually defined in the water licence, and it will be defined by the Water Resources Department. It can take different forms. I'm not trying to be evasive; it just depends on the sampling period. But if, for example, their weekly requirement for the effluent was once a week, if it was once a week then it would be the average over the month of the four samples. So maximum average concentration means the average of the last four analytical results submitted to the Board in accordance with the sampling and analysis requirements specified in the surveillance network program. So it's measured once a week for a month, the average of those samples.

MR. J. BAYLY: So we're not talking about the maximum concentration, we're talking about an average of a series of samples taken over a period of time, depending on how the licence were written to require you.

MR. N. GUILD: There's two parts to the licence and to the effluent quality. There is the maximum average concentration and there is also the maximum concentration in a grab sample. And the grab sample would be if you, as it says, a grab sample. If you take a sample from the creek, there's limits for that. And those limits are generally twice the limits of the maximum average concentration. And that's the format that's been followed in any draft licences that have been prepared to date, or any tables that have been proposed to us by the Water Board.

MR. J. BAYLY: Mr. Chairman, if I can just refer to the Board that that may be a very important consideration where a stream flow is fluctuating greatly over a period of a year, that the Board should look very carefully at the numbers assigned in any licence it's thinking of because that could mean the difference between high concentrations and medium to low average concentrations going into Prairie Creek, at least permitted to go into Prairie Creek.

On page 16, Mr. Guild, in the first paragraph you talk about the amount of suspended solids and heavy metals in the South Nahanni River. I wonder if you could first tell me where you got the numbers and, secondly, what part of the river was either sampled or measured to determine these numbers?

MR. N. GUILD: I think you've misunderstood what I've written. The levels given are the levels in Prairie Creek, the quantities that Prairie Creek

carry to the South Nahanni River, and these were developed simply from the background levels that had been collected in Prairie Creek. So it was from the sampling done in 1975 and in our sampling work done in 1980. Those are actually the levels carried, or the amounts carried by Prairie Creek to the South Nahanni.

MR. J. BAYLY: That's from the minesite to the South Nahanni, is that correct?

MR. N. GUILD: Virtually, well the analysis that we took were in the mine-site area so there would actually be more added in between there and the South Nahanni.

MR. J. BAYLY: Now I take it, if I am not putting this too simply, that the solution that Cadillac proposes to the discharge of mine effluent to Prairie Creek is one of dilution. That there are small quantities of heavy metals and small quantities of suspended sediments that will be added to the background levels referred to in this paragraph, and that the affects will not impair water quality if I understood your interchange with the Parks people.

MR. N. GUILD: Well basically our solution for effluent quality is to treat it. However, there obviously is a dilution available to us in Prairie Creek, and it was the feeling of Department of Environment and Water Resources that we should always make sure there was a 20 to one dilution available in the Creek for any effluent that we put in. And we set certain parameters according to them. As I said, it was three parameters that we felt that we really needed at least 40 to one dilution to assist us with. But basically our approach to it is to provide a treatment system that will give us an effluent quality ...

MR. J. BAYLY: I appreciate that. What you're saying though is at the end of that that there are certain points beyond which it is either very difficult or expensive, or both, to go when your effluent, treated, finally is discharged along with the process water into the creek.

MR. N. GUILD: Basically we have taken what we believe we can, we're going to produce an effluent if we can with practical technology that is available. That's the limits.

MR. J. BAYLY: You're talking about the carrying capacity of the creek and I'd like you to address the work that you've either done or the theory that you've applied as to where the heavy metals and suspended sediments or solids will or may be deposited both through the course of Prairie Creek to the South Nahanni and within the South Nahanni itself. And I suggest to you that there are, within river systems, places where materials are carried in greater amounts than others. There are pools and eddies where materials are dropped, at least for a period of time, until the next flood or high water period.

MR. N. GUILD: Perhaps I could explain why this paragraph is in this brief. Certain questions were raised at the previous Hearings with respect to the fact that we were introducing heavy metals into Prairie Creek almost to the point that there was never any heavy metals already in Prairie Creek. Now what we're simply trying to convey here is that Prairie Creek naturally carries heavy metals and suspended solids, and it carries this amount, the 23,000 pounds of heavy metals and four million pounds of suspended solids from about the minesite down to the South Nahanni every year. And the quantities that we were introducing and give a percent, sorry, and to develop a percentage between



those quantities and the quantities that we'd be introducing. There was no great theory behind where it was going to be deposited or in what areas it was going to be deposited. It was just simply a fact a life that naturally that creek carries as suspended solids, and in fact the total metal is suspended solids too, virtually as sulphides or some other form, mostly sulphides that would be naturally, by natural erosion upstream or bank erosion, would be conveyed down the creek to South Nahanni.

MR. J. BAYLY: I understand that but going beyond that point you haven't gone into predicting whether there will be places where these might accumulate in amounts that would be greater than background either from natural accumulation or from natural and combination with anything that your mine might introduce.

MR. N. GUILD: No, that is correct. There's no detailed study about deposition methods or deposition locations, no.

MR. J. BAYLY: There was a discussion between the panel of witnesses and Mr. Gamble regarding the perceptions of the spill of hazardous materials, namely oil, during early June, I believe, of this last year. And my concern isn't the same as Mr. Gamble's, but do I understand that Cadillac feels that the response to this spill by its contractor personnel was a good and effective response. Would that be fair, a fair way to interpret the third paragraph on page 16?

MR. N. GUILD: Yes, that would be a fair way.

MR. J. BAYLY: Can you tell me when the leak was first detected?

MR. N. GUILD: I believe it was early June.

MR. J. BAYLY: And within what period from the first detection was the appropriate inspection authority or enforcement agency contacted regarding the spill?

MR. N. GUILD: From the written report that I have, my understanding is that they were contacted within one or two days.

MR. J. BAYLY: What was it that drew the attention of the personnel on site to the possibility that there was an oil leak from one of these bolted tanks?

MR. N. GUILD: I honestly can't answer that. I can only assume that oil was visible around the base of the tank.

MR. J. BAYLY: Can you tell me what training the contractor personnel had with regard to oil leak detection and oil spill clean-up?

MR. N. GUILD: I can't answer that one, perhaps someone else could.

MR. L. MORRISROE: Well I could give you that help. Gulf Oil helped us. Laurence Morrisroe of Cadillac. As soon as it was detected the people of Gulf Oil, we went and contacted Gulf Oil and they also came up with some suggestions what should be done.

MR. J. BAYLY: But prior to the detection, was there training given to the personnel of what they might do to watch out for losses of oil, or possible spills?

MR. L. MORRISROE: I think when the spill came up was we measure the tanks all the time. When the tanks was measured we noticed one tank was lower and that's where the detection came.

MR. J. BAYLY: So your either recollection or information about this is not that they noticed oil necessarily on or in the ground but that they were checking ...

MR. L. MORRISROE: That's right.

MR. J. BAYLY: ... the inventory and found that there was some missing oil.

MR. L. MORRISROE: Yes, they check the oil all the time.

MR. J. BAYLY: And what equipment, either Mr. Morrisroe or anybody else on the panel, what equipment is presently kept on site for the impounding or clean-up or recovery of oil or other materials that might be spilled or lost?

MR. L. MORRISROE: Well I can't tell you any special equipment that's being held, but the way I watched the spill being cleaned up, that type of equipment is there all the time. It was, the pits were dug and the oil was skimmed.

MR. J. BAYLY: Was the oil contained within the berm we saw in the photograph, or did it go beyond the berm that we have seen around the bolted tanks.

MR. N. GUILD: We're looking at different tanks and the slide that you saw, welded steel tanks, these are the new, that's the new storage facility. There was not a slide of actually the old bolted steel tanks.

MR. J. BAYLY: Then was there a berm around the old bolted steel tanks or not, at the time that the spill occurred.

MR. L. MORRISROE: Maybe to help you, Mr. Bayly, those tanks were put in there in 1968. And they were put on top of the gravel which is about four feet under is the permeable clay. And there was a dyke put around these here tanks, but it wasn't clayed with impermeable clay and, at that time, it was thought that was all the requirement needed in case lightning struck, you know what I mean, or so forth. So today precaution is quite different. We're down, we have the permeable clay under these here tanks which wouldn't, the same thing couldn't happen today.

MR. J. BAYLY: Do I understand, Mr. Morrisroe, your answer is then that ...

MR. L. MORRISROE: And this here oil went down into this here three or four feet on top of the clay.

MR. J. BAYLY: Did it then go beyond the dyke that had been built out of this other material?

MR. L. MORRISROE: Yes it did.

MR. J. BAYLY: Then the pits that you dug were actually outside this impoundment area.

MR. L. MORRISROE: That's right.

MR. J. BAYLY: Did you have, at the time that this occurred, and prior to it, did you have a spill contingency plan that either you or your contractors were aware of and your personnel or your contractor's personnel were trained in.

MR. L. MORRISROE: I couldn't answer that, Mr. Bayly.

MR. J. BAYLY: Is there anybody on the panel that has the answer to that?

MR. N. GUILD: There was a framework of a plan within the original environmental evaluation and that would be the plan, any information in that would be in effect at that point in time. They're in the throes of creating a spill contingency plan for submission to the Water Board as part of the licence, at this point in time.

MR. J. BAYLY: Now that accident took place in June, last year. Do you have an interim spill contingency plan in case something should occur between now and the time when you might be granted a licence?

MR. L. MORRISROE: Yes, they have that, Mr. Bayly, but when you talk about the spills, every situation is different, whether a truck tips over, this here happened to be a leak, you know what I mean, a freak situation.

Everyone, you know what I mean, is different, and there's all over the world every time you'll see a spill, a tanker, a leak or something, every situation, you know what I mean, is different. One time equipment works for one but it won't work on the next one. So you've got to be very flexible and at the time you have any problems, maybe the equipment you haven't got there is on hand but you'll have to get the technicians in that have the right things so it's quite hard just to say one day to the next, you know what I mean, is different. Every spill is different.

MR. J. BAYLY: I appreciate that, Mr. Morrisroe, and that's why I'm very interested in this plan that's being developed and wondering how you're approaching it because you're going to have an awful lot of different ...

MR. L. MORRISROE: As I told you, Mr. Bayly, the present time is very much different than what it was before. We're down, we got impermeable clay underneath, we got dykes now that are banked with clay and our complete storage could be broken down, you know what I mean, any big tank and, you know what I mean, it's held there. It's not like it's a situation like what we went through.

MR. N. GUILD: John, two positive things that I can say are that since that first spill the people on site are much more familiar now with the problems that do exist with spills, and methods of clean-up. Also, as part of our preparation of this final spill contingency plan we obtained from, well Cadillac actually obtained from Gulf Oil their spill contingency plan for oil clean-up and that is, at present, on site and site personnel are aware of it.

MR. J. BAYLY: Now when you say the plan is on site, is the recommended equipment to go with the plan, and the training made available and given to the men so that they know how to respond if there is one of at least the normal kinds of emergencies, if there is such.

MR. L. MORRISROE: Well, Mr. Bayly, for an example, personnel on site is trained. Suppose that a leak is found tomorrow morning. Immediately water would be put into those tanks, immediately, and be filled right from the top with water. So the water goes to the bottom and you've got the water then leaking, you know what I mean, instead of oil. That gives you so many days, you know what I mean, or whatever it is to stop, you know what I mean, that spill. Those type of things, the personnel, they're trained and so forth on. Valves and everything. People are trained, you know what I mean, to keep them closed, and they're inspected.

MR. J. BAYLY: Have you put additional equipment, or given additional instructions to the personnel since this spill that would put them in even a better position than they were in in June to respond to the kind of accident we hope won't occur, but obviously does from time to time.

MR. L. MORRISROE: That's right, we have, yes.

MR. J. BAYLY: And what is that that you've ...

MR. L. MORRISROE: Well, as I've told you, that we've taken every precaution. I said the people check the valves, check the tanks more often, and all those type of things. We got a number of people that are still there on site that helped clean up the site and so forth. So we've got experience there that we didn't have before.

MR. J. BAYLY: Do you keep booms on site, for example?

MR. L. MORRISROE: I couldn't tell you that, what that is; that's not my department and maybe somebody else here can help you, but I can't.

MR. J. BAYLY: Can anybody respond?

MR. L. MORRISROE: If you're an expert, you know what I mean, in clean-up, you know what I mean, well then if you're talking about booms and certain things you're talking out of my language there now so, John ...

MR. J. BAYLY: Mr. Morrisroe, I'm just trying to find out what's there and the capability of response at present, because, as I understand, you've got 150 men busily working to put this project together and I want to know what the response has been since the spill. And you say you don't know whether there are booms. Is there anybody that knows, for example, whether there are booms, or absorbants, or slick tickers, or ...

MR. L. MORRISROE: I don't know if any of them would reply as an expert.

MR. J. BAYLY: I don't know if they would either, sir, I'm just inquiring.

MR. L. MORRISROE: If you're getting, you know what I mean ...

MR. J. BAYLY: No sir, I'm afraid that I'm just here to ask some questions.

MR. G. HAMILTON: Gerry Hamilton from Cadillac. As has been previously mentioned, our contingency plan is being prepared at the present time, and we have accelerated the development of that plan. We are currently assessing the various types of booms, the various locations, we have been discussing it with members who are with the Water Resource people in a broad sense, and are prepared to submit to the Board this plan following such consultations and the materials that we feel have to be maintained on site, and are requested to have on

site, we will have on site. At the present time it's under consideration. We have the normal earth-moving equipment, our people are trained to use it, they have an understanding of the various methods of containing various types of spills, and we will end up, once our contingency plan has been completed, of having the proper materials, the proper equipment, and properly trained people to handle them.

MR. J. BAYLY: Then I'm referring now to an item on the Water Register dated September 1st, 1981, a letter from Andrew MacPherson, Regional Director General of Environment Canada for the Western and Northern Region to the Department of Northern Affairs, Assistant Regional Director in charge of Northern Environment. I'll just read you the main paragraph of that letter and I invite you to comment on it as to whether you feel that it's a fair statement regarding your ability and preparedness to clean up.

The paragraph reads as follows, and I'll give you the whole letter before you comment, but I'll just put this paragraph on the record, "We have reviewed reports on the oil spill as prepared by the Environment Protection Service, Parks Canada and your Department. It is our conclusion that the operator had no spill contingency plan, no personnel trained in fuel recovery procedures, and no equipment on site for recovery operations. Since this was the case it raises serious questions about the nature of licence conditions imposed upon the operator, compliance with these conditions, and inspections being given operations of this nature. Further, we are specifically concerned that the operator was given permission to use fuel storage tanks in light of advice to the contrary when it was known that the tanks were in poor shape and also without dykes."



You've certainly responded to the one part about dykes, that there were some although they permitted the passage of oil. I'll just give you this letter so you can look at the whole thing before you comment.

MR. G. HAMILTON: I was, in my recollection I was not aware of this letter.

I feel that some of the comments that have been made are perhaps not quite fair. I do believe that at the time that this, the date of this letter, which is 28th of July, that at that time the spill had occurred, the steps had been taken by the people on site utilizing equipment that was on site in order to recover the spill and start the clean-up procedure. Should the gentleman who wrote this letter be referring to booms and etcetera as you have mentioned, no, that equipment was not on site. As far as the permission to use the bolted steel tanks that were on site, I can offer no comment on that. It certainly was, at that point in time, the permanent fuel storage tanks which are now being utilized were being erected on site, and, as Mr. Morrisroe has stated earlier and as others have stated earlier, they are now contained behind an impermeable dyke and the proper procedures have been introduced into our operation to make sure that any leaks in there will be detected early and will be contained.

MR. L. MORRISROE: Mr. Bayly, if you get down here with letters and you've got a lot of information, and I don't think you're quite fair. You're presenting us letters and everything, and you've got a brief you didn't present on time, and you're expecting us, you know what I mean, to have the world of answers. If you'd conducted your brief, put such letters as this as you wanted answers to, and had your

brief presented on time, which we could have picked up, taken the days, you know what I mean, to go over your brief, we could've had all these here answers and saved an awful lot of time. So I think that you're being entirely unfair to the Board, and everybody here today, and to our panel of experts when you got these surprise letters that you had in your back pocket. These should have been put in the brief, and the brief should have been put in time and given us the opportunity to turn around and be prepared to answer your question.

MR. J. BAYLY: Mr. Chairman, the letter I've referred to is on the public Water Register of the Northwest Territories which is required to be kept under the Northern Inland Waters Act, and is as available to Mr. Morrisroe and his company as it is to me and my client. I don't propose to address the question of whether he was caught by surprise by this letter. It was available. I've done my homework; if his company hasn't done his I'm sorry for that.

MR. L. MORRISROE: I'm saying you didn't do your homework. You never had your brief, and you never had it presented in time. If it comes down according to be technical on the briefs today, your brief should never have been accepted. We've been good enough to accept it today.

MR. B. CASE: I think it ...

MR. J. BAYLY: Time for coffee, sir?

MR. B. CASE: I think it would be a good time for coffee. Thank you,  
Mr. Bayly.

MR. B. CASE: Ladies and gentlemen, before we resume with the questioning by Mr. Bayly, we have decided that after supper, presuming that there are no further questions of Cadillac, that we will move on to the presentation of briefs and that we will give the opportunity to the various individuals who wish to present a brief or state their case to come on right after supper, and when all the individuals have finished presenting their briefs then we will move on to the formal briefs that were indicated are coming from various government agencies. I trust that will be the most suitable way.

Mr. Bayly, would you like to carry on with your questioning then?

MR. J. BAYLY: Yes, sir, I will. Mr. Guild, if I could move on to the effluent treatment section beginning at page 17, at the bottom of the page the treatment method to be employed is called the alkaline chlorination process. And when we were discussing the treatment of sewage by the two possible means, I think it was one of your engineers who stated that in a chlorination process you will end up with chlorine. In the alkaline chlorination process which treats the mine effluent, as opposed to the camp sewage, do you end up with chlorine which will go into the tailings pond and beyond?

MR. N. GUILD: At the end of the treatment system proposed, there will be a tank into which we'll introduce sodium metabisulfite which will, in fact, destroy the chlorine. So there is a tank added on the end of the treatment system that will destroy the chlorine.

MR. J. BAYLY: Is that before it goes into the tailings pond then in the effluent treatment process.

MR. N. GUILD: That would be prior to its discharge to Prairie Creek.

MR. J. BAYLY: So it's the last process before the stand pipe to the creek.

MR. N. GUILD: That's correct.

MR. J. BAYLY: In the effluent discharge you've referred at page 18 and 19 to if you like staging your discharge really to the open water months except that some effluent will be discharged beneath the surface of the ice. Do you plan on putting the same average in that you have in your table on page 15, that is .56 cubic feet per second, under the ice?

MR. N. GUILD: Normally no, it would be less than that amount.

MR. J. BAYLY: Have you considered the implications to fish and benthic populations of the introduction of, particularly, suspended materials into waters in which they may overwinter which may have fairly low oxygen contents because of the season of the year?

MR. N. GUILD: Yes, that's considered in the quality of effluent that we'll be discharging.

MR. J. BAYLY: What is it then about the quality of the effluent that will determine whether it will use up available oxygen?

MR. N. GUILD: That's usually the biological oxygen demand and that is one of the parameters that is really set for the sewage treatment plant more than the effluent treatment plant which is of correspondingly factors of almost ten to 20 smaller volume than is actually going into the creek.

MR. J. BAYLY: Then the discharge of either untreated or partially treated sewage under ice might be more concern to fish and other organisms downstream than the discharge of the treated mine effluent.

MR. N. GUILD: It purely depends on a dilution. Obviously if the dilution factors are instead of 100 to one, they're 700 or even 1000, to 2000, to one, then that impact would not be greater than perhaps the effluent from the treatment plant. The flows are so small from the treatment plant in relation to the flows from the effluent treatment plant.

MR. J. BAYLY: Do I understand your answer to be that when you have effluent from the effluent treatment plant combined with sewage from the camp, that that in itself will contribute to the dilution factor.

MR. N. GUILD: Yes, it will assist it, certainly.

MR. J. BAYLY: Then in the present situation where you don't have an effluent discharge with the exception of certain minewater that's coming out at present which may be even natural flows or a combination of those and pumped out water from certain levels that we're seeing a much higher proportion of partly treated sewage to mine effluent going into the creek than you would expect when the mine is producing.

MR. N. GUILD: It depends on which way we decide to discharge. In actual fact the effluent from the treatment plant, the quality of that effluent is licenced separately on the basis of it discharging independent from the effluent treatment plant, and presently that is what is happening. It discharges to Prairie Creek. Now that may well continue. We are giving consideration to combining the two effluents at one point, so it'll only be one discharge point to Prairie Creek. So in answer to your question, the licence, the values that would be set in the licence for the sewage treatment, the method in which we are discharging now would be no different from that point unless we decide to combine the two.

MR. J. BAYLY: Referring now to what you call on-going development at page 20, you say that it is probable that the Cadillac mill will be equipped with a modern on-stream analysis system. What's the lead time or critical path requirement for making the decision of whether to provide that equipment to a mill that you presumably already have under construction.

MR. N. GUILD: Yes, the reason for the word "probable" in there is that these are on-going developments that are happening daily and Gerry Hamilton will fill you in exactly on what the proposal is at present.

MR. G. HAMILTON: To answer your question, we are currently carrying out what is known as a pilot plant test at the Colorado School of Mines Research Institute in Golden, Colorado. We have had previous experience with an on-stream analyzer and found it very successful in order to control the addition of reagents into our circuit. The type of ore that we are familiar with was a copper/zinc application. We are now looking at a lead/zinc application. The equipment that we are going to, we would like to utilize is a system called monaxin which was developed by Otto Compo in Finland, and in this pilot plant test we have made arrangements to have a probe used in this test to see if we can get the results that the manufacturer claims he can in order to install the system at Cadillac. It's expected that that test should start within the next two weeks. It'll probably take about four or five weeks to run the test and the subsequent report should be available to us within about two and one-half months. Prior to receiving the report we will have, hopefully, have sufficient information to let us know whether the system will work in our circuit.

We suspect that the answer will be positive. If it is positive that equipment will be installed this fall, probably about three or four month delivery time.

MR. J. BAYLY: Will you provide yourselves with any back-up equipment since what you're proposing to use, as I understand your answer, is something which is very recently off the drawing board.

MR. G. HAMILTON: No, it's not recently off the drawing board, the system is well known. It is a development from what is known as a courier system. A courier system is a very sophisticated system and very expensive. We are of the opinion that such a system is not economically viable in our operation. The system that we are proposing, the monaxin system, is one which has been in use for some ten years now in various parts of the world, and that system, what it does for us, we have the alternative of either operating our system manually or operating it with an on-stream analyzer. If we operate the system manually you have a delay in the various parts of your circuit, you sample for control, from the time you take the sample til you get the analysis. Using an on-stream analyzer, which is linked to a computer, the operators get a print-out of the various elements that we select for analysis, and that print-out can be made available to the operators in any, well in our last application we had a print-out every seven minutes. So every seven minutes the operator knows the analysis of various elements within respect, within the sampling areas of the circuit and, knowing this, the operator then can manually control the addition of reagents. In any normal mining operation it's very difficult to have a consistent feed into your plant. The percentage of various metals

predominantly, in our case, lead/zinc that are going in where the average is probably in the order of 12% of each element, this can fluctuate quite widely. The amount that it fluctuates you either over-reagentize or under-reagentize, and if you under-reagentize you lose the metal into the tailings pond. If you over-reagentize you're putting too much reagent in and giving yourselves problems in your effluent. And the reason for putting this on-stream analyzer in is to assist the operator in not only to gain better recovery, but to make more economical and more prudent use of the reagents in our circuit, and it is not a new system. It is something that is well known and has been very successful in various parts of the world.

MR. J. BAYLY: Do you propose though to keep available a laboratory analysis capability in the event that your computer goes down or gives you certain problems?

MR. G. HAMILTON: That is correct. The laboratory is there regardless. The sole purpose of the on-stream analyzer is to give the operator control of the circuit.

MR. J. BAYLY: I'd like to turn now to the question of your studies on fish, and I'm referring first to a telex that was sent to you, Mr. Hamilton, from Glenn Warner, the Chairman of the Water Board, on the 8th of September, 1981. In that telex he requested or said that the Board required certain additional fish studies to be carried out. Since the time of that telex, or in the interval between the last information before that that had gone to the Water Board and the present time what studies have been carried out to satisfy this request?



MR. N. GUILD: Perhaps you could turn to page 31, second paragraph from the bottom. If you read that paragraph and the next paragraph that'll outline to you the work that was carried on.

MR. J. BAYLY: Now I had a look at that report that you filed last Friday, or that got to the Water Board last Friday, the big thick green telephone-book sized one, and the May studies I take it were conducted on the four rivers or creeks over a period of four days. Is that correct?

MR. N. GUILD: That's correct.

MR. J. BAYLY: And am I correct in saying that they involved water sampling for clarity ...

MR. N. GUILD: ... pH, temperature ...

MR. J. BAYLY: ... that sort of thing as well as electro-shocking and gill netting in those four streams?

MR. N. GUILD: We looked at spawning for Grayling in the streams, yes. There was electro-shocking done and netting.

MR. J. BAYLY: And as I understand the report, electro-shocking was certainly limited in Prairie Creek to the edges of the Creek because of the flows in the river at that time. Am I correct?

MR. N. GUILD: Wayne, could you confirm that?

MR. W. DWERNYCHUK: Yes, Wayne Dwernychuk, Beak Consultants. In the report there was gill netting done at stations upstream of the minesite for a period of 3.5 hours, downstream 16½ hours, another downstream site at 13½ hours. It is registered in those reports, section B of the report.

MR. J. BAYLY: Will you give me a page reference please that you're looking at?

MR. W. DWERNYCHUK: Table 5, table 4. Table 4 with respect to the winter road.

MR. J. BAYLY: Alright, and was it from that that you, that was the extent of your sample then in the spring of Prairie Creek upstream. Did you do similar work in the other streams that have been referred to, the Tetcela River, Sundog Creek and Grainger River?

MR. W. DWERNYCHUK: Okay, well Table 4 gives an accounting of gill netting and shocking on the Grainger, Tetcela, the two Tetcelas, well actually, yes, and the Sundog Creek tributary.

MR. J. BAYLY: During the, that period of time, did you feel that it was necessary for you to come back and do further studies that have been referred to in September, as being done in September, 1982.

MR. W. DWERNYCHUK: Dwernychuk, Beak Consultants. The species of fish, the Bull Trout and the Mountain Whitefish spawn later in the year, and the studies, the September studies were directed at addressing specific articles regarding spawning, spawning habitat with respect to those species. That's why the September studies were implemented.

MR. J. BAYLY: And how many days were you able to spend on those studies?

MR. W. DWERNYCHUK: I think that one was about six days total, I'm not sure, I'd have to check the methods. It's about five or six days total.

MR. J. BAYLY: In terms of the information that you have, are you satisfied that you have a good idea of the kinds of fish populations, the areas that may be important to them, the suitable habitat, the migration patterns that they may have.

MR. W. DWERNYCHUK: Dwernychuk, Beak Consultants. Other than the migration patterns, those data are available. I believe we were in a little bit too late to determine the exact timing of migration if it did

occur beyond the minesite. There was no data indicating that there was any passage past the minesite, so we are suspecting that it did occur somewhat earlier than the time that we were on site.

MR. J. BAYLY: I was going to ask you about that. When it says no data that doesn't mean that ...

MR. W. DWERNYCHUK: That's right.

MR. J. BAYLY: ... you don't suspect that there might be some, just that you missed it.

MR. W. DWERNYCHUK: That's right.

MR. J. BAYLY: Now you were in this fall. I wondered if you'd followed up on the concerns that were expressed by Dave Sutherland about downstream problems below the site. He referred to a blanketing of certain portions of the stream, algae growth that seemed unusual because it didn't occur upstream of the minesite, a loss of benthics, and a possible discouragement to the passage of fish. Did you look into that?

MR. W. DWERNYCHUK: Dwernychuk, Beak Consultants. Your statement on the loss of benthic organisms, I think, is not quite correct. The whole system is rather unpopulated in terms of benthic invertebrates. It is, well I shouldn't use the term "sterile", but it's very low in productivity. As far as the algae are concerned, I have no idea what prompted their populations. I'm not aware of any notable difference between algal growths upstream as opposed to downstream of the minesite.

MR. J. BAYLY: You didn't measure it then, is that what you're saying?

MR. W. DWERNYCHUK: No, we didn't.

MR. J. BAYLY: Did you make any observations when you were there?

MR. W. DWERNYCHUK: No, our crews did not.

MR. J. BAYLY: Mr. Chairman, the reference I'm making is to a letter on the Water Register, dated September 9th, 1981, just for the information of the Board and the witnesses if they want to refer to it.

Mr. Guild, turning to the question of reclamation, and this came up at earlier meetings, what is the position of Cadillac regarding the responsibility to monitor the to-be-abandoned minesite to make sure that it remains in a stable condition and that the reclamation steps that you had proposed to take have been successful.

MR. N. GUILD: Procedures for mining developments, normally one would initiate reclamation prior to abandonment, and monitor it during the period of operation so by the time of abandonment one would have a pretty good knowledge of exactly how successful their reclamation efforts were. And in the area of the tailings impoundment it, again, there'll be an on-going monitoring during the life of the project of the rip-rap protection that will be placed on the embankments. So again, at the time of abandonment, we believe that the integrity of those embankments should be ensured.

MR. J. BAYLY: Does the company accept a level of responsibility to carry on on-going inspections of these facilities after abandonment?

MR. N. GUILD: Normally at the other companies that I have worked with, and I believe Cadillac are of this opinion, that for a minimum of a year after abandonment they would certainly monitor the project site. Beyond that, as I think I said at one of the last Hearings, would be a matter for the Board or Water Resources to comment on.

MR. J. BAYLY: Is this something that you discussed, or Mr. Hamilton, your Board discussed when you were putting together this presentation, and keeping in mind that the Water Board may be interested in whose responsibility it is both to inspect and give the appropriate assurances, monetary and otherwise, that the reclamation procedures will be successful.

MR. G. HAMILTON: That is correct.

MR. J. BAYLY: It has been considered then?

MR. G. HAMILTON: Yes.

MR. J. BAYLY: And what will you be recommending, if you're asked, regarding the responsibility of the company after abandonment?

MR. G. HAMILTON: Specifically what are you referring to?

MR. J. BAYLY: Well, you have a proposal for what will happen to the mine-site when you finish mining it, and you've just told me in your answer, as I understand it, that your Board of Directors has considered that you may have some responsibilities after the mine has shut down, once you've got all the ore that is marketable, and what I'm asking is, what has your Board considered recommending as regards to what those responsibilities should be?

MR. G. HAMILTON: I think, to answer your question, we are well aware that there are certain responsibilities that a mining company has on abandonment, and that we are aware that our company will have to meet such regulations that are imposed on us at that time. I believe that it is something that my previous experience, what was in place when the mine opened and what was in place when the mine was abandoned were two different things. And we, in my past experience, we have had to meet those regulations that exist at the time of abandonment.

MR. J. BAYLY: So you're proposing that in the, because of the experience that you've had in the mining industry, that there's no sense thinking at this point in time about what the terms of abandonment should be because they're almost bound to be different six years or 20 years from now.

MR. G. HAMILTON: That is partially correct. I mean there are certain things that are generally consistent, such as closing openings and rehabilitating the tailings pond. As indicated in our brief, during the life of the operation tests will be conducted by agronomists on the right type of seeding and how to grow, create growth on the tailings surface, and that will be carried on, but there are other factors that are introduced from time to time by the regulatory authorities and we are aware that when we come to abandonment that those regulations will have to be met.

MR. B. CASE: Mr. Bayly, perhaps I could assist you here. I think the Water Board has to operate on the assumption that when a mine is finished that the mining company may no longer be in existence, or certainly not in the existence say in the Northwest Territories. And I'm not pointing the finger at Cadillac at all because this is quite common in the industry. You finish mining there, you don't find any more, and you move on. So that the Water Board, I think, has to operate on the assumption that the mining company will not be there after the mining operation is finished, therefore, the reclamation, at the time of closure, must be of very high standard.

MR. J. BAYLY: Mr. Chairman, that was what I was concerned about, that the Board follow through and think in terms of licencing as much as

it can, either the terms of bonding or whatever, that may be required to ensure that the things are done in an acceptable manner to the public and to maintain water quality. I won't pursue it any further, I think the point has been understood in any event.

Just going back to one matter discussed earlier, before the coffee break, Mr. Guild, I think this is within your area of expertise, when we were discussing floods and hundred year and maximum flood conditions, as we were discussing it we seemed to be discussing increases of flow creating greater heads of water and larger velocities. I understand that one of the phenomena of some of the rivers in this area is that they can create damming effects, either because of the constricted channel or canyon through which they may pass, only a certain amount of water can pass at a given time, or because another river may be in flood and blocking the passage if you like causing the river to back up on itself. Have you taken into account when you're determining the height levels that might be generated by a hundred year flood and a maximum flood the possibility of this damming effect downstream of the minesite, either on Prairie Creek or even farther down the river system?

MR. N. GUILD: One of the things we had our hydrologist do when he was working out these flood flows was, in fact, investigate Prairie Creek for quite a considerable distance downstream for exactly that reason. One has to actually take several cross sections down Prairie Creek and from that you look at what effect a maximum flood will have because there are certain areas that can act as restrictions, and that was taken into account when we projected our flood levels for Prairie Creek.

MR. J. BAYLY: So you're saying that the height of the tailings dyke has taken into account the possibility, not only of rising water coming from the north, but water backing up from the south as well.

MR. N. GUILD: Yes.

MR. J. BAYLY: At page 34 you refer to an environmental technician who will report directly to the mill superintendent, and that he will have certain areas of responsibility. Has the company addressed what power he might be given to, within the company structure, to stop something that might cost the company quite a lot of money on environmental grounds. That is, to stop it for environmental reasons?

MR. G. HAMILTON: The environmental technician that we will retain to work will be a member of our staff and will work with our management team, and we operate as a team and we look for input from each member of that team and each of the members has a different expertise, and we are all prepared to work with the individual members and recognize the problems that they have and take those into consideration in arriving at our management decisions.

MR. J. BAYLY: So you're saying that it'll be a group decision and you'll receive the input from this person as a senior member of the group.

MR. G. HAMILTON: That's right.

MR. J. BAYLY: Mr. Chairman, those are my questions. Thank you very much members of the panel.

MR. B. CASE: At this time I'd like to call an adjournment for supper. We'll reconvene what time? 7:30? Seven? Okay, we'll reconvene at seven, and assuming that there are no further questions to address



to Cadillac, we'll start off with presentations by the individual citizens.

MR. B. CASE: Ladies and gentlemen, I guess we'd better get going, and I guess I better apologize again, but we seemed to have overwhelmed the dining room at the hotel, and maybe we ate too much too, I don't know, but our apologies for being late. I think now we'll move on to the presentations, we have both briefs from various government agencies and other organizations and we also have indications from some of the citizens of the area that they wish to talk. I will advise you at this time that after all of the presentations have been made there will be another opportunity to ask questions of any of the participants, Cadillac or any of the intervenors, before we give the floor over to Cadillac for their final summation. So to start with I would like to call on Mr. Paul Gammon, of Fort Simpson, to make his presentation which he assures me is very short and he's only got one piece of paper.

MR. P. GAMMON: I'm employed by the Village of Fort Simpson. I'm just here to put into the records a motion passed by the Village Council at a meeting held on February 18th, this year.

"That Council supports the Cadillac Mine application for water use based on the following conditions:

1. That the provisions, sorry, that provisions be made for the tailings pond to be left in a safe condition, i.e. an example is cemented over, or some other method of deadening the pile.
2. That the money for repair and clean-up costs which might occur after the area is abandoned be placed with the Government of the Northwest Territories in the form of a bond.
3. That the Village Council and the Band Council visit the mine site annually, or at a convenient time after an environmental incident such as an oil spill, and
4. That the Water Board pay the cost of the Village and Band representatives to visit the site before the Hearing, in this case the Hearing occurred too soon, but in future applications, i.e. for mining concerns or the IPL or whatever, that elected representatives of the community are afforded the opportunity of visiting a particular site prior to a Hearing."

That's it. Thank you very much.

MR. B. CASE: Thank you. I wonder, Mr. Gammon, if you could submit that motion in writing to the Water Board, as well.

MR. P. GAMMON: Yes, sir, it's addressed already to the Board. I would hand it to the secretary ...

MR. B. CASE: Thank you kindly.

MR. P. GAMMON: Thank you.

MR. B. CASE: As I indicated before, we want to give the opportunity to the private citizens who wish to be heard before going on to briefs

from some of the organizations and government agencies. I believe there's a couple of the people here who indicated they wished to speak. Betty Menicoche.

MS. B. MENICOCHÉ: I'm not prepared right now.

MR. B. CASE: You're not prepared right now? Okay, well maybe later. How about Percy Hardisty. If you wish to wait til later we can. Okay. But just don't let us forget. Are there any other private citizens who would like to be heard at this time to give us their views. If there are no private people who wish to speak at this time, perhaps we could call on the, start with the various agencies, government agencies who have indicated they wish to speak. Find the list here. First of all, Mr. Thomas, did you wish to make a comment about the government, would you care to come up and identify yourself please.

MR. J. YOUNG: Mr. Chairman, my name is John Young. I am the lawyer representing, normally, Environment Canada including Parks Canada, and I'm here representing Her Majesty the Queen and Right of Canada, having instructions both from the Department of the Environment and from my own Department, the Department of Justice.

It has been decided that, I think you're aware of this already, that really only one brief should be submitted on behalf of the Department of the Environment, and this is going to be submitted jointly by Mr. Falk of the Parks Canada section, and Mr. Dave Sutherland of Environmental Protection Service. In actual fact, there was a Parks Canada brief submitted and while this should be regarded as ancillary to the Departmental brief, I don't think there's really anything

in it that the Department as a whole would take exception to, and I think it's probably helpful if it could continue to be regarded in essence as an appendix, if you like, to the main brief which I think pretty well covers the situation anyway.

One should perhaps, as a matter of law here, just emphasize that there are two aspects in which primarily the Department of the Environment is interested in the proposed development. The first is in its capacity as a regulatory environmental agency, and the second is in respect of, if you like, proprietary interests that Parks Canada primarily has in what is a designated area in terms of the National Parks Act. I'm aware that the status of this Park is in one sense, and I don't want to risk offending anyone here, in one sense is as a provisional park as a National Park Preserve. None the less, I think for the purposes of this Hearing, it's more realistic to regard it as a Park under the National Parks Act in the fullest sense, a Park which is none the less subject to certain indigenous people's claims, because the fact of the matter is that for a number of years, whether it's a Park or a Park Preserve, fairly considerable amounts of money have been spent on the area, money which in essence has contributed by the people of Canada as a whole, and in addition, and Mr. Falk will be enlarging on this, in addition the Park is an International Heritage Site, and Canada has not only spent a considerable amount of money, that in essence belongs to all Canadians on the Park, albeit in a sense a provisional one which is for the benefit of all Canadians, Canada has also made certain commitments to the outside world that a protection will be given to this rather interesting Park, a Park which in fact is rather built around water. It's a very unique area and an

area which prior to the designation of the Nahanni Park Preserve in terms of the National Parks Act had very considerable hydro-electric and other potential and a very conscious effort was made at that time by the Government of Canada to look to the preservation of this unique area for the benefit, not only of the people in this immediate area but really for the benefit of all Canadians and, in a sense now, for the benefit of pretty well the world at large.

That really is pretty well all that I want to say but I do want to emphasize the two aspects of the Department of Environment interests. The first, the general environmental interest, and the second is the specific proprietary interests that Canada has on a piece of land which is dedicated as a National Park on which a great deal of money has been spent and on which assurances have been given to an international body, in this case UNESCO, that considerable care would be taken of this prime piece of property, if you like. And of course, as has already been pointed out to the Dene Nation by the UNESCO Committee, it really is the responsibility of the agency administering this Park Preserve, if you like, to make sure that it is protected.

That really is about all that I wanted to say and now Mel Falk will present that part of the brief that covers the main Park concerns.

MR. B. CASE: Before, thank you Mr. Young, but before Mel starts I wonder if you could clear up something for us. The Board is in a bit of a dilemma. We have received the brief from Parks Canada and have given it limited circulation to our own people. Now then it's quite possible

that perhaps some people outside of the Water Board have seen it. Now do you wish this brief withdrawn? You indicated that it was ancillary to the presentation which will be made. Could I get your instructions please.

MR. J. YOUNG: Yes, I think it probably would be simpler if it were withdrawn. I think we're all satisfied that everything can either, is adequately covered in the Departmental brief or can be adequately covered by oral presentation.

MR. B. CASE: Thank you. We will, we can't, we will get it back from everybody who has received it, but it will be recorded in the transcript that it is ancillary to the main brief and will not receive any wider circulation.

MR. M. FALK: Mel Falk, Parks Canada. By way of introduction, this submission to the Northwest Territories Water Board, dealing with the application for water use and waste disposal by Cadillac Explorations Limited, represents an intervention by the Department of the Environment and the Department of Fisheries and Oceans. In this submission, DOE and DFO wish to emphasize their concerns about the potential adverse environmental implications of the proposed Prairie Creek Project on the Nahanni National Park Preserve, and on the South Nahanni River basin. We wish also to advise the Water Board of Departmental recommendations for prevention and control of the environmental impacts of development.

It is fully intended that the scope of this submission not be limited to the proposed Prairie Creek project. Rather, it is the intent of this submission to address all future developments in the

South Nahanni River watershed. The Prairie Creek project is only one of a planned series of developments which must be managed with due regard to the Park and the watershed ecosystems. The contention that regional planning is a pre-requisite for development in the South Nahanni watershed is, therefore, a major point in this intervention.

Parks Canada mandate. The objective of Parks Canada is to identify and maintain a system of parks which is representative of Canada's natural and human heritage, to preserve these parks for all time, and to encourage an awareness of their values through use and enjoyment. National Parks are an important part of Canadian heritage which can benefit Canadians today and, if they receive the protection they deserve, will be part of the heritage of future generations as well.

National Parks are under the jurisdiction of the Minister of the Environment, and are administered by Parks Canada under the National Parks Act and various park regulations. The Act dedicates the parks to the people of Canada for their benefit, education, and enjoyment, to be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations.

It is Parks Canada policy to make protection of natural and cultural resources its primary consideration. National Parks are special areas which are protected by federal legislation from all forms of extractive resource use such as mining, forestry, agriculture, oil/gas and hydro-electric development. The natural and cultural resources of a Park must be protected from the effects of

man's activities so they can be left unimpaired for future generations. These resources must, therefore, be given the highest degree of protection to ensure the perpetuation of a natural environment essentially unaltered by human activity.

Now, specifically in the Nahanni National Park Preserve, this Park occupies a central position in the South Nahanni watershed. It encompasses 476,560 hectares of spectacular wilderness along the South Nahanni and Flat Rivers. The purpose of the Park is to protect, for all time, a natural area of significance representative of the Mackenzie Mountains Region. The Park focuses on the South Nahanni and Flat Rivers which, by carving through a series of mountain ranges, have created some of the world's finest examples of river canyons in Canada and the world. Other landform features of major significance are several mineral hotsprings, extensive cave systems and spectacular karst terrain. The major vegetation zones in the Park are northern boreal forest in the river valleys and alpine tundra at higher elevations. Several unique plant communities are represented around the hotsprings, on the Prairie Creek fan and the plateau areas. Particularly significant wildlife species are the peregrine falcon, golden eagle, trumpeter swan, grey wolf, grizzly bear and Dall's sheep. Further, the intention of the Park is to maintain the free-flowing wilderness quality of the rivers, essentially primitive and unpolluted, while allowing the natural evolution of the Park landscapes and providing opportunities for the public to experience Park values.

The South Nahanni River has a worldwide reputation as one of the last great wilderness rivers and, as a result, has been placed



on the United Nations World Heritage List. This list was established to identify and protect cultural and natural properties throughout the world which are considered to be of outstanding universal value. Canada is committed to the protection of the South Nahanni River by agreement and Parks Canada is very determined that the qualities inherent in the integrity of Nahanni National Park Preserve must be maintained.

The Park, by virtue of its position in the South Nahanni watershed, is particularly vulnerable to upstream developments. All tributary streams in the watershed flow into the South Nahanni River and, as a result, flow through the Park. For example, the proposed Prairie Creek Project is situated on the Prairie Creek floodplain, only 27 kilometers from the Park boundary and 43 kilometers upstream from the South Nahanni River. It is, therefore, inevitable that the Nahanni National Park Preserve would be the initial recipient of any adverse effects associated with the proposed development.

MR. D. SUTHERLAND: Concerns. The primary concern of DOE and DFO regarding the Cadillac development proposal is the potential impact of the Prairie Creek project on the water quality in Nahanni National Park and in the South Nahanni River basin. The water of this system is a vital resource, both to the inhabitants of the region and to its visitors. The aquatic resources are depended upon as a source of potable drinking water, as a habitat for aquatic biota, as a resource base for terrestrial wildlife, as a means of transportation, and as an aesthetic and cultural heritage of inestimable value both to the inhabitants of, and to the visitors to, this region. The goal of

both DOE and DFO is to maintain the existing water quality within Nahanni National Park and, by doing so, to ensure the protection of the interests of all downstream water users. Maintenance of existing water quality is herein defined as the absence of any statistically significant increase in the levels of mine-related deleterious substances in Prairie Creek waters within the Park boundary.

1. Treatment and disposal of liquid wastes. First, industrial effluent.

DOE and DFO recommend that effluent quality requirements for all liquid wastes slated for disposal to Prairie Creek be based on the requirement to maintain existing water quality below the Park boundary. The objectives of this recommendation are:

1. To protect users of fresh water as well as fish and other aquatic resources within Prairie Creek itself, and therefore to ensure continued safe use of other downstream waters;

2. To protect aquatic resources within the Park to an extent that is consistent with Parks Canada's stated policy of preserving the essential qualities of Park waters; and third,

To establish a precedent for use of headwaters of the South Nahanni River which would ensure protection of the existing quality of those waters from multiple waste inputs.

The requirement to maintain background water quality may be accomplished through a combination of treatment to best achievable levels, and controlled release to Prairie Creek. Recommended effluent quality guidelines are presented in Table 1.

Perhaps, Mr. Chairman, we could deal with Table 1 at the end if you like.

There are various options open to the proponent for achieving these limits. These include:

1. Treatment to best achievable levels with available technology. Consideration should also be given to polishing of treated effluent through increased solids removal, chlorine removal, enhanced decomposition of cyanide complexes, etc.;
2. Storage of effluent during periods of low flow in order to maintain a minimum dilution ratio in Prairie Creek;
3. Reduction of effluent volumes, and thus effluent storage requirements, through maximum re-use of treated wastewater;
4. Reduction of overall process water requirements, and
5. Control of minewater production.

In order to protect fish migration past the minesite, the proponent should be required to demonstrate the capability to monitor fish movements, and to cease discharge of effluents during spawning runs.

2. Sewage effluent.

The discharge of treated sewage by Cadillac Explorations Limited will introduce human pathogens into Prairie Creek. As a minimum standard for sewage discharge, effluent quality should meet the Guidelines for Municipal Wastewater Discharges in the Northwest Territories, in this case, less than 10,000 total coliforms per 100 milliliters. A sewage discharge of this quality, however, will not guarantee drinking water quality for Prairie Creek water within the Park boundary, that is, 0 faecal coliforms per 100 ml. Further disinfection or sterilization of treated effluent during the open water season may be necessary to ensure reduction of risk from human coliforms to water users within the Park boundary.

The DIAND inspection report of February 2nd, 1982, supports the assessment that the present sewage treatment system is inadequate in the areas of design loading, sludge handling, disinfection, and overall operation. It is strongly recommended that the Water Board review the design and operation of the sewage treatment plant, and re-evaluate the adequacy of the existing ultraviolet disinfection system.

Secondly, implementation of contingency plans.

Significant spills of fuel oil at the Cadillac minesite and on the winter road in 1981 provided ample demonstration of the concern regarding the proponent's ability to respond to environmental emergencies. As is clearly evident from inspection reports, the proponent's ability to respond to these incidents was inadequate.

DOE and DFO recommend that the Board require Cadillac to demonstrate, on a regular basis, their capability to implement their contingency plans.

Third, seepage from tailings pond.

Seepage from the tailings pond in excess of design could result in a significant discharge of effluent to Prairie Creek. During the operation, a system of sampling tubes to enable monitoring of water quality within, and at the base of, the tailings dykes should be established. In addition, a contingency plan, acceptable to the Water Board, should be developed by the proponent to rectify seepage problems deemed by the Board to be serious.

Fourth, control of multiple sources of wastes.

Effluents from the sewage and industrial treatment plants and surface runoff ponds may not be the only sources of waterborne

wastes resulting from the mining operations on Prairie Creek. Other mineralized zones are potential producers of minewater which may require treatment. Silt loads from construction and maintenance of roads may also contribute incremental impacts, especially during low flow conditions. There is a need, therefore, for coordination and control of all waste disposal activities in order to ensure that existing water quality within Nahanni Park is not compromised.

Section 11 of the Northern Inland Waters Regulations stipulates that water may be used without a licence if the use is of a type or of a maximum quantity permitted under the terms of these Regulations. Authorizations for disposal of wastes are routinely issued for activities associated with operations which themselves are subject to the licencing process.

It is presumed that Authorizations for further water use and waste disposal activities will be sought by the proponent after the issuance of a licence to cover the present application. DOE and DFO therefore recommend that the Water Board consider a policy requiring Board review and approval of all further water use and waste disposal activities associated with operations which have already been licenced.

Fifth, long term disposal of wastes.

After completion of mining operations, the tailings pond will be essentially a permanent structure on the Prairie Creek floodplain. Prior to abandonment the stability of the dams must be assured. If necessary, the Board should require an independent review of the proponent's final plan for abandonment and restoration.

Groundwater infiltration into the mine workings, and particularly into backfilled areas, may produce long term additions of toxic substances to Prairie Creek. The proponent must address the question of the magnitude of the problem early in the life of the development. Methods for minimizing groundwater flows entering backfilled areas should be implemented as soon as possible.

Sixth, biological impacts.

In 1981, the proponent's consultants carried out a survey of fish migration and spawning in Prairie Creek, both above and below the minesite. The data, although providing observations on aggregations of whitefish and charr above the minesite, constitutes only a preliminary examination of the spawning, overwintering and rearing potential of the Creek. Follow-up studies must be conducted to determine the seasonal significance of the Creek for various species. The Environmental Protection Service carried out a baseline study of water, sediments and benthic invertebrates in 1981. Although analysis of samples is ongoing, it appears that additional work will be necessary in 1982.

DOE and DFO recommend that a coordinated assessment of all data collected to date be completed before additional work is initiated by any party.

Regional planning.

Protection of Nahanni National Park as a national wilderness resource means that all developments in the South Nahanni River watershed with the potential to add to the incremental degradation of the Park ecosystem must be planned, controlled and managed to avoid problems

before they arise. The goal of sound regional planning should be to design broad watershed objectives rather than to evaluate individual water use and waste disposal proposals in a piecemeal fashion. A document summarizing the ecological resources of the South Nahanni River watershed and their relative significance would facilitate the regional planning process. New projects should be evaluated in a broad context rather than in isolation, as is the case for the proposed Prairie Creek Project. Preparation of a regional development plan for the South Nahanni River watershed is, therefore, seen by DFO and DOE as an essential pre-requisite to the protection of the South Nahanni basin over both the short and long terms.

Recognizing the need for maximum possible protection of the existing water quality of the South Nahanni River watershed, DOE and DFO recommend that the Board consider the following recommendations.

One, the Water Board should support the proposals that the South Nahanni watershed be designated as a water management area, that Nahanni National Park be recognized as a priority water user, and that comprehensive evaluation and planning be carried out in the watershed as provided under the Northern Inland Waters Act.

Second, the Water Board should advocate the immediate implementation of DIAND's regional planning process in the South Nahanni watershed. Recognizing that a regional plan may require several years for completion, the Water Board should advocate that DIAND establish interim management guidelines for the South Nahanni watershed. If such guidelines cannot be established, the Water Board

should seriously consider a recommendation to DIAND that development in the South Nahanni watershed be referred to the Federal Environment Assessment and Review Office.

Third, the Water Board should develop terms of reference for the establishment of a comprehensive water quality network in the South Nahanni watershed. Collection of baseline information should be carried out in a manner that enables both effective design of impact mitigation measures and statistically valid monitoring of environmental impacts.

The Water Board should evaluate the present water use/waste disposal application by Cadillac Explorations Limited in relation to the further development activities being proposed by the proponent in both the Prairie Creek and adjacent valleys, and

Five, the Water Board is requested to provide a copy of the proposed water use/waste disposal licence for the Prairie Creek Project to Parks Canada for review prior to approval by the Minister of the Department of Indian Affairs and Northern Development.

As far as the table is concerned, Mr. Chairman, I have some amendments to make to some of the values that were put in the copies of the briefs that were submitted to the Board. I might just go through those first.

On Table 1, the first page of Table 1 with the columns of numbers, on the left hand side under the heading of "Total Residual Chlorine", going over one, two, three columns under the column marked "Suggested Mine Effluent Maximum Average Concentration at Dilution Rate of 20:1 or greater", the value for total residual chlorine under there should be .05.



If you go over to, two columns over to the "Suggested Mine Effluent Maximum Average Concentration at Dilution Rate of 40:1 or greater", the value there should also be .05.

And the next column to the right, the maximum concentration for a grab sample at 40:1 or greater, should be 0.10.

Moving down, on the left hand column again, the parameter column, moving down the column to "Un-ionized Ammonia/Nitrogen", and over again to the maximum average concentrations at dilution rate of 20:1, the value should be 0.20, not 0.40; moving to the next column to the right, the value should be 0.40, not 0.80; moving to the next column to the right again, the value should be 0.20, not 0.80; and moving again to the right, to the final column, the value should be 0.40, not 1.60.

And the final parameter on the left hand side again, nitrite, moving to the column under maximum average concentration at a dilution rate of 20:1, the value should be 0.15, not 1.5; the next column to the right, the value should be 0.30. not 3.0; the next column to the right, the value should be 0.15; and the last column, the value should be 0.30.

MR. B. CASE: Mr. Sutherland, I wonder just to ensure that all those corrections are properly recorded if you could please file a corrected copy with the Water Board?

MR. D. SUTHERLAND: Right.

MR. B. CASE: And a copy to the applicant and to the Dene Nation.

MR. D. SUTHERLAND: Right. Okay, the applicant I believe has a corrected copy.

Okay, I have a transparency too if anyone wishes to ask questions about the Table, or discuss the Table, I could put it up probably in a very short, quickly.

MR. M. FALK: Mel Falk, Parks Canada. This is a supplementary clarification for the information of all present.

In the submission presented by DOE and DFO, it was noted that Nahanni National Park Preserve has been placed on the United Nations World Heritage List. I would like just to take a minute to expand on this.

The UNESCO World Heritage Committee which met in Washington in September, 1978, approved four natural and eight cultural sites as first nominations to the World Heritage List. Nahanni National Park Preserve was one of these.

By way of background, the United Nations recognized some time ago that the world's natural and cultural heritage transcends national boundaries and must be preserved for future generations. Consequently, the member states of UNESCO drew up a convention concerning the protection of the World Cultural and Natural Heritage known, in short, as the World Heritage Convention.

The Convention provides for:

- a) The establishment of a World Heritage Committee;
- b) The compilation of a World Heritage List comprising those cultural and natural properties throughout the world which are considered to be of outstanding universal value according to criteria drawn up by the World Heritage Committee;
- c) The preparation of a list of world heritage properties in danger;
- d) The establishment of a World Heritage Fund to provide aid to member states for World Heritage Sites in danger, and for other specified purposes;

e) The provision of technical assistance to member states on request, and the general promotion throughout the world of the importance of heritage conservation.

The objective of the Convention, therefore, is to identify, protect, and preserve and interpret for all peoples those cultural and natural sites throughout the world considered to be of outstanding universal value in accordance with criteria established by the World Heritage Committee.

Nahanni National Park Preserve, with Virginia Falls, canyon systems, karst landforms and cave systems, mountain areas and hot springs, contains outstanding examples of the major stages of the earth's evolutionary history and of significant on-going geological processes and includes superlative natural phenomenon and formations and features of exceptional natural beauty. For these reasons it was identified as a priority for designation as Canada's first World Heritage Site.

Due to this worldwide recognition of the uniqueness and value of Nahanni National Park Preserve, the highest possible level of protection should be afforded. Failure to do so would reflect poorly on Canada's image as a world leader in the support of heritage conservation, and dilute the objectives of the World Heritage Convention.

Thank you.

MR. J. YOUNG: John Young, Counsel. I'd again, Mr. Chairman, take the liberty of drawing the Board's attention to the submission which was filed by the Department of Fisheries and Oceans really of itself.

I don't really propose to read this. Suffice it to say that it confirms its support and participation in the joint submission of the Department of the Environment and Department of Fisheries and Oceans. It alludes to Fisheries and Oceans' responsibilities ...

MR. B. CASE: Mr. Young, you should read it to get it into the record.

MR. J. YOUNG: You would prefer that it be read?

MR. B. CASE: Yes.

MR. J. YOUNG: The Department of Fisheries and Oceans participated with the Department of the Environment in the review of the environmental evaluation of Cadillac Explorations Limited Prairie Creek Mine.

The Department of Fisheries and Oceans has the responsibility, under the aegis of the Fisheries Act, to ensure protection of Canada's fisheries resources. And this responsibility includes the protection of fish and fish habitat.

The Department's concerns, generally, are covered in the DOE submission to the Water Board, which is in fact referring to the joint submission. However, Cadillac Explorations Limited is proposing to chlorinate its sewage effluent prior to discharge to Prairie Creek, and Fisheries and Oceans Western Region, in keeping with its responsibilities under the Fisheries Act, is making this submission to the Water Board to emphasize its opposition to the practice of sewage chlorination.

The reasons for this position are:

1. Discharges of chlorinated effluents have been shown to result in fish kills which occasionally have been massive, to reduce the abundance of fish downstream of the discharge, and three, to block the migrations of fishes.

2. Laboratory studies have shown that chlorination significantly increases the acute lethal toxicity and sublethal toxicity of wastewaters to fish and to other aquatic organisms. Demonstrated sublethal effects include reduced reproduction and growth of fish and aquatic invertebrates, and avoidance reactions by fish.

3. Chlorine and chloramines reduce primary productivity by depressing photosynthesis, respiration and the uptake of nitrate and ammonia.

4. Chlorination results in the formation of chlorinated hydrocarbons which have direct lethal and sublethal effects on fish and may accumulate in fish flesh rendering it unsuitable for human consumption.

In addition, the Department would like to bring to the attention of the Board the public health consequences of chlorination. As mentioned above, this results in the formation of chlorinated hydrocarbons to which the public will be exposed. And evidence has shown that some of these are toxic to humans, carcinogenic, teratogenic and mutagenic. Also, studies suggest a link between drinking chlorinated water and the incidence of certain cancers in man. It's suggested that the Water Board consult with the Department of National Health and Welfare in the matter of public health effects of chlorinating sewage.

And attached to the submission is a selected bibliography.

MR. B. CASE: Anything else, gentlemen?

MR. D. SUTHERLAND: That's all we have.

MR. B. CASE: Okay. Thank you.

MR. G. CARTER: Can I ask a couple of questions of these gentlemen?

MR. B. CASE: Yes, Mr. Carter would like to ask a couple of questions.

MR. G. CARTER: One of you, it doesn't matter which, what is your objection to an increase in the measurable, a measurable increase in the pollutants let's say, that are going down the river if, in fact, these pollutants do not threaten insect, human, animal or other uses of the water? In other words, if there's no threat to anything that's using the water, why do you object to a measurable increase.

MR. D. SUTHERLAND: I just might respond to that. I think the principal reason is that it's a question of risk, the DOE water quality guidelines give levels which, based on toxicity testing, laboratory testing, of a fairly limited nature in many cases, are designed to protect aquatic life. But the problem is in trying to apply something like a guideline that is designed on laboratory testing perhaps for water systems with characteristics that may differ considerably from Prairie Creek water. The problem is that using that guideline does not provide as good a safeguard as attempting to ensure that there is no significant increase over background water quality levels.

MR. G. CARTER: But you measure significant by the ability to measure, period. Not significant in terms of any threat to health, or perceived threat to health, but just significant in terms of the ability to measure. That seems to be your understanding.

MR. D. SUTHERLAND: That's correct, yes.

MR. J. YOUNG: I think, Mr. Chairman, one could perhaps add something to this and that is that one of the great qualities, or characteristics, of Nahanni Park is really the fact that it is one of the last natural

great rivers. We use the word "pristine" quality. It's relatively speaking a virgin river, and this of course is one of the principal characteristics of the Park. There might be other Park situations in which the concern for water pollution would not be quite as serious.

MR. B. CASE: Perhaps we could leave any further questioning until after all the briefs have been submitted. The next organization I have on my list for presentation of a brief, and there was no particular order, or reason in setting this order, but the next one we have is the Dene Nation and Metis Association of the NWT.

MR. J. BAYLY: Mr. Chairman, the Dene Nation and Metis Association have a submission which I will read into the record. It was filed with the Water Board on the 15th of February, 1982 so that the record may show that.

The Dene Nation and Metis Association are both societies incorporated under the Societies' Ordinance of the Northwest Territories, and they wish to intervene in the Hearing of the application of Cadillac Explorations Limited for a licence for water use and disposal at Prairie Creek in the Northwest Territories in conjunction with a proposed mine in which the pre-production development is presently underway.

Number two, the Dene Nation and Metis Association submit that Cadillac Explorations Limited has applied for a licence for only a part of their water use and disposal. The company has informed the Water Controller that it intends to seek permission to upgrade its road, build an airstrip and construct bridges over Prairie Creek to enable it to develop other areas of its mineral property. All of

these intended works have the potential to affect water quality and should be the subject of the water licence application for the entire project. They are not part of the application. It is therefore further submitted that the Water Board consider, as Parks Canada recommended in the brief that was originally submitted and seems to have been said in similar terms in the combined brief that we just heard, that future development potential of the proposed Prairie Creek Project in relation to the present water use and waste disposal application by Cadillac Explorations Limited be considered in combination with the proposals for future development potential.

If the Board considers that Cadillac Explorations Limited has not provided sufficient or any information upon which it can make a licencing decision on the revised and expanded project, it is submitted by the Dene Nation and Metis Association that the Water Board make the applicant aware of the deficiencies and adjourn the Hearing to a date when the information can be placed before the Board in the context of the Public Hearing process.

Number four, it is submitted that the Governor-in-Council may under Section 26 of the Northern Inland Waters Act make regulations pursuant to subsection (b) on the recommendation of the Minister and the Water Board to provide for priorities among the classes of use of water within a management area. It is further submitted that the Water Board and the Minister should make recommendations regarding those priorities prior to its issuing a licence to Cadillac Explorations Limited. The uses of the water of the Mackenzie River Basin, particularly those of the people of Dene descent who have used and occupied



the Mackenzie River and its tributaries since the earliest times, must be protected and must be given the priorities required to protect their domestic and other uses of water before those waters can be licenced for use by the applicant and others associated with this and related and unrelated industrial undertakings.

Five, it is further submitted that since a water management area has been established under the Northern Inland Waters regulations, citation given, as water management area number three, it is respectfully submitted that the Northwest Territories Water Board should conduct a Hearing pursuant to, that should be Section 15 (1), I believe, relating to its objects within the water management area. Section 9 of the Northern Inland Waters Act provides that among its other objects the Northwest Territories Water Board is to provide for the conservation of the water resources of the Northwest Territories in a manner that will provide the optimum benefit therefrom for all Canadians and the residents of the Northwest Territories in particular. Since water use priorities have not been established, and since there is an increasing number of water licence applications, and since there are proposed projects which will necessitate water licence applications, it is the responsibility of the Northwest Territories Water Board to review the potential uses within this water management area so that the combined uses of water within water management area number three will not impair water quality in such a way that the people of Canada, and in particular the people of Dene descent in the Northwest Territories, cannot use and enjoy the optimum benefits of these waters.

Item six, the Dene Nation and Metis Association wish to reserve the right of individual residents of the Dene communities within the region to make individual submissions, express individual or community concerns, and to ask questions of the applicant and of the Board.

Item seven, the Dene Nation and Metis Association are particularly concerned with the potential of the project to pollute waters within a watershed depended upon by many of the people of Dene descent.

Item number eight, the Dene Nation and Metis Association, through its Counsel, will make submissions and direct questions to the applicant regarding the environmental, social and economic impact that its use and disposal of waters may have in the region.

Item number nine, the Dene Nation and Metis Association further submit that because of the water and land use potential of this project and because of proximity of this mine to the Nahanni National Park and the settlement of the people of Nahanni Butte, the Water Board refrain from considering the granting of a water use licence to Cadillac Explorations Limited until it has recommended to the Minister of Indian and Northern Affairs that he refer the entire project to the Federal Environmental Review Office and until the Board has confirmed to it, has confirmed to it by the Minister whether or not he's prepared to make this referral.

Mr. Chairman, as I said at an earlier time, a number of these points have been made in previous Hearings to this Board in association with applications for water use and disposal within water

management area number three, the Mackenzie River Drainage Basin, and I expect that I'll continue to make this type of submission on behalf of the Dene Nation and Metis Association because the concern of these people continues. In my submission, the difficulties for the Board in assessing individual applications without setting water use priorities and without determining a water management plan for a watershed is that while it may find water uses by themselves acceptable, that is the levels of contaminants that are disposed of in waters and the quantities of water withdrawn for various purposes, and these may appear to be satisfactory when seen individually that when taken together the Board may suddenly find that it has licenced the water use in a watershed to such an extent that in fact the overall water quality is not acceptable, that it is not providing for the best use, conservation and development of the waters for the people of the Northwest Territories in particular, and the people of Canada in general, and it may be too late for you or anybody else to do anything about it. And you have probably read, as I have, and I'm sure others have, in the press that although the resources we're immediately concerned with running short of are hydrocarbons, but the real crunch may be that we're going to run short of fresh water and that we've always thought of this as a renewable resource and are rapidly discovering that it is not renewable in the sense we'd thought of when people of my generation were going to school. I realize that, as one of the representatives from Cadillac Mines said in the spring, people in Southern Canada and the United States have moved off the land and into the cities and accepted new ways of life, the irony is that it's in the populated areas of the continent that

those shortages are already being felt and are going to continue to be felt. So this is a precious resource that this Board is dealing with, and I've said this before, and it's of interest to me that as a person who goes to Hearings professionally that we go to Hearings with very wide scopes and mandates to look at projects in which the applications and proponents undertake not to put anything in the water, and the Board must come to grips with the fact that what it does in its process is often to licence the putting of certain things into water, and that's often what is really requested in applications, that it is that permission that is sought, not permission to leave the waters the way they are, but to put in what must be determined to be acceptable or unacceptable amounts of various new things.

The Board has come to this at the very end of a process in that the mine is partly developed and, as Mr. Morrisroe has pointed out, the company has spent a lot of money. Ironically the Board provides, through its statutory procedures, one of the very few windows into an industrial development that the public has access to and can make presentations at. That's not the Board's fault, that's not the public's fault, that's not Cadillac Mines' fault. But that's the way it is. And so many of the concerns that are raised are ones which Mr. Morrisroe and I might very well wish had been raised in 1966, or prior to that. The fact is we deal with them now because this is the opportunity we have.

Those are my submissions. I've strayed from the written brief but only to refer back to things that were said at an earlier

Hearing in my presentation on the 20th of May, 1981, to make sure that those things would be included in the record.

Thank you.

MR. B. CASE: Thank you, Mr. Bayly. Is there a representative of the National and Provincial Parks Association present? We had indications that there wouldn't be a brief.

MR. J. BAYLY: Mr. Chairman, I was contacted by them and they had asked if the presentation they'd sent by telex could be read in, perhaps by a member of the Board or someone because they weren't going to be able to be here. I gather they'd sent it from Southern Canada.

MR. B. CASE: Thank you, Mr. Bayly. Mrs. MacQuarrie has a copy and she'll read it into the record.

MS. J. MACQUARRIE: This is dated February 16, 1982.

The following is a submission to the February 23rd, 1982 Hearing of the Northwest Territories Water Board regarding the application of Cadillac Explorations Limited for a water use and waste disposal licence on Prairie Creek. We hereby request that this submission be read aloud during the course of that Hearing.

The National and Provincial Parks Association of Canada, established in 1963, concerns itself with the promotion of the wise use, protection and establishment of Parks and other areas reserved for protection and for recreation.

We have been very concerned about the potential for environmental degradation of Nahanni National Park as a result of current and proposed mining activities in the Nahanni watershed. Although it may not be the main issue in the application Hearing today, the potential

for incremental damage to the ecosystem must be kept in mind. We would like to make the following comments and recommendations.

1. Water quality.

Our foremost and most basic concern is in the assuring that zero changes in water quality occur in Nahanni National Park. All of our comments below are made with this consideration in mind. We strongly urge that the water licence reflect this basic commitment. Particular attention must be made to provisions in the licence that reflect low flow conditions and flood conditions.

2. Abandonment.

It is unacceptable that the Federal Government or the Government of the Northwest Territories be faced with the possibility of cleaning up this site some years in the future. The licence must contain strict conditions with regards to responsibility for the site after the resource is exhausted, and to how the site is rehabilitated. We must not be faced with the possibility of mine wastes, of other substances, entering the ecosystem twenty or fifty years from now.

3. Accidental Spills.

With respect to past performance on this project in this regard, we must view the commitment of this company to detect, contain and clean up spills with some concern. Accordingly, we recommend that the contingency plans for accidental spills be clearly and exhaustively outlined in this licence, if it is approved, and the responsibility for spills or contamination of the environment be squarely on the company.

4. Extent of plans.

Although the company is applying for an eight year licence, there are at least 25 years of reserves at this site, as well as other exploitable sites in the region. Does the company expect to work only part of the mine's potential? What are its plans beyond five years? This and many other questions prompt us to support the request of the Dene Nation that no water licence be approved until the company presents the full extent of their plans and that this licence application be considered with these considerations in mind. We are confident that a more appropriate decision can be rendered if this is done.

5. Water management area.

In the interests of intelligent long term planning and management of the Nahanni watershed, we support the recommendation of Parks Canada that an intergovernmental group be established to monitor a comprehensive water quality control network in the entire watershed. Further, we support the recommendation that the Water Board propose the South Nahanni watershed as a water management area, and that Nahanni National Park be recognized as a priority user under the Inland Waters Act.

6. Federal environmental assessment.

Although we have been making comments and recommendations with respect to a water use licence, it seems quite clear that there is a potential for significant environmental effects as a result of this project. We have outlined our concerns in this regard in our June 8th, 1981 brief, and have requested a referral to FEARO several

times in correspondence with the Ministers of Environment and Indian and Northern Affairs. Accordingly, we are urging the Northwest Territories Water Board to exercise their responsibility under the directive of the Cabinet Committee on Science, Culture and Information of December 18th, 1973, which states that "Proprietary Crown Corporations and Regulatory Agencies should be invited to participate in the Federal Environmental Assessment and Review Process", paragraph 2. We have been encouraged to think that the Water Board may refer a project directly to FEARO, or may do so through the Minister of Indian and Northern Affairs if they prefer. In either case, we recommend that the Water Board adjourn this Hearing immediately so that they may pursue this course of action.

We emphasize again, as we have done before and will continue to do, no measure is too conservative or cautious, and no effort is too great to make to ensure that our National Parks remain inviolate, and are preserved for future generations to appreciate and revere. Nahanni must not receive the results of too precipitous decision making.

The National and Provincial Parks Association of Canada appreciates the opportunity to present our concerns and recommendations, and regret that financial restrictions prevent our attendance in person. Our Association and other members across the country await with interest the proceedings of this Board.

Respectfully submitted, Janet Grand, National Program  
Director, National and Provincial Parks Association of Canada.

Do you want to know who the copies went to?



MR. B. CASE: I don't think that's necessary Mrs. MacQuarrie. Thank you kindly.

MS. J. MACQUARRIE: Mr. Chairman, there's an attachment, a letter to the Honourable John Munro from Janet Grand. Did you want that read into the record?

MR. B. CASE: I think you should read that in. It's part of their brief.

MS. J. MACQUARRIE: This letter is dated February 17th, 1982. Dear Mr. Munro. The National and Provincial Parks Association of Canada has been communicating with you for a year now regarding the plans of Cadillac Explorations Limited near the borders of Nahanni National Park.

The Northwest Territories Water Board is reviewing the application for a licence on February 23rd. They will have a tough decision to make. It will be clear to them, when they consider the case, that there is a good deal more work planned in the future than is actually being applied for at this point. It will also be clear that there is considerable concern on the national level about potential damage to the ecosystem of Nahanni National Park. We are sure that you don't wish this to happen.

We are asking you, Mr. Munro, to assure the Northwest Territories Water Board that they do in fact have the authority, and the ... I don't know what, there seems to be a typographical error here, oh I see, okay.

We are asking you, Mr. Munro, to assure the Northwest Territories Water Board that they do in fact have the authority, and the option, to refer the project to the Federal Environment and Assessment Process should they feel the need, under the directive

of the Cabinet Committee on Science, Culture and Information of December 18th, 1973. We are sure that you would wish to show your support of the process in this way, and ensure that too-hasty decisions that may have drastic effects on a National Park are not made.

Thank you for your consideration and we look forward to receiving your answer to our request.

Sincerely, Janet Grand, National Program Director.

MR. B. CASE: Thank you, Mrs. MacQuarrie. The next brief that I have on my list is from the Water Resources Division, Department of Indian and Northern Affairs.

MR. D. STENDAHL: This brief presents the submission of the Water Resources Division, Northern Affairs Program, DIAND on the licencing for water use and waste disposal of Cadillac Explorations proposed mine development on Prairie Creek. The paper is limited to the specific issues regarding the present application and does not discuss the management of development in the Nahanni River Basin. This has been dealt with by other agencies adequately at this Public Hearing. Water Resources has established its position following participation in the evaluation of all water related aspects of this project.

During the Initial Environmental Evaluation, Water Resources supported the intergovernmental review committee in its decision that the Cadillac project did not pose a significant environmental threat and therefore could be referred to the normal regulatory process rather than undergo a Federal Environmental Assessment and Review. Following Cadillac's application to the Northwest Territories Water Board for water licencing on August 5th, 1980, the staff of the

Division has studied the issues and concerns regarding this project on a day to day basis. We have actively participated at all six Technical Advisory Committee meetings and at the two previous Water Board Hearings. Water Resources has inspected the mine site on eight occasions in the past year. Similarly personnel from Lands Division of Northern Affairs and our District Office at Fort Simpson have routinely visited the mine site and carried out office and on-site assessments.

We acknowledge that concerns exist regarding Cadillac's mining activities on Prairie Creek. Many questions have, in fact, been raised by the staff of the Northern Affairs Program. We do not question the potential sensitivity of the Nahanni National Park and Prairie Creek, or the need to maintain these beautiful wilderness areas. We believe that all possible management controls should be taken to protect Nahanni National Park. Since our Division of Northern Affairs would ultimately be responsible for administering and enforcing a water licence issued by the Northwest Territories Water Board to Cadillac under the Northern Inland Waters Act, it is in our best interest to ensure that a practical and enforceable licence is issued and that all possible precautions are taken to protect Prairie Creek and the waters of Nahanni National Park.

Many of our concerns have been resolved through in-house discussions with the company and its consultants, and through participation at Technical Advisory Committee meetings. Presently we have reached the stage in our assessment that we believe a licence can be issued to Cadillac with terms and conditions that, if met, will

ensure the protection of Nahanni National Park and Prairie Creek. I will now summarize some aspects of the project which enable us to express this optimism. And these deal largely with what Norm Guild has already summarized earlier today, Ker, Priestman.

Under water use, the source of water for the mine project will be the Prairie Creek groundwater aquifer and thus water will not be taken directly from Prairie Creek.

Testing is planned by the consultants to show adequacy of this aquifer and to establish any connection it may have with Prairie Creek.

Water consumption per ton of ore processed for this mine will be the lowest on record in the NWT.

80% of water used in ore processing circuits will be recycled.

Further actions to reduce make-up water demands and the volume of effluent discharged to Prairie Creek are being examined by the consultants and this is a day-to-day consultation back and forth between our Division and the people representing Cadillac.

Regarding waste disposal, concerning the tailings storage, the tailings will be totally contained in an impoundment made impermeable using clay and a synthetic liner.

At least 1 meter of freeboard will be maintained in the impoundment at all times.

The dyke bordering Prairie Creek will be rip-rapped with armour rock to a level 1 meter above the maximum probable flood evaluation. Piezometers will also be installed in the tailings pond dyke to monitor for possible seepage.

Waste rock. The waste rock is largely composed of dolomite, an innocuous material which contributes to the buffering capacity of the waters in this area and assists in protection of the fisheries in the receiving water body.

Erosion and runoff diversion. Runoff diversion ditches are planned to minimize surface runoff influx into the mine area.

Settling ponds have been constructed to reduce sediment loading into Prairie Creek.

Wire baskets filled with large rocks will be installed along Harrison Creek to stabilize the channel.

A rip-rapped dyke has been constructed along Prairie Creek for flood protection.

Regarding the sewage treatment system, an enclosed system using extended aeration and ultra-violet sterilization has been installed. As earlier expressed there have been some problems regarding this system and I will discuss that later in the submission.

Under minewater, minewater is presently being treated with lime at a sump inside the mine portal to control its heavy metal content.

Once the tailings pond is complete in early April, I believe that's the correct date, the minewater will be stored in this impoundment until the industrial effluent treatment system is operational.

Industrial effluent quality requirements. Discussions are on-going with Cadillac's consultants to establish suitable effluent quality requirements for the mine.

The latest proposal by Cadillac, submitted on January 20th, 1982, represented a significant improvement from their original

position, and it appears to me to demonstrate their good intent to protect Prairie Creek.

However, we believe that their submission is not acceptable. It needs some improvement and that more discussions are needed to establish a suitable effluent quality requirements for a licence.

Spill contingency plan. Cadillac is presently re-drafting the plan to include site specific details.

The final plan is expected for review and approval in early March.

Cadillac has expressed willingness to demonstrate capability of implementing the plan in 1982 that should be, there's a typo there.

Dealing with Cadillac's commitment and cooperation, Cadillac's staff and contractors have been cooperative during our site inspections.

They have always been open to suggestions on ways of minimizing environmental impact at the site and have not hesitated to answer our questions regarding their plans for the operation.

Further, Cadillac has contracted consultants to undertake studies to establish the baseline characteristics of Prairie Creek and the importance and sensitivity of its resources.

An on-site Environmental Technician will be employed by Cadillac for the life of the project to ensure adherence to the environmental requirements for the project.

A water laboratory will be constructed on site by Cadillac to enable monitoring of their effluent treatment systems and to ensure compliance with effluent quality requirements.

From this, Water Resources makes the following conclusions.

The progress made to date is most worthy of optimism. Cadillac has demonstrated they are committed to maintaining high engineering and environmental standards for their operation. We believe, however, there are several issues that must be addressed before the Water Board should endeavor to issue a licence to Cadillac.

The first concern is regarding the sewage treatment system. Sampling and testing at the sewage treatment plant has shown it is not operating effectively. We recognize that the extended aeration system has been recently installed and may require aging and some site specific fine tuning, however, we are not convinced that even once it is working to specification that the suspended solid levels will not prohibit effective UV sterilization of the waste. As indicated in Cadillac's submission today, the suspended solids levels required for the final sewage effluent is 55 milligrams per liter. With this level of suspended solids in the final effluent, we believe that ultra-violet radiation will not effectively, will not be effective in sterilizing the waste. We recommend, therefore, that the sewage treatment system be modified to meet the proposed effluent requirement for coliform bacteria, and that is in a draft licence which has been developed by the Technical Advisory Committee for the Water Board. It's 10,000, less than 10,000 maintained. Pre-treatment to remove the interfering suspended solids prior to ultra-violet sterilization, or chlorination followed by dechlorination with hydrogen peroxide, or activated carbon, or other treatment, are two options that could be considered to get the system operating effectively.

The second concern is regarding abandonment and restoration.

We suggest that a plan be requested from Cadillac addressing the progressive abandonment and restoration of the site considering such concerns as the long term ability of the tailings pond dykes to resist scouring action of Prairie Creek, the long term acid generation potential of the sulfide tailings once recirculation of alkaline mill solutions ceases, and the revegetation of impacted areas to stabilize these zones and prevent long term erosion problems. In association with this, practices such as cementing of diamond drill holes should be initiated in the mine to reduce minewater flow. Minewater may present long term abandonment difficulties if not addressed early in the project.

The third deals with spill contingency planning.

There have been two fuel spills and one PCB spill in the past year at the Cadillac site on Prairie Creek. One fuel spill resulted from a leak in an old fuel storage tank that produced an estimated spill of 24,000 gallons of diesel fuel. Of the quantity spilled, an estimated 150 gallons entered Prairie Creek and the remainder was cleaned up. A Water Resources Officer from our Division was on-site shortly after the spill to oversee the clean-up operation.

The other fuel spill incident occurred on the winter road about five miles from Tetcela River and involved 500 to 700 gallons of diesel fuel. Prompt action by Cadillac Mines to pump off the remaining fuel in the overturned tanker prevented a serious spill.

The last spill was a leak of PCBs from an electrical capacitor. One gallon of PCB-containing material soaked into the ground. The contaminated soil and the capacitor were placed in metal drums



and sealed for removal from the site. Disposal is presently being coordinated through Environmental Protection Service, Yellowknife and no further PCB-containing material is allowed on site.

Although these spills did not cause significant environmental damage, they certainly demonstrated the need for an effective Contingency Plan at the site, and capability of implementing it.

Cadillac's Spill Contingency Plan is presently being revised and is expected to be ready in early March. We urge the Board to carefully examine, through its Technical Advisory Committee, the adequacy of the Contingency Plan. The main objective of this plan must be to prevent any oil, or other hazardous or toxic material, from getting into Prairie Creek. It should deal with actions planned in the event of seepage from tailings, from the tailings pond, spills on the winter road, or fuel tank leaks or overfill. The field exercise requested by the Board should adequately assess the capability of Cadillac to implement the Contingency Plan.

Regarding effluent quality requirements, Water Resources has prepared a table, which is attached, of suggested effluent quality requirements for Cadillac minesite and Prairie Creek which, if met, should not alter background concentrations by greater than two fold. To achieve this, Cadillac must meet the suggested effluent concentrations and maintain at least a dilution of 25 parts Prairie Creek water to one part effluent. We believe these effluent concentrations can be achieved using available technology. We also believe that the dilution is available in Prairie Creek and the storage capacity in the tailings pond. The suggested effluent levels

are very stringent, much more stringent than the guidelines set by the Government of Canada, listed in the table. Following dilution of the effluent in Prairie Creek, the concentrations will still be below those considered safe to protect aquatic life. As a further 50% dilution of the effluent would occur between the minesite and Nahanni National Park, Nahanni Park boundary due to dilution from local runoff, and since dilution ratios available in Prairie Creek are often greater than 25 to one, it is anticipated that the suggested effluent levels would not cause detectable change in water quality in Nahanni National Park.

To conclude, we recognize that there are some outstanding issues regarding this project, such as modification of the sewage treatment system which has just been installed, review and approval of the Contingency Plan, and the establishment of a suitable set of effluent quality requirements. However, once these issues are resolved, we feel confident that a suitable licence can be issued to Cadillac with terms and conditions that, if met, would protect Nahanni National Park and Prairie Creek.

I don't know if you wish to discuss the table at this time, but I can go through it if you'd like.

MR. B. CASE: Well, has the applicant got a copy of your brief?

MR. D. STENDAHL: Yes, I would imagine.

MR. B. CASE: Has the Dene Nation got a copy?

MR. J. BAYLY: Yes, sir, we received one today. It certainly wasn't filed ... the 15th of February, but it was available today.

MR. B. CASE: You do have a copy, Mr. Bayly. Tables are very difficult to talk, Mr. Stendahl, but if you wish to, go ahead.

MR. D. STENDAHL: Okay. I'd just like to point out a few things on the table. Starting from the left side, the first two columns deal with the effluent requirements that would be put into a licence, or the ones that were proposed for the licence, and they deal with maximum average concentration, which has been spoken about before, and the maximum concentration in a grab sample.

The next column indicates the present background concentrations of these parameters in Prairie Creek. The next column deals with predicted concentrations in Prairie Creek, maintaining this 25 to one dilution during discharge of this effluent into Prairie Creek. Now these levels have been derived by a calculation of taking the maximum average concentration plus 25 times the background concentration and dividing that by 26, which would be your division factor. And as you see there is, as I indicated, there's no greater than a two-fold increase in background concentrations using these effluent requirements.

For comparative purposes I've included the present Government of Canada guidelines which is the last column, the Metal Mining Liquid Effluent Regulations and Guidelines, and for those parameters where it's applicable, and as well, the water quality objectives by DOE, 1981, which provide the levels considered safe to protect aquatic life. And as you can see the levels, the predicted levels in Prairie Creek, even with the effluent discharge and maintaining this 25 to one dilution, are lower than most of those values considered safe to protect aquatic life, and for those that it's not lower, I have indicated with denoting 'c', which indicates that because of the high hardness, alkalinity

and pH of Prairie Creek water, which modify toxicity in the receiving water body that higher concentrations of these metals could probably be safe as well to aquatic life.

And that's all I have to say right now.

MR. B. CASE: Thank you, Mr. Stendahl.

MR. J. BAYLY: I just wondered if I could ask Mr. Stendahl a question just before he sits down.

MR. B. CASE: Just one, Mr. Bayly?

MR. J. BAYLY: Just one.

MR. B. CASE: Okay.

MR. J. BAYLY: Mr. Stendahl, in your brief you referred to 150 gallons of diesel fuel being lost into Prairie Creek.

MR. D. STENDAHL: Yes, that's my understanding.

MR. J. BAYLY: Yes. I'm referring to an Inspection Report, which I believe was done by Mr. Dalton of your Water Resources Division.

MR. D. STENDAHL: Yes, that was where I, well what I did was, where my estimate for 150 gallons comes from is a direct telex which was sent, follow-up from our Department, on that spill which you're speaking about. It mentioned 150 gallons in it, and it's a direct quote from that. I don't know, I'm not familiar with all the material on the spill, but I do have the telexes we sent to all government departments regarding that spill, and that's what it said. I can give you a copy of that, I have it with me in my briefcase.

MR. J. BAYLY: If I could just get to my question ...

MR. D. STENDAHL: Sure.

MR. J. BAYLY: ... which was that Mr. Dalton, on the second page of his report which was filed on the Water Register on the 16th of June, 1981,

report for the period between June 5th and 9th, 1981, calculated the amount of fuel oil that was in the tank, drawn down, used by the company, and at the end of the second paragraph on that page he stated that there were approximately 16,000 Imperial gallons of diesel still unaccounted for. And I just wondered if your office was able to account for where the 16,000 Imperial gallons, less 150 that you estimate went into the Creek, where it went.

MR. D. STENDAHL: I have never, as I say, I am not familiar with all the material on that spill, there's been wads of information and I didn't have time to go through it all. If you want me to look into that, I can get back to you. As I say, that was my understanding of the situation.

MR. J. BAYLY: Thank you, Mr. Stendahl.

MR. B. CASE: Would you do that, Mr. Stendahl?

MR. D. STENDAHL: Yes, for sure.

MR. B. CASE: And would you advise the Board and Cadillac of your conclusions.

MR. D. STENDAHL: Okay.

MR. L. MORRISROE: I think I should help you at this time. We recovered the difference from our pits and so forth.

MR. D. STENDAHL: I'll do that, Mr. Chairman.

MR. B. CASE: The last formal brief that I have listed here is from the Department of Renewable Resources, Government of the Northwest Territories.

MR. M. LABINE: Good evening, Mr. Chairman. My name is Michel Labine. I'm going to be presenting this brief on behalf of Renewable Resources.

This submission is made on behalf of the Department of Renewable Resources, Government of the NWT, with respect to the application of Cadillac Explorations Limited, to the Northwest Territories Water Board for a licence for water use and waste disposals on Prairie Creek.

The Department of Renewable Resources wishes to identify for the Board's consideration a number of as yet unresolved issues and make several recommendations for the actions by the Board prior to the decision on the requested water licence.

The Department of Renewable Resources mandate. The Department of Renewable Resources represents the G.N.W.T. on the Technical Advisory Committee to the Water Board. We are further involved in the screening of environmental review of proposed development projects through the Regional Environmental Review Committee and through the Land Use Advisory Committee. The Department of Renewable Resources has represented G.N.W.T. in review of Land Use, Land Lease, and Water Use and licence requests made by Cadillac Explorations. We have also been involved in the review of a draft Socio-economic Action Plan between G.N.W.T. and Cadillac Explorations.

The Department of Renewable Resources' responsibilities and concerns results from several Territorial Ordinances including the Environmental Protection Ordinance, the Petroleum Products Storage Ordinance and the Wildlife Ordinance. The Department of Renewable Resources wishes to draw the Water Board's attention to several licences and non-licence issues which we believe require action prior to the granting of a water licence.

Licence related issues. Waste disposal.

The sewage disposal system on site has performed poorly and DIAND Inspection Reports question several aspects of the design. The Board should insist that the design and operation are reviewed, particularly the disinfection system.

Other domestic waste must either be incinerated daily or buried completely to prevent the attraction of nuisance wildlife species such as grizzly bears.

Contingency planning.

Spills of PCBs on the site and spills of fuel oil both on-site and on the winter road have proven the need for contingency planning to address environmental agencies. The Board must insist that adequate formal plans exist and that the equipment on-site is adequate to do the job. Equally important is the training of on-site personnel in the procedures for emergency situations and in the handling of equipment.

Restoration and clean-up.

Although presently projected mine life is indicated to be slightly greater than six years, significant other reserves exist at the site. Any plans for restoration of the site must be progressive. As soon as an area can be cleaned up, revegetated, and restored, this should be done. If the mine life is extended beyond six years, this feature of the restoration plan will be important to reduce contamination of Prairie Creek with silt and other debris. The restoration plan should be prepared before production is begun, approved by the Board, and updated yearly.

Non-licence issues. Mine expansion plans.

The proponent applied in late 1981 for permission to build two bridges and an access road down the east side of Prairie Creek, and 25 miles of permanent road from the mine site to an alternate airstrip location which would be capable of accommodating much larger aircraft than those presently accessing the site. Our understanding is that these applications have been withdrawn.

The proponent must assure the Board that these plans have indeed been cancelled before a licence can be drafted. These works would definitely affect the management of both water resources and wildlife resources associated with the project.

Both water licencing and the leasing of the project must be comprehensive of the proponent's plans. To that end, a tentative timetable for further development at the site should be requested so that careful consideration of possible impacts, and mitigations of these effects, can be planned.

Wildlife studies.

The land use permit, under which present development at the site and construction of the access road was completed, were issued despite strong opposition by the N.W.T. Wildlife Service.

Wildlife studies associated with the preliminary I.E.E. were inadequate and, as a result, Cadillac Explorations agreed to initiate a three year study in the vicinity of the minesite and the winter access road.

Detailed studies were initiated in late 1980. To date, only one year's data has been compiled in report form. The following points are relevant.



Significant numbers of Dall's sheep inhabit many upland sites around the mine during the lambing period in June. Data collected to date suggests that lambing occurs in the vicinity of the minesite.

The mineral lick below Adit 3 is actually utilized by Dall's sheep.

Significant numbers of woodland caribou inhabit the areas around the mine and winter road. Data collected to date suggests that caribou calve in the area.

The wildlife studies undertaken by Cadillac Explorations are just beginning to quantify potential impacts of the development on populations, which in some case, example caribou and moose, may be shared with Nahanni Park. Any further developments, such as alternate airstrips, permanent access road, etc., are premature because we are still unable to either estimate the potential significance of impact on wildlife, or to design realistic mitigation programs to reduce impacts on wildlife populations.

The Department of Renewable Resources which acts to ensure that terrestrial considerations such as wildlife are comprehensively considered by the Land Use Advisory Committee and Regional Environmental Review Committee of DIAND when leasing documents are produced. As we've noted above, the water licence must be comprehensive of all present plans by the proponent. While the Water Board's attention is primarily focussed on water related issues, we respectfully submit that the project's effects on related land-based resources must not be ignored.

### Regional planning.

The means whereby water and land related issues can be integrated is through a regional land use planning exercise. The Nahanni watershed is of international significance owing to the presence of Nahanni National Park. However, it is also a watershed under pressure due to both existing and planned mining developments.

The Minister of Indian Affairs and Northern Development has announced a land use planning policy and has released a discussion paper on the process of planning North of the 60th.

It is essential that the NWT Water Board bring the Nahanni watershed concerns to the Minister's attention through recommendations for early actions in land use planning efforts addressed at this area. The planning efforts must include inputs by Native organizations and local residents early in the process of drafting terms of reference. To avoid further conflicts during mining explorations and development on the Nahanni watershed, regional residents must have a hand in shaping the planning framework.

### Summary and recommendations.

Careful review of the design and operation of waste disposal facilities for both sewage and domestic wastes must be required of the proponent and the enforcing agency.

Contingency planning must be reviewed. Readiness of equipment and personnel on-site to respond to environmental emergencies must be tested. Minimum standards must be identified and enforced.

Restoration plans should be submitted prior to production start-up. The activity should be undertaken progressively and yearly updates provided.

The proponents must speak to the comprehensiveness of the site development plans upon which this licence and land use lease being developed. No further major expansions should be permitted until the information base, such as for wildlife, is adequate to evaluate and, if possible, to mitigate potential impacts.

The Board should recommend that the Regional Planning exercise be undertaken as soon as possible on the Nahanni watershed. This effort should involve regional residents to the maximum extent possible.

Thank you very much, Mr. Chairman.

MR. B. CASE: Thank you, Mr. Labine. I'd now like to call about a five minute recess and after the recess we'll ask any private citizens, who wish to present a brief or make a statement, to come forward, and following those statements we'll have a last opportunity to ask questions of the applicant or of any of the intervenors, and finally we will give the applicant a chance to make a closing statement, or summation, whatever they wish to do.

So we'll just take a five minute break.

MR. B. CASE: Well, ladies and gentlemen, I think we can get going. As I indicated before the recess the time has come for the private citizens to make a brief or a statement, whatever they want to say. We'll

get on to the questions later. I've got quite a list here. I think, is Chief Jim Antoine in? Would you care to lead off, Jim?

CHIEF J. ANTOINE: Okay, first of all I'd like to, since I'm a Chief for my people here in this area, I'd like to welcome the Water Board once again to Simpson, and to Mr. Morrisroe and his crew. And first of all, I've read the application, oh excuse me, this is Charlie Cholo, he's one of our Elders, he grew up around Nahanni area; he's trapped and grew up along the South Nahanni up the Prairie Creek area, he knows it very well.

Anyways, I read the application of Cadillac Mines and when I first ever talked to Mr. Morrisroe at the Sub-Arctic Inn a few years ago, when he first talked to us about Cadillac Mines, he had another set of consultants at that time, and one of the first question I asked him was what kind of chemicals they will be using in the process of their mine. And at that time they told me that there was going to be no non-toxic chemicals will be used.

And the first time that I found out that sodium cyanide is going to be used was one day before the first Water Board Hearing, and it was brought to our attention by our lawyer at that time, and since that time I was very concerned because reading the application and listening to their presentation and listening to the different government agencies that have concerns about the mine, my main concern right now is the dumping of mine wastewater into Prairie Creek. They are planning to dump this 'effluent' they call it, industrial effluent into the Creek.

And I've talked to members of the Band, as many people as I talked to in the last few weeks, and especially the last few days,

and after finding out what the proposal's all about, it brought a lot of concern to our people. And the concern is also expressed by people from Nahanni Butte, as well as people from Wrigley. And talking to different people from the different communities down the Mackenzie, it's also a major concern that these different wastes, chemicals will be dumped into Prairie Creek.

And the main concern is that in the springtime and sometimes in the fall these different species of fish go spawning, and I've seen the fish do that in this country here where in the springtime, around June, May/June, the fish all go up into the creeks when the water is high and spawn. And after they do that they come back into the main river systems, and our people use gill nets to fish and take the fish for food.

And it's caused me a lot of concern because right away when I hear that they're going to dump industrial effluent into the river I think of pollution.

And it seems to me the solution that Cadillac is proposing here is, their answer to pollution is to dilute it. But I'd like to suggest that, you know, if you don't put anything in the water you're not going to pollute it.

And also my other concern about the water is that there's a lot of Dall's sheep in that country, and a lot of moose and caribou that come down to the rivers to drink water. Birds, beaver, everything, have to drink water, and especially in that area the sheep there go down in the summer time to drink water down in the flats there. And if they are downriver of the dumping I'm sure that they're going to

get contaminated. And that goes for the rest of the other animals.

And the other point I'd like to make is the tailings pond again. They're planning to build this huge structure but there's always a chance of seepage. They've never tried it out and the seepage that this, how are they going to regulate it, I don't know. And that tailings pond they come into the problem of floods, and it was covered by the different people here and I was listening, and I'm concerned about the flash flood.

According to what my Elders have been telling us and my experience with the mountains is that in periods the spring, as well as different times during the summer when it rains for two, three days, the water level in these mountains really rise really quick. And in 1960 there was a flood at Cadillac Mine site, when these drums and the whole area was flooded. And who's there to say that it's not going to happen again. You know maybe, especially this winter here, we have a lot of snow, as you could see outside, and the snow is thick all the way through to Liard, and all over this area there's a lot of snow. And when that happens, in the spring-time there's a lot of water.

And if there's a flood, what happens if the tailings pond is, like when the flood water goes over the top and it washes all the different solids that are on the bottom down the river it's really going to pollute this whole river system.

So I'm very concerned about that. And I've always said, right from the very beginning, I questioned Cadillac on what type of chemicals they'll be going to be using, and how they're going to use

it, and only very recently that we've begun to realize that they're going to be dumping a diluted form of this pollution into the river. But as far as we're concerned it's still pollution. And that's going to affect our way of life.

So that is my main concern about the river and the water. And when the man from Beak Associates was talking about doing all these studies on the fish and looking at the pictures on a map, it seems to me that there should have been more tests done for fish downstream of the Cadillac minesite. It seems to me there was quite a few tests above it and on the other winter road site but all the way down to South Nahanni there should have been tests and continuous tests of what's going on, what kind of fish are living in that area.

And electric shocking, to test it in a fast moving stream, I don't think it's very effective. It's like taking a shot with your 30/30 in the bush and following it and see if you shoot any moose, and from there you deduct how many moose is in that area. It seems to me that's the way it's going, that's the way they deduct it, their analyzation there.

But that's about all I have on Cadillac. And the other part that I was concerned about is the area of policing of the environmental part of this thing here, and I think it has to do with Andrew Cullen and his associates there. And I was talking to a former member of the Water Board, Lou Menez, about two weeks ago and from what I gather it seems that the policing of environmental problems with regards to mining is not very strict. And that especially in this area if a licence were to be issued that I expect to see some

really strong policing of it because if a situation were to be created such as the fuel being dumped and such as a PCB being dumped there, and I understand PCB is cancer causing liquid, and it don't break up in water, and I don't know if any of that got into the Prairie Creek. Anyway some of that PCB was spilled and it got in Prairie Creek the cancer causing agents will not break up and it goes all the way down the river.

You know, these sort of things there, a lot of our people don't really understand that. It's got to be explained to them what's going on here. But we don't know these things until its, after it happened. And that the Dene people along the valley here, we're really concerned with our land, and that's including the water. And we have a lot of respect for the water.

Unfortunately the Mackenzie's getting polluted and so is the Liard, and there's big changes in our waters. I hope they don't change any more.

Another thing is that the other Provinces, in B.C. and Alberta, want to dam up our rivers. So if B.C. dam up the Liard, and the Liard is functioning at less, 40% of the water's taken out of Liard, then there again if you're dumping pollutants into the rivers it's going to take that much longer to dilute.

So I guess my main concern here is, my main point here, my main point is that we don't want no pollutants to be dumped into the river, whatsoever. If you got pollutants don't dump it in the river system.

That's all I have for now, and the reason I asked Charlie to come up here is maybe say a few words about himself and his experience with that Prairie Creek.



MR. C. CHOLO: I know if they start pouring that stuff over, it's going to run into Prairie Creek and it's going to spoil a lot of things. It's not very nice to be doing that. Why are they going to do that? There's a lot of fish, and moose, caribous and things, sheep too, that come down to the Creek and drink water. If they're going to do that, that's going to hurt all them animals. Why don't they dig in the ground, make holes for the garbage and sewer and things like that and then put their sewer and stuff in there and then cover it up with dirt when they're finished.

MR. J. ANTOINE: Okay, that's all we have. There might be other people that speak, but that's basically our position right now.

Thank you.

MR. B. CASE: Thank you, Chief. Thank you, Charlie. I believe we have some people here from Nahanni Butte who have travelled to this Hearing. I think they've waited long enough to be heard. Is there somebody from Nahanni Butte who would like to speak?

MR. G. BETSAKA: Mr. Chairman, I'm representative of Nahanni Butte, and I'm Sub-Chief. I wish to question you.

MR. B. CASE: Sit down and give us your name please, and just tell us what you want.

MR. G. BETSAKA: My name is George Betsaka, and I represent Nahanni Butte, and I'm Sub-Chief there. There are some questions that I'd like to ask you, and is Earl Dolan around here? Is Earl Dolan around here?

MR. L. MORRISROE: No, he's not here.

MR. G. BETSAKA: He's lucky. About this tail pond over here, Mr. Chairman, how careful are you?

MR. B. CASE: I'm not sure what you mean, George?

MR. G. BETSAKA: Well, you know with that oil spill, you guys aren't careful of Cadillac Mine itself. I know for a fact because I was there and what some people over here, on this group over here, they were saying that it was reported after two days, and that is bullshit. Because I was there 30 days and it was reported, 30 days before that. So how do you expect in two days to get rid of 24,000 gallons. And that is bullshit, Mr. Chairman.

Mr. Chairman, if I have to go to jail for it.

MR. B. CASE: We accept what you say, George. We hear you.

MR. G. BETSAKA: I would go to jail for it, but what I heard over here isn't true. I was in Cadillac Mine, I was fuel man. Okay, but still, you know, it isn't what is carried out how careful you are, it's not what you carry out right now. You know that tail pond or dyke, I helped to build that up. Okay. Now there's no God damned way that you can tell me that how careful you guys are. That is bullshit, because that tank was leaking a month before it was reported. Now if I have to go to court for it, you know, I would testify for it.

MR. B. CASE: Are there any other concerns that you have, George, about the whole operation at Prairie Creek or about the future?

MR. G. BETSAKA: Well, what I'm saying right now is how protective are you on that dyke there. You were telling people that, you know, that chemical you guys use and it's not going to go through that dyke. But how do you know?

MR. B. CASE: Well I'm not, George, this Board is not part of Cadillac.

We are here to hear what everybody has to say, Cadillac, yourself, and all the government agencies. We have nothing to do with Cadillac. Our responsibility is to, if we see fit, to issue a licence to Cadillac to operate their property up there and use water and dispose of waste. And what we're here to ...

MR. G. BETSAKA: Yes but look, Mr. Chairman, can you hear me out first?

MR. B. CASE: Yes.

MR. G. BETSAKA: Does Cadillac have enough power to carry out what it says?

MR. B. CASE: I guess we have to make a judgement on that, George, whether we think that they are capable of constructing the plant and the tailings dyke and operating the mine in a safe manner, as far as the water is concerned. And it's a judgement that this Board will have to make.

MR. G. BETSAKA: Mr. Chairman, could I ask you a question?

MR. B. CASE: Sure.

MR. G. BETSAKA: How thick is the clay on the inside of that dyke?

MR. B. CASE: According to the Cadillac people, it's approximately 13 feet thick, the width of a buggy.

MR. G. BETSAKA: Mr. Chairman, could I ask you another question? I guess you wouldn't know how thick it is down there?

MR. B. CASE: Not personally, no.

MR. G. BETSAKA: Mr. Chairman, I would like to have a definite answer. Well if I don't because whatever happens, you know, if we had leakage or something like that fuel spill, you know who it's going to affect? That's Nahanni people, and you know I don't like to have that bullshit. So as far as I'm concerned, I can't take your word for it. And you up there, there isn't one God damned corner that I would say that I'd

trust you people. There isn't one God damned corner. And you know why? It's because I know what happened with that fuel leakage. And that's the only reason why I asked if Earl Dolan was present over here, and he isn't. Because after we find out that fuel is leaking, nobody report it. Nobody give a shit, and there is white guys, Mr. Chairman, there is white guys in there. So you can't tell me that there's going to be definite proof that it's going to be no leakage in there.

MR. B. CASE: I can't tell you that. As I said, George, that's a judgement that this Board will have to make as to whether they think the tailings dam and the other facilities that are put up are safe and I can't give you an answer at this time as to what our decision will be. But I can tell you that this Board is just as concerned as you are that the waters of Prairie Creek, and the Nahanni River, and the Liard River, are not polluted. That's why this Board was appointed, to do everything in their power to ensure that pollution of the waters does not occur.

MR. G. BETSAKA: Mr. Chairman, I'll ask you one more question before I go here. Who is going to look after all the dumping out of the mine over there? After you guys get through with the main mine there.

MR. B. CASE: You mean who will be responsible after Cadillac is all finished?

MR. G. BETSAKA: Yes.

MR. B. CASE: The general policy is that all the waste that they have put on the surface has to be stabilized in a permanent manner so that it will never get into the waters. And that is another matter

that this Board has to discuss and decide upon.

MR. G. BETSAKA: Mr. Chairman, over here. You know, we might take your word right now but still, you know, there's no definite word is there because I was there at the time that fuel dispatched over there, and nobody said nothing. You know, what if there's leakage over there out of that tail pond?

MR. B. CASE: Well there are Inspectors who work for Mr. Cullen and who visit mining properties on a regular basis and examine all the workings to ensure that the operation is according to the conditions in the water licence. So that is one method of policing the operation, inspecting it.

MR. G. BETSAKA: Mr. Chairman, you don't get my point yet.

MR. D. GAMBLE: Mr. Chairman, could I just interrupt that. Since this was raised by the Sub-Chief from Nahanni, I wondered, I had raised earlier two Inspectors Reports which tend to be somewhat similar to the views that you're expressing, particularly the one related to the oil spill. And I had asked, I'd given them to the people from Cadillac and asked them if they would look at them. I wonder, Mr. Guild, if you've had a chance to do that and if you could tell the Board and the people here if you were personally aware of these reports before today.

MR. N. GUILD: Norman Guild. I really haven't had a chance to look through those reports yet in the time that's been available.

MR. D. GAMBLE: Well could you tell me if you were aware of them before today?

MR. N. GUILD: I personally had not seen those reports before.

MR. D. GAMBLE: So that you didn't have these, or the knowledge of them, when this submission was written and the assurances that were provided in it were written.

MR. N. GUILD: That is correct, I did not have copies of those reports at the time we were preparing the submission.

MR. D. GAMBLE: Well after you've had a chance to review them, I would personally, and I think it would help the people from Nahanni, if you could respond to them and advise us if this changes your views in any way.

MR. N. GUILD: We will be reviewing that matter with Cadillac and Cadillac will be responding to those reports.

MR. G. BETSAKA: Mr. Chairman, it would affect my people before it affect Mackenzie Delta? That's why I'm concerned of. And I mean, you know, you guys are the ones who is getting rich, not us. But, you know, I'd just like to know whether, if you people consider other people instead of getting rich. I mean this is damned bullshit, you know.

MR. B. CASE: George, this Board ...

MR. G. BETSAKA: Look, I may use profane language but to me for what you guys are using my land is profane to me. And you know that's what I take as. I might say that, I might use profane language, swear words, but to me you guys are using my land to make dollars. And look what I pay. You know, and don't ever say that I'm using abusing public because I'm not abusing public. You people are; you know it's just something that I like to express myself sure, you're God damned right. Just like I said you're God damned right, you know. And you people are using the same profane language as mine describing it. You know there's no damned way that you could say it that I'm wrong.

MR. B. CASE: Well I want to assure you, George, that this Board which has the responsibility of either issuing a licence or not issuing a

licence to Cadillac, has the very strong concerns for protection of the water. The same kind of concerns that you have, and we will do our very utmost to ensure that Cadillac operates that mine in a safe manner and that your water will not be contaminated.

MR. G. BETSAKA: You know, I really don't know. I really don't know if I could take your word for worth because that's what we're told one time. And Cadillac got their rights so they're start operating. But that oil spill, you know, right there, you know, just right there it got to a point where Indian can't trust white guys. I know there's all kinds of white guys right here, and if you think I'm scared of them, you're crazy. And if you think I trust one of you to get a dollar out of you, you're crazy. Because we're told that it's going to be clean mine. What happened? You give me an answer to that. How clean are you. I've been in that mine and out of that mine, I work in that mine. I'm not saying that I know the answer to every God damned \$150 words, but I know for a fact that Cadillac Mine is not carrying out what they're supposed to. And here we are just for, you know, just to say that Cadillac Mine should get water rights. That is bullshit. Now we're from all over the place, but does it ever occur to you guys that Cadillac Mine, there's only one Creek and that's Prairie Creek. And it runs into Nahanni Butte. Doesn't it ever occur to you people that there are people just like you, they breathe just like you, you and I. What ever garbage you throw in there, it's going to damage those people, right?

MR. B. CASE: George, the Board has heard your concerns about the operation. Your concerns have been put on tape so it will be in the public

record, and I can assure you that if a licence is granted that the Cadillac operation will be inspected, I mentioned Andy Cullen's Water Inspectors will inspect them regularly. In addition to that the Environmental Protection Service have inspectors, Fisheries have inspectors, so that there will be a lot of people keeping watch on Cadillac. That's assuming that they get their licence and go into operation. And we want to thank you for coming from Nahanni to tell us your concerns, and they're not lost on us.

MR. G. BETSAKA: Mr. Chairman, what I'd like to say right now is were you in Cadillac Mine, you I mean.

MR. B. CASE: Yes, I've been there.

MR. G. BETSAKA: See that dyke?

MR. B. CASE: Yes.

MR. G. BETSAKA: Did you drill through that at the bottom of that dyke and see that there's 30, what is it?

MR. B. CASE: I said there was 13 feet of clay on the inside. That's what the design is.

MR. G. BETSAKA: Mr. Chairman, I'd like to ask you a question over here. What's going in there?

MR. B. CASE: What's going inside the tailings pond?

MR. G. BETSAKA: Yes.

MR. B. CASE: The waste rock from the mill, from the mine, and the water that they use in the mine and in the mill.

MR. G. BETSAKA: Well, that liquid, would it affect human life if it was ever got contact with human life?

MR. B. CASE: I can't answer that, George, because I don't know the answer to that, but as you've probably heard today, there are small



amounts of chemicals that are used in the mining process that are in that water. I don't think it would be good for you.

MR. G. BETSAKA: Well let's put it this way, Mr. Chairman. How much chemicals are you guys going to use into that tailing pond?

MR. B. CASE: Well I'm not going to use any, but ...

MR. G. BETSAKA: Well whoever uses it.

MR. B. CASE: Cadillac.

MR. G. BETSAKA: You speak for Cadillac anyways.

MR. B. CASE: No, I don't. No, I speak for the Water Board. I have nothing to do with ...

MR. G. BETSAKA: Well, whoever you're speaking for, let's have some answers.

MR. B. CASE: Well I can't give you, I don't know how much chemicals go into the tailings pond, George.

MR. G. BETSAKA: Well, Mr. Chairman, could you tell your audience over here that what kind of liquid you guys are going to use?

MR. B. CASE: Well that has been described by the people from Cadillac, and I can't answer you as to the different types of chemicals that are used. But that information can be supplied to you.

MR. G. BETSAKA: And also, Mr. Chairman, whatever deposit from the mine, is it supposed to be a liquid?

MR. B. CASE: No, it's ground up rock and water, with small amounts of chemicals in it.

MR. G. BETSAKA: So what you call that?

MR. B. CASE: We call that tailings.

MR. G. BETSAKA: Is it supposed to be liquid?

MR. B. CASE: Well, it's like soup when it goes into the pond and then the water comes to the top.

MR. G. BETSAKA: So you don't call soup liquid?

MR. B. CASE: Yes.

MR. G. BETSAKA Thanks.

MR. B. CASE: Okay, George, thank you for coming.

MR. L. COMIN: I'm a representative of Nahanni Butte also.

MR. B. CASE: Very good.

MR. L. COMIN: Sirs, my name ...

MR. B. CASE: Could, I just wanted you to identify yourself.

MR. L. COMIN: My name is Louis Comin. I'd just like to make a brief statement saying that the Board should not consider issuing a licence to Cadillac at this time, to use water or to dispose of any waste. Most of our departments, agencies, associations, are opposed to this project, or have serious reservations about it, as I also do. These are our public consciences in these matters. A lot of them are technical and most of them I can't understand, except they're not environmentally sound. I don't see how you can consider issuing Cadillac a licence at this time.

When all our technical advisors stand up and say yes, this is an environmentally sound project. It's going to be good for the people of Canada and the people of the Northwest Territories. There will be no adverse environmental affects now or in the future. Then let's consider issuing Cadillac a licence.

Thank you.

MR. B. CASE: Thank you very much, Louis.

Have we got anybody else who wants to make a ... there we have somebody to present a brief.

MR. A. MOSES: My name is Albert Moses, I'm the Chief from Fort Wrigley. Mr. Chairman, I would like to get introduced to the personnel from Cadillac, I think I sort of came in late this morning.

MR. B. CASE: Mr. Hamilton, could you introduce your people.

MR. G. HAMILTON: Mr. Chairman, on my left is Mr. Morrisroe, the Chairman of the Board and Chief Executive Officer of Cadillac Explorations. On my right is Mr. Norman Guild, who is a consulting engineer engaged by Cadillac from Ker, Priestman and Associates, and Norm is responsible for hydrology, waste disposal, and the environmental aspects of our program. Next to Mr. Guild is Mr. Ron Eames, who's employed by Cadillac Explorations and is responsible for the development of our training policies, our hiring policies, and our relationships with our employees on-the-job, with the communities surrounding our operation. The next table is Mr. Murray Bath of Kilborn Engineering; Kilborn Engineering have been engaged in the engineering and the design of the mine and the plant. Next to Mr. Bath is Mr. Brian Fletcher of Golder Associates, who have been responsible for the geo-technical aspects of our project and the design of our tailings impoundment area. And the final gentleman on the right of Mr. Fletcher is Mr. Wayne Dwernychuk, who represents Beak Consultants Limited, who are responsible for the wildlife, the aquatics and the vegetation studies connected with our application.

MR. A. MOSES: Thank you. I got a question for the Chairman here. Mr. Chairman, I was listening to the brief on the sewage that was dumped into Prairie Creek. I believe what they said was 6,000 gallons per day. Were you aware of this? The Water Board, were they aware of this.

MR. B. CASE: These things are not reported to the Water Board. They're reported to the Water Resources people in Yellowknife. And perhaps I could ask Mr. Cullen to field your question.

MR. A. CULLEN: Were we aware of the 6,000 gallons a day? Yes, we were aware of it and we addressed it in our Inspection Report, and we told them we gave them four weeks to get the thing in proper working order. This is a new plant that was installed.

MR. A. MOSES: I guess with something like this they pretty well have to go to the Water Board doesn't it? Because they are tampering the water, any inland waters or any rivers. Don't they have to go for an application, some sort of thing like this?

MR. B. CASE: The applications for a licence come to the Water Board. Once the licence is issued, or an authorization to use water is issued, then the Water Resources people are, they're the policemen, and they enforce it. Really, after the licence is issued, the Water Board is finished its work.

MR. A. MOSES: This wastes they're dumping in, is it just from the mine wastes, or what?

MR. A. CULLEN: The waste that's into this treatment system is the domestic wastes from the camp only.

MR. A. MOSES: What were they doing with it before they started doing this? How were they disposing it?

MR. A. CULLEN: As most camps in the NWT do on a short term basis, they were disposed of in sumps only, which is basically a seepage.

MR. A. MOSES: Like the mine waste, did they have to have a sump for it too? Mine wastes. What did they do with the mine wastes?

MR. A. CULLEN: Yes, they were required to have a sump and we requested that in July of this year.

MR. A. MOSES: How about the years that they've been operating there, what have they been doing with the mine waste?

MR. A. CULLEN: Well basically there's no mine waste, you're talking, I believe, minewater.

MR. A. MOSES: Water, and chemical stuff they use in there, what do they do with it?

MR. A. CULLEN: Previous to their development proposal, there was no authorization or nothing to address the situation. If there was any mine-water previous to that it was natural and there was nothing to cover it.

MR. A. MOSES: Okay, but this tailings pond, I guess I wanted a couple of answers on this. How would the volume of wastes that goes into the tailing pond be controlled?

MR. B. CASE: Could I get one of the Cadillac people to address that.

MR. N. GUILD: Just so I understand your question, the volume of waste that goes into the tailings pond is delivered to the tailings pond via pipeline, and as the mill produces the concentrate there is the waste rock formed. As it's formed a certain proportion will go back into the mine, where it came from, to be used as backfill in the mine and the remaining portion will go to a sump in the mill where it will be pumped from there to the tailings impoundment.

MR. A. MOSES: Okay, what would happen in a case like if it did ever get overflow? Like if it's going to be pumped in there, somebody's got to be constantly controlling it or else ...

MR. N. GUILD: The volume that's available in that tailings impoundment, there's about one million cubic yards and if you pump tailings in for a period of one year, you still wouldn't fill up the tailings impoundment. So there's flexibility within that. It's not as if the level in the pond is going to rise overnight and overspill the embankment. It's something you monitor throughout the whole period of the year.

MR. A. MOSES: What happens if there's a flood or anything like that in the valley? Would that affect the tailings pond?

MR. N. GUILD: The tailings embankment, we've taken into consideration floods in the valley in the design of the embankment. The crest of the embankment is 14 feet above the maximum level that we could conceive of a flood coming down the Prairie Creek valley. In fact it's 17 feet because we have rip-rap protection on the outside of the embankment to protect the embankment, and it extends three feet above the level of the flood that we've calculated. And then there's 14 feet from the top of that protection to the top of the embankment.

MR. A. MOSES: I was just talking to some people, some old people that I talked to said in the mountains some years they get really bad floods. And you guys did a lot of studies on how the water levels every year?

MR. N. GUILD: Yes, we used all the information that was available. One point I could address, that was mentioned by Chief Antoine, about the flood in 1960, flooding the area of the minesite. That was before any dykes were actually in place, and we did an estimate on what we thought the flow was at that time, from historical information that was available from Cadillac, and the quantity that we estimated at

that time was 8,500 cubic feet per second, that was the flow of water down the Creek. Now if you remember that figure, 8,500, our design for that tailings impoundment is for 38,000. So that's a factor of 4 in excess of that. So we believe that the embankment is protected against any floods that can come down the Nahanni, sorry, the Prairie Creek.

MR. A. MOSES: Okay, this stuff right here, like it says quantity and quality there on mill water and required stuff like that discharge. How well would it be treated?

MR. N. GUILD: The water which will come from the tailings pond will pass through a treatment plant. An outline of it is shown on the drawing on the wall, and the quality that the effluent will be treated to, when introduced into Prairie Creek will have no detrimental effects on the aquatic life in Prairie Creek, or should it affect any wild-life that drink from the waters.

MR. A. MOSES: Okay, like that spill you had last summer there, I guess the only people that knew about it right at the moment was just people from Environment and you, Cadillac I guess. Is that correct? Nobody knew about it til ...

MR. N. GUILD: I was aware of it and, however I was not aware of all the details that were in these spill reports that were handed to me.

MR. A. MOSES: Yes. Did Wayne there, as about the fish and stuff like that, after that oil spill, did he do any tests or anything?

MR. N. GUILD: No, there's been no additional aquatic studies done since that date.

MR. A. MOSES: Yes, because where I come from a lot of people, mostly they are hunting in the summertime and trap in the wintertime, mostly all

year they hunt. And in the summertime there was quite a bit of people that told me there was all kind of fish floating around. So how would this, was that the cause of it or was ...

MR. N. GUILD: I can't say that it wasn't the cause, but I would doubt that it was.

MR. A. MOSES: About how much was spilled anyways, total of fuel.

MR. N. GUILD: My understanding, in total, there was 24,000 gallons spilled of which ultimately 150 gallons was never recovered. The balance was either recovered by pumping or deposited within the tailings impoundment. But the time of the spill, I know that the waters were high in the Creek. So I would think that that amount of 150 gallons, with the flows that were in the Creek, I would doubt that there would have been any fish killed by it. But I can't confirm that.

MR. A. MOSES: You said only 150 gallons wasn't recovered, over 24,000 gallons you said was leaked out. It was out of that 150 that you recovered, was the rest in the dyke or something? Is that how you recover it, in the dyke?

MR. N. GUILD: I believe that approximately 12,000 gallons were recovered by pumping, and the balance, some portions of it were burned and the balance then was saturated within the soil in the spill area and that soil was excavated and used on the inside of the tailings impoundment dyke. That's on the inside of the clay liner.

MR. A. MOSES: If anything like that occurs again, how well is Cadillac equipped to clean it up?

MR. N. GUILD: Since that spill, obviously the people on site are better prepared than they were prior to that spill. Since that time, and



within the very near future, we are preparing with Cadillac a complex Spill Contingency Plan and that is due for submission early March, which will outline spill procedures for collection of oil, in detail, not in general, and in that is also a list of equipment that should be on site to deal with spills when they happen. Over and above, this is, booms, for example, over and above actual construction equipment, which is actually on site, and there are pumps on site. So this is in preparation and within, as I say, the next few weeks this document will be presented to the Water Board.

MR. A. MOSES: How long has the mine been in operation? How long have they been mining now?

MR. N. GUILD: I believe the mine has been there since, correct me if I'm wrong Laurence, about 1962/63.

MR. L. MORRISROE: No, about 66/67.

MR. N. GUILD: 1966/67.

MR. A. MOSES: Okay, since 1967 there, how were they doing this mill water and stuff like that? Like it says right here, quality and stuff like that. There's going to be a discharge into the Prairie Creek, right. What were they doing since 67?

MR. L. MORRISROE: Well maybe I could help you out. We're still not milling. We're doing some mining see, but we're not doing any milling yet. We've done all the construction, and we're getting a mill constructed, and we won't be milling for the next two or three months. And we're not allowed to mill, we can't mill, until we receive a water licence. So the mining is one phase, and the milling is another.

MR. A. MOSES: Well what's the purpose of the tailing pond then, if you're not milling now.

MR. L. MORRISROE: Well, we're preparing the tailing pond for when we start milling.

MR. A. MOSES: Thing doesn't make much sense, what you said. Like what you said, they're not allowed to mill, so what's the use having a tailings pond there?

MR. G. HAMILTON: Gerry Hamilton of Cadillac. I think that, to answer your question, in order to obtain a water licence the regulations are such that certain structures have to be built in a manner that is satisfactory to the Technical Advisory Committee to the Water Board, and these installations have to be in place and have to be acceptable to that Technical Committee before the Water Board will consider issuing a licence to Cadillac. Therefore, Cadillac has to go to the expenditure of constructing all the infrastructure including the tailings pond prior to having their licence considered by the Water Board.

MR. A. MOSES: Okay, like this discharge and stuff, like after you start milling this stuff into the Creek, how would it affect the environment along the Mackenzie anyways, eventually it's going to go down the valley. Like Prairie Creek runs into South Nahanni, right, and it runs into Liard and Mackenzie. Like cyanide and stuff you're using, you're going to be using, as I heard, how are you going to dilute it? Is there any way you could dilute it?

MR. G. HAMILTON: The reagents that are used in the mill process, in order to recover the minerals from the rock that we introduce into the mill, are partly disposed of in acquiring the, in the concentrate. The balance of it ends up in what we call the tailings. The portion of

those tailings, as Mr. Guild has told you, will be put back into the mine again to replace the rock that's been taken out. The balance of it goes behind the tailings pond. Some of that material decomposes on exposure over a period of time. The effluent, or the water that's in the tailings, which contains these reagents in a solution, are aged in the pond. Then they are taken from there into a water treatment plant. And the water treatment plant is designed to extract from the tailings the reagents that could contaminate the water course, and the technology that is used is the best technology and the most practical technology, and the best technology that's available today. And it's the intention of Cadillac, through the assistance of our consultants, to design that treatment plant to such a point that we can introduce the outflow from the treatment plant or the treated water that comes out of that plant will be of the highest quality that technology will let us produce at this point in time. There's always new technology being developed, and we will be following the development of new technology and I'm sure the government agencies, with whom we are associated, with whom we work, will also be following it and as time goes by these plants are continually updated to meet the new technology as it's developed.

MR. A. MOSES:           Okay, I've got another thing too. Like the chemicals that they're using in there, what happens, what would happen if it ever did get into Prairie Creek before it's treated?

MR. G. HAMILTON:       The plant is designed in such a way that it's practically impossible for that material to get in ...

MR. A. MOSES:           ... like before it's treated.

MR. G. HAMILTON: Before it is treated. The effluent that comes out of the mill is contained in behind the tailings dyke, and that dyke is designed, as the consultants have explained today, to meet the requirements to ensure that we have the maximum protection possible to avoid any spillage, or any leakage through that dam.

MR. A. MOSES: I guess that doesn't answer my question yet. I said, what if cyanide got in the rocks, you know stuff that's accidentally it went into Prairie Creek. Like before it's treated, like sort of a leak or something and perhaps right into the Prairie Creek.

MR. G. HAMILTON: I think, if I understand your question right, that if, as you say, using the example of cyanide. Steps are being taken by Cadillac to store all our chemicals in a safe manner, and in a manner that is acceptable, again, to the Technical Advisory Committee and we will, it's certainly our intention to do everything that we can that is practically possible to ensure that such an occurrence doesn't happen. We don't want to see it any more than anybody else does. As a matter of fact, and as is stated in our brief, that we are presently studying alternate methods of recovering the mineral from the ores at Prairie Creek in reducing the use, or eliminating perhaps the use of some of the reagents that could be considered toxic where they'd enter the water course.

MR. A. MOSES: I guess that was my main concern, but there was another thing that I was concerned about. Like eventually whatever wastes that's going into Prairie Creek will involve people along the valley. I guess this will go up, this will be for the Chairman here. Why wasn't the communities further north of Simpson invited to this Water Board Hearing? Because eventually, if there ever is a spill, contamination and

anything, people that live down the valley would be affected too, so that's all the questions I have.

MR. B. CASE: With respect to your question about invitation, the notices for this meeting, and the prior, this Hearing and the prior Hearings were published in all the newspapers in the North well in advance, and individual notices were sent out. I can't say that they were sent to Wrigley, but maybe Mrs. MacQuarrie can.

MR. A. MOSES: Yes, I got a copy of it, but there's another thing too. I didn't know whether I should come up because I phoned Viola Henry to phone her up and she said it was out of her jurisdiction. What was the real ...

MS. J. MACQUARRIE: Mr. Chairman, it's been customary for the Board to send a special notice to the communities that are directly affected by the project. And I don't know if Mr. Redshaw would like to comment on why the people from Wrigley did not have their transportation paid by the Department to attend this Hearing.

MR. A. MOSES: Mr. Chairman, another thing too. I think it's sort of disappointed about this whole thing I told you, like you've heard now from Cadillac and Water Board, like if there's anything like that cyanide and stuff used in the Creek like that it will go down the Mackenzie Valley. I would like to be involved too. It's not only me that's going to be complaining, a lot of people I talked to are complaining, sort of disappointed about this. So that's all my concerns, and thanks a lot.

MR. B. CASE: Thank you very much.

MR. M. CANADIEN: Mr. Chairman, my name's Mike Canadien. And so far as I am sitting through this Hearing, I have not yet heard any definite answer

to definite questions. The only answers I've heard so far are presumably, supposedly steps are being taken, and so forth. There's no definite answer as to what you are trying to do within the valley. We want definite answers, not presumptions, not presumably, not steps are being taken. We want to know what kind of steps are being taken, how they are being taken. Facts, not presumptions. Okay? All I hear through this whole Hearing is presumptions, not facts. We presume to do this; we assume things will be done this way; things are supposed to be done that way; that's all we've been hearing. We want facts, not presumptions. Thank you.

MR. B. CASE: Thank you, Mike. I'd like to call a recess for just about five minutes, maybe we'll grab a cup of coffee.

MR. B. CASE: Okay, ladies and gentlemen. Maybe we can reconvene and carry on. We're now open for either statements or questions, whatever you wish. And if you could identify yourself please, and shoot away.

MS. B. MENICOCHÉ: My name is Betty Menicoche. I wasn't prepared when you called me, and I don't know if I have statements or questions but it's a conglomeration of all. So I am just going to sort of ramble on because it's really not formal.

I listened to the part of the Cadillac presentation, but to me it was a little too technical and there's too short a time to

educate the Native or long-term residents. And the way I sort of see it is that the net benefits won't, well there'll be no net benefits for the long-term residents. And to me, as a long-term resident of the North, like I come from a history and generation of people that have lived here 30 to 35 thousand years, and were called (Native language presentation) which means they are people of the river, of the big river. And as the mother of two children I hope that this history will be, you know, twice as long or longer.

So the kind of things that Cadillac has presented to you has a direct affect on me and my future generations, because I've done land use research maps with the Dene Nation, in 72/73, and in reference to that it's too bad we don't have copies of it, but in doing land use maps we interviewed all the traditional land users and waterway. And a lot of the major use of the land was, well the major uses were all the lakes and the rivers and the tributaries. So I'd like to sort of make reference to that because that was our highways and we maintained a livelihood. And we've had to contend with a number of, a lot of development and that sort being bombarded to us, you know, in different directions.

A couple of months ago it was B.C. Hydro and their dams. A couple of years ago, you know, at the same time as this Cadillac Hearing, it's the Norman Wells Pipeline and now this is the Cadillac Mine water licence Hearing, and the Hire North construction, the highway construction, pointing them out and all that sort of thing. So it's a lot of things that we've had to contend with at the same time having to deal with our socio-economic situations in this area.

And to me, that's almost forcing us into a poverty culture, because as it is now in Simpson my peers, and maybe older or younger, we're all either employed by private funding from government, or as grants, or else we've all been through the education system and all this training programs that the Territorial Government has had for 13 years, or maybe five years, and there's reference to it in here someplace about more training for our people.

We set up Hire North because they were going to train our people for construction. And then the Norman Wells Pipeline talks about training, and to me, I was thinking, you know, it's our choice. We've got to decide, you know, what training that we want to get into.

And the other reference that I sort of want to make too is this land use, water use application to me it's really significant because in our history and in our culture, our people were sort of given a mandate to look after our river and our land, and one of the things is that we are really careful with the kind of things that we put in our water. And all of a sudden I find out there's a Water Board, and what happened to our mandate. Like in every story there's your story, my story, and their story. So you know, it's just like we're being left out.

And the other things that I am sort of concerned about is that there's a lot of socio-economic problems right now. Like you say about the net benefits and it shows about 42 people that have been employed from here in Cadillac Mines. Well I'll tell you where that money is going, because I have friends and peers that go work there. They come back, they drink up all their money, and then they



drink up their money in three to five days. In a week's time, after they drink that up, they all live with their brothers and their sisters, and usually it's with the women that have had to contend with making ends meet. So the women get burdened with looking after these men that are supposedly making a living and all this money is just going right down the drain. And that's one of the things that I'm concerned about that even now it's affecting us. Like they spend their money and then they don't even send any money to their family or parents.

And that's part of our Dene culture that we support and help one another, and you know, as I was thinking about this more, and then I thought well Cadillac Mine has come here, or Explorations, and they haven't even put a profile, an organizational file, you know who are they? Why? And so, you know, that sort of brings that to my mind.

And so the other thing that happens is that a lot of the people that aren't into the wage economy with the Territorial Government or on the little granting systems that we sort of have to depend on, or that aren't being trained to death, make a living off the land, like they go set a line for ... and that's their mainstay, that's what they survive and make their living, you know, go day to day. Maybe they don't eat, you know, three meals a day like you and I do.

So you know, those things that Betsaka brought up, you know, to me that wasn't funny. It's real. It's there. It exists. And to me this thing is sort of like a farce because it's too premature. You're just forcing things down on us and we're not prepared.

And like with the Park, in reference to the Park, the people made presentations and saying that, well UNESCO made certain arrangements

or whatever, but there are sacred sites to our people there in Nahanni National Park that I haven't yet heard anybody mention, or make reference to.

So the other thing that I'm sort of concerned about is that, you know, it's not only us Dene that it's going to affect, it's going to affect, any kind of development like Cadillac, it's going to affect the whole Northern, you know, Northern people. Because what guarantee is there really for me, or for my partner down the street that is white and has a business. If somebody from down South that has an "in" with the mines or development comes in and sets himself up. You know, there's no guarantee for him either. So what's happening is that because a lot of these development are coming in it's creating a lot of conflict amongst the people that have lived here in harmony for quite a few years.

And just since this development, like the white and the Native are really starting to fight, and the other question I had in my mind, like I can see the magnitude of the mandate of the licensing Board because, you know, you've got a heck of a responsibility. You know, the licence that you're going to issue is determining the future of my life, of my kids lives.

And it brings me to mind about the time that we okayed the Liard Highway. And at that time George Erasmus had made reference that we are opening the whole area of Mackenzie-Liard to development. And I can see it clearly now, and I feel really guilty for being part of that decision. And at that time on the condition that we allowed that Liard Highway to be constructed was that we have a Liard Planning

Authority which, if it was in place, would pretty well do the same thing as the licencing Board or your policemen over there.

And the other thing that I had in mind was the mining history in North America. You know it hasn't worked in Central America that, you know, they were trying to force the native people into that environment and it killed them off, so they finally had to bring people from Africa. So, you know, why pretend it's going to work up here. We're the most uncivilized people, according to what do they call it, industrial revolution, right now in the world.

So in relation to that I had some questions to the, to Cadillac about, the questions that I had they made reference to the cross-cultural programs that they're going to implement. The Territorial Government has been here 12, 13 years. They haven't even done that, let alone this community.

And the other thing that, you know, there's no references to the grade level. The education system has been noted to be geared for failure. It's understimulating our people. So what chance is, you know, the Native people going to get specialized jobs with licencing Board, I mean with Cadillac Exploration. We don't have a chance.

And then the other question that I have, like you keep saying well how are you going to store your garbage, you know, all this pollutants. You know, why not truck it back down South where you brought it in from in the first place. Take it along with the ore that you want to take.

So to me that, you know, finding that these pollutants are going to be cancer-causing and creating more illnesses. Like we have

an illness in our society right now, you know. People are so confused and that, why create more? Why put some more pollutants so that people will become really ill.

And you know, these are sort of the concerns that I wanted to bring up. Thank you.

MR. B. CASE: Thank you, Betty.

MR. P. HARDISTY: Mr. Chairman, the Panel, and the Cadillac Panel. My name is Percy Hardisty. And I do believe I was here back in May, and I had made my presentation. And tonight, again, I'm going to just briefly give an outline as to what the concerns me the most.

You had more of this come out with different types of safety directions that were put forth, but the question at the back of my mind is, what priorities does the Board have at this present time, or as a matter of fact in future, as towards these different companies are applying for your water licence, Mr. Chairman.

MR. B. CASE: I don't think I understand your question, Percy. You said what ...

MR. P. HARDISTY: The Board, what priorities do they have when the different companies do apply for a water licence?

MR. B. CASE: There really is no priority, Percy. It's just the order in which the applications are filed, and we just call Hearings and consider the licences. And it's mainly on the, just on the order in which the various companies or government agencies file their applications.

MR. P. HARDISTY: Well I guess that I'm not too, quite satisfied with the answer as what you said, but my main concern is about the chemicals

that they are going to dump into the river. If they are going to dump that chemical into the river, why don't you get the company, those people that are involved behind it, you know, to drink that water. And let's see how long they last.

And we're not definitely going to get the benefit out of it. Maybe temporary jobs. I can't see no future, definitely nothing, nil. And this is all I have to say. Thank you.

MR. B. CASE: Thank you, Percy.

MR. K. MENICOCHÉ: Is this one working?

MR. B. CASE: Yes, I think so.

MR. K. MENICOCHÉ: I would like to present to you this written brief I have.

My name is Kevin Menicoche and I'm presently employed here in Fort Simpson. I'm just pressing into environmental matters a bit further. This is what I wish to say to the Board.

I don't think granting that licence would be very good. I am not against development, but I am against the destruction of the land. This land, my home; home is where you eat, where you drink. The Deh Cho is where I drink; from the land, my food.

I am very concerned of Cadillac's intention of using Prairie Creek near the mine to dispose of the mine tailings. This Creek is not only connected to larger bodies of water, with populations of people, but to the land itself. Would any of the representatives of Cadillac Mines be so kind as to stay here a few years to drink and eat out of this development they talk of? I have to.

In closing, if Cadillac Mines is granted a licence, all I ask of them is this. Fulfill the great promises they make in their

submission, for I am concerned. Because this is where I live. Thank you very much.

MR. B. CASE: Very well done, Kevin.

MR. K. MENICOCHÉ: Thank you. And is there any chance of having an adjournment until tomorrow morning?

MR. B. CASE: We would prefer to carry on for awhile yet. We may still have to adjourn but we'd like to carry on for awhile longer.

MR. K. MENICOCHÉ: Thank you very much.

MR. O. WATSYK: My name is Orest Watsyk, speaking on behalf of the Village, primarily. A few comments would not be on behalf of the Village Council, they'll be my own observation.

The Village Council had taken a position last year on this. We were generally in favor of the development based on the track record of regulatory bodies and so on. We again discussed this, several weeks ago, as to our current position on this. Our first discussion, the point that came up, well gee, it would be nice to visit that minesite, and we would then know better what we were talking about.

One of our members, who was also on Band Council, had told us that the Band Council was also interested in doing the same thing. And our Secretary-Manager had contacted Cadillac Mines and their reaction was that, yes, they'd love to do that, but they wouldn't want to be seen as though they were trying to win our support and so on. So that was put off.

A subsequent meeting we discussed this and one of the recommendations, or points, from Village Council was that the Water Board make allowance for situations such as this, so that people from here, we said specifically Band and Village representatives, to visit the

minesite prior to the Hearing, with say the Water Board, or at your expense.

The first item that we had discussed then, of a very specific nature, which was of a lot of concern last year, was the tailings pond after the project is completed. From the Hearings today, I think also the question deserves a lot of attention, there is a lot of concern. We were wondering, well, should that tailings pond be, say, cemented over. Maybe cement is not the appropriate thing. It'll break and so on, so maybe a layer of clay. On the other hand, if monitoring over the next several years and as Cadillac had presented the information of that tailings pond, it will not be a hazard. If it's proven not to be a hazard, they can convince us of it, convince you people of it and maybe we don't need to cover it over. But that this at least be considered, the possibility of covering the thing over so we would not feel we've got any potential time bomb sitting there in our back yard. .

Related to this problem, our second sort of position was the placing of a bond, or some form of security or guarantee, that after the site had been abandoned, closed up according to the present sort of regulations, that there still be some recourse if there are expenses involved, that there is going to be a clean-up, we're not going to end up with a situation, well gee, it's not our jurisdiction, or who's going to pay for it. We'd know that there's sort of a bond in place and this type of clean-up, or emergency action, after the whole place has been declared abandoned, can still happen.

The last item that Village Council had agreed on was that the visit by Band and Village representatives annually, to the minesite,

be arranged. Also, after any environmental incident. And hearing the representatives from Nahanni Butte and Wrigley, maybe they should be included in this type of arrangement. That way, we would not have these great concerns. Like the people from Nahanni and from Wrigley, I've not been into a mine. I don't know what it is. The only difference between them and me is I might understand the English language a bit better, and I have an idea what a tailings pond is. But for us to go there and be able to see it, I'm quite sure from the indications we had, Cadillac might be able to accommodate us on this, or should we be part of the team that goes say with Bernie Gauthier's crew here, the Department of Indian and Northern Affairs. That representatives annually be taken to the site to be shown this, or after a spill. Not at the time of the occurrence. If we're seen to be sort of in the way, we don't want to just be spectators, but to have us go there and see what happened and have them explain to us so we would then know.

The other observations I had was this great sewage disposal problem. And it almost seems as though some of the departmental, the government agencies, are practising a very discriminatory policy. About five or six years ago the Village was interested in getting a better year round supply of good, fresh, drinking water, and the line into the other side of the Mackenzie was being talked of. The question that we had brought up at that same time was, okay, we get a permit to use the water, what do we do with it afterwards, because right now all we do is dump raw sewage in the river. And we had asked, well okay, is there going to be money, is there going to be sewage treatment plant or sewage lagoon, we do have the problem, we are on the island, and lagoons



are sort of impractical. They're the cheapest, but they're not practical right now because of the flood situations. And we were told by various government departments, some of them who are very enthusiastically presenting what I consider almost negative positions regarding Cadillac Mine, but yet when it came to our Village situation, they were telling us, oh sewage, no problem. It will go in the river, there's great volume, it'll disperse by the time it goes five or six miles downstream. That's the same darned people, practically the same departments, who are taking a different position. You'd never recognize them. They were black one day, they are white today.

Those were the Village positions and my observation about those sewage problems. Thank you.

MR. B. CASE: Thank you very much, Orest.

MS. L. MENICOCHÉ: Hello, my name's Lorayne Menicoche. I was sitting on the Technical Advisory Committee for the Cadillac Exploration Limited water licence, which is under the NWT Water Board. I just have one question to ask before I go on.

There's the previous Hearings and the Technical Advisory meetings. I'm just wondering, all the material that came out of it, would it be used? Would it be considered?

MR. B. CASE: I think any knowledge about the Prairie Creek operation would be considered, as long as it is not, you know, not outdated. As I indicated to Mr. Bayly, the transcripts from the previous Hearings, and all the correspondence, and all the material that has accumulated to date is still of value. We've gained a lot of new information today which may outdate some of that, some of the previous.

MS. L. MENICOCHÉ: So some of the stuff, like the people that, there was a lot of people that spoke up at the two previous meetings, and there's a lot of questions that were asked, they will still be considered in drafting up the new water, the water licence if it's approved ...

MR. B. CASE: Well I would say that you are participating on the Advisory Committee on this particular licence, and it would be, if I were you, I would raise those questions if you don't think they have been properly answered.

MS. L. MENICOCHÉ: But I'm just wondering because this is a new Hearing, right, so I'm just wondering whether this material from before is going to be used, is also going to be used, considered and things like that, or else it's just going to be no longer used. I mean put aside, shelved.

MR. B. CASE: As I indicated, Lorayne, any information that is still pertinent, still of value, still current, should be used.

MS. L. MENICOCHÉ: Okay. That's good. Let me see where I could start then.

Okay, I'm going to ask Andy a question. Could I?

MR. B. CASE: Yes.

MS. L. MENICOCHÉ: Okay. Andy, is it true that with that oil spill 150 gallons were not recovered, or is it more?

MR. A. CULLEN: Well, as Doug reported, Andy Cullen. As Doug reported, as far as we're aware there's 150 gallons. I believe there's a final report put out by our Department and under Arthur Dalton's signature which would clarify everything after the clean-up was completed. And I think, whether 150 is exactly accurate or not, I don't know at this particular instant. But Doug is going to follow-up and answer the

details to the Board, and you will be, the information will be passed on. But the final report was prepared by Art Dalton after the complete clean-up, and it's available.

MS. L. MENICOICHE: Okay, that's all I wanted to ask you. What type of licence is Cadillac operating under right now? Oh, sorry, I didn't realize it was you.

MR. A. CULLEN: Cadillac's operating under land use permit and water authorizations at present.

MS. L. MENICOICHE: Water authorizations?

MR. A. CULLEN: Yes, for the camp. To use water and dispose of waste for the camp, and to control the minewater.

MS. L. MENICOICHE: And how long is this in effect for?

MR. A. CULLEN: Well, it's in effect until the licence, or probably until October of this year, whichever comes first. As soon as the licence is issued, these will be null and void. But they won't be operating any mill or anything like that under an authorization.

MS. L. MENICOICHE: Well I did hear Morrisroe say that they're mining now. Are they mining now?

MR. A. CULLEN: Yes, apparently they are mining now but they're not using any water, or doing mining under any authorization.

MS. L. MENICOICHE: Yes, that's what my next question was going to be, is under what authorization.

MR. A. CULLEN: Well, they're not doing it under an authorization. They're not using water, the water is coming out because they're mining.

MS. L. MENICOICHE: Yes.

MR. A. CULLEN: But they're not using water under an authorization for that mine.

MS. L. MENICOICHE: So this is the wrong Board to bring up any questions to right underneath that, about that?

MR. A. CULLEN: Well, there's land use permits under which they have the authority to do some mining, to develop the decline to 4000 feet, I believe, is what the land use permit gives them permission to do.

MS. L. MENICOICHE: So I'm just wondering then, this tailings pond too they built, which is about 90% complete. Is it with authorization or without?

MR. A. CULLEN: They built the tailings pond without any authorization. The tailings pond has never been approved.

MS. L. MENICOICHE: Oh yes, and then my next question would be if it's not authorized, how is it monitored by the government officials?

MR. A. CULLEN: I'm sorry, it's not authorized?

MS. L. MENICOICHE: Yes, if it's not authorized, how is it monitored? I mean who's ...

MR. A. CULLEN: Regular inspections are carried out by the District Manager here in Fort Simpson, and by people in Water Resource Division. But Cadillac has their own man, geo-technical engineer, and it's to their advantage as well as to ours for both people to be aware of everything that's going on in construction of the tailings pond.

MS. L. MENICOICHE: Like checking for the 13 foot clay?

MR. A. CULLEN: Yes, the people, we've been on site. I've seen the 13 feet of clay. I wouldn't swear that every inch of it is 13 feet, but I'm sure that there's a certain thickness of clay there and I'm confident that it's there. There's no advantage besides that. It's upon our request that, and as you're aware, the piezometers in the

tailings pond have been put in at the request of people who were concerned about any possibility of seepage at all. So I don't know what you're, where you're leading it from there.

MS. L. MENICOCHÉ: No, I'm just jumping all over the place here. That's what I just wanted to know. I just wanted to know how they're operating, under what kind of authorization right now, and just to get a clear picture.

MR. A. CULLEN: Well they have built the thing under land use permit but there's no water authorization to build a tailings pond. They put themselves in the position if we're not happy with it, they'd have to change it, I suppose.

MS. L. MENICOCHÉ: Right. I now understand. Okay. I'm just jumping all over the place here. I'm going to ask some questions about this Contingency Plans. What stage is the plans at, right now?

MR. B. CASE: I'll have to address that to Cadillac. They're preparing the Contingency Plan.

MR. G. HAMILTON: The Contingency Plan is in a rough draft state at the present time. We have gathered information from various sources, and we're in the process of putting that information together in a form that we will be able to submit it to Mr. Cullen, and his people, and to have it considered by those who are involved, and we expect, as we stated, that that will be available early in March.

MS. L. MENICOCHÉ: In your plans, are you considering floods? For floods, what would you do if there was floods?

MR. G. HAMILTON: I'm sorry, I ...

MS. L. MENICOCHÉ: Well, like there's a lot of people that have been bringing up the fact that there's, there could be a big flood up in the mountains,

right. A lot of people have been bringing up that concern today and in the last two meetings, at two Hearings.

MR. G. HAMILTON: Yes.

MS. L. MENICOCHÉ: And what I'm asking you is that in your plans, are you also covering the floods?

MR. G. HAMILTON: Yes. I believe it's been stated by Mr. Guild that the tailings dam and the protection of the works at the site have been designed taking into consideration a maximum flood condition. From the records, as I understand, that are available at Prairie Creek, we have a multiple of safety, a factor of safety of better than 4 from any recorded flood, or knowledgeable flood in Prairie Creek. In other words, we've designed for a flood condition four times greater than any flood that has been recorded, or any data that has been assembled, to indicate the volumes that have gone down Prairie Creek in previous floods.

MS. L. MENICOCHÉ: I feel that you're not answering my question. I'm asking, if there was a flood, do you have any contingency plan in place? If there was a flood over that tailings pond, do you have any kind of safeguards on how you would protect us from the poisons?

MR. G. HAMILTON: I think to answer that question, all I can say is that the embankment has been designed to accommodate the maximum flood conditions. Not a hundred year flood condition, but a maximum flood condition. And I believe that in any design this is a standard practise, and it's a maximum condition that anyone would ever design for. We have designed for that and we have allowed sufficient free-board above that design that we can actually take in excess of the

maximum flood condition without flooding the tailings pond.

MS. L. MENICOCHÉ: Okay, let me put it another way. What would you do if there was a flood, a flood that was so high that it went over your tailings pond, what do you guys have in place?

MR. G. HAMILTON: We have nothing in place, and I don't think anyone would have anything in place.

MS. L. MENICOCHÉ: Okay. Maybe somebody could check into that. Just, you know, just a concern here. It's like you never know what might happen. I'm going to sound very naive in something here. Page 4, and page 7 of your report. Okay, it says here, "Of the 1,000 tons per day mined and processed, approximately a third will be recovered as metal concentrates...a third will be returned to the mine as back-fill, and a third will be delivered to the tailings pond at the site."

I just calculated on my own way. I took a third of the 1,000, and I came out with, and I times it by 365 days, and I came out with 121,545 tons per year, and I timesed it by six, so I came out with 729,270 tons in six years. I'm just wondering, what is the capacity for holding in the tailings pond, because on page 7 you say that the storage capacity is one million cubic yards. How much is that equal to, that one million cubic yards, how much is that equal to in tons? How much, I don't know, are you guys lost? Anybody lost?

MR. G. HAMILTON: Your calculations are ....

MS. L. MENICOCHÉ: Wierd?

MR. G. HAMILTON: ... quite correct. We will deposit, on the basis of one-third of what we put in the mill going into the tailings pond, we'll

deposit approximately 120,000 tons a year, which means that in six years 720,000 tons will be behind the existing tailings dam. And at that point in time we will have three feet of freeboard on the dam, which it was designed for.

MS. L. MENICOICHE: This cubic yard storage capacity is equal to this 729?

MR. G. HAMILTON: That's correct, plus 720,000 tons plus there will be three feet over the whole surface of the, the top of the dyke will be three feet above the surface of the tailings, after we've put 720,000 tons of tailings there.

MS. L. MENICOICHE: And this tailings, the tailings in the pond, it's not going to be liquid, right?

MR. G. HAMILTON: No, the tailings are introduced into the pond as a slurry, a mixture of finely ground rock and water. Over a period of time, the finely ground rock sinks to the bottom and the water comes to the top, and we take the water off the top, reuse it in the circuit or put it through the treatment plant.

MS. L. MENICOICHE: What if after six years you decide that the mine life is about 25 years, what would you do?

MR. G. HAMILTON: We will hope that that is correct. We would like to see the mine last longer than six years. And at that time, or certainly long before that occurs, we will be making an application to the Water Board to either increase the capacity of our existing tailings pond or relocate, as Mr. Guild expressed earlier this morning, into what is known as location T3, which is downstream from the present plant on the floodplain.

MS. L. MENICOICHE: That depends on whether you've been following the conditions of the water use licence, right?



MR. G. HAMILTON: That is correct.

MS. L. MENICOICHE: Page 5, it says, "concentrate storage areas." How well protected are they? I believe that these concentrate storage areas would be where you keep the chemicals, or is that ...

MR. G. HAMILTON: No.

MS. L. MENICOICHE: ... no, that's where you keep your mine stuff, right? So where you keep the chemicals, how well protected is it?

MR. G. HAMILTON: We, as I expressed earlier, we are preparing the plans at the present time to submit to the Water Resources people for their consideration, and following that submission and their recommendations, if they accept our plan as is then we will construct the necessary protective facility in order to ensure that none of our chemicals get into the water course.

MS. L. MENICOICHE: Are you, at the present moment, are you hauling any chemicals?

MR. G. HAMILTON: Yes, we are.

MS. L. MENICOICHE: And how is it being stored?

MR. G. HAMILTON: Those chemicals presently are being stored on the site, in behind the protective dyke.

MS. L. MENICOICHE: I don't know which dyke you're talking about.

MR. G. HAMILTON: That is the dyke that protects the works, not the tailings dyke. Along the outside, Prairie Creek side of our plant we have a retention dyke all along that side to protect the works from flooding should Prairie Creek reach flood condition. And as you know, on the north side of Harrison Creek, there's a dyke runs down Harrison Creek as well, those chemicals are contained in that area so that we can control the outflow from that area ...

MS. L. MENICOICHE: Do these dykes have a liner under it?

MR. G. HAMILTON: No, they are clay dykes.

MS. L. MENICOICHE: Mine drainage water, how is it contained now?

MR. G. HAMILTON: The mine drainage water at the present time is discharged through a ditch on the lower level and it is drained down through the yard into the settling pond. And it's discharged, decanted out of the settling pond, or overflows the settling pond into Prairie Creek.

MS. L. MENICOICHE: Does it contain anything?

MR. G. HAMILTON: There are some heavy, analysis have indicated some heavy metals in the minewater, and in order to decrease the heavy metal content of the minewater lime is introduced before the minewater enters into the sump, which is inside the mine, which has a retention time in it to allow these heavy metals to precipitate. This is being monitored by ourselves and reported to the, Mr. Andy Cullen's Department as the results are obtained.

MS. L. MENICOICHE: So there's just good water coming out of that settling pond, is that what you're saying?

MR. G. HAMILTON: Yes.

MS. L. MENICOICHE: What is the word they use, pristine?

MR. G. HAMILTON: I wouldn't want to say what the exact quality of the water is because I'm not sure at this point, but the water is being monitored to meet the standards that we've been asked to meet.

MS. L. MENICOICHE: Do you have any Contingency Plans in place for right now for where you keep your chemicals stored, in case there was a leak or something like this, besides being behind the dykes?

MR. G. HAMILTON: Only the plan that, there's not a formal plan. That plan is being drafted at the present time. But there is sufficient equipment on site, and the people on site are knowledgeable enough to know what they're supposed to do and will carry out whatever measures have to be carried out to ensure, to the best of our ability, that nothing escapes into the water course.

MS. L. MENICOICHE: On page 6 it says, "In addition, bulk cyanide storage will be located well above the floodplain of either Harrison or Prairie Creek."

Right now you just told me that the bulk cyanide storage is behind the dyke.

MR. G. HAMILTON: That is correct.

MS. L. MENICOICHE: And then this is where you have your, this is where you're submitting your plans over to ...

MR. G. HAMILTON: Water Resources.

MS. L. MENICOICHE: Water Resources for storing them above the floodplain?

MR. G. HAMILTON: We intend, the initial submission we make, the chemicals will be stored in behind the dyke where it is at the present time, and they will be placed in an area which will have a liner in it and will have a berm built around it so that we can contain any spill withinside that berm.

MS. L. MENICOICHE: This is very interesting, and I've just been wondering. Nobody asked any questions about this and so I just thought maybe I should. Page 7 it says, "The proximity of the pond to the plantsite facilitates close monitoring of the tailings disposal system and short pipeline lengths for the reclaim and tailings facilities."

How safe is this short pipeline?

MR. G. HAMILTON: The pipeline?

MS. L. MENICOCHÉ: Yes.

MR. G. HAMILTON: The pipeline is an insulated line, and as we have stated in our submission, it is in mining practise within a very short distance of our operation. And the line is, as long as the mine is operating, the line is filled with water being reclaimed from the pond to provide the make-up water we need in the circuit, and the tailings line is filled with tailings being pumped back into the tailings pond. And were there any breaks in that line, they're in behind the retention dykes and any material that were to come out of that line in the event of a breakage would be controlled through the settling pond.

MS. L. MENICOCHÉ: Would I be right in saying this, that there's a whole area that's filled in with clay that's behind this dyke?

MR. G. HAMILTON: That is correct.

MS. L. MENICOCHÉ: Right up to where the pipeline is, underneath that pipeline?

MR. G. HAMILTON: Yes.

MS. L. MENICOCHÉ: Or is it just to a certain distance? It's all under, that whole place is covered with clay? I'm just wondering because if there was a leak in this pipeline, like let's say that pipeline that was leading to the tailings pond, and there was a leak, and you say you have this dyke there to stop any leaks, right?

MR. G. HAMILTON: That's correct. We have the yard drainage system and the yard drainage system would take that material into the settling pond.

MS. L. MENICOCHÉ: Page 9 you said, you guys say, "A drainage system will be

incorporated in the constructed liner, to collect runoff water from behind the liner."

MR. G. HAMILTON: That is correct.

MS. L. MENICOCHÉ: How would this affect the whole pond, I mean all this water behind there. There's a liner and then you're saying here that's the tailings pond, right. And then there's water between those two?

MR. G. HAMILTON: We want to ensure that there is no water between the two. We don't want any pressure on the liner, from the inside. We want to make sure that as, from behind the liner any water that's, runoff water or any seepage water that comes from back up in the valley drains down through the backslope, into that drainage line, and then is pumped out. So that the liner is always in contact with the backslope, we don't want any pressure in there, or any build up of pressure which is liable to damage the liner. Therefore by putting a drainage in behind the liner, we're taking any pressure off, any pressure from the upstream side away from the liner.

MS. L. MENICOCHÉ: If you weren't reusing the water from the tailings pond and the mine drainage, the water you'll be using will be greater than 205,000 Imperial gallons per day? On page 11.

MR. G. HAMILTON: To answer your question, in the circuit itself there will be 382 gallons of water will be recovered every minute from the mill, from the tailings pond and recirculated back through the circuit. Part of that water remains in the tailings, and the portion that's introduced to the mine, the water that's contained in those tailings goes into the mine, so we lose 83 gallons a minute into the mine. We also discharge, in making the concentrate, the concentrate has

a certain moisture content, and there are 376 gallons a minute, or pardon me, in the tailings pump there's 376 gallons a minute go back in. But what we lose in the backfill and what we lose in the concentrate requires us to introduce 71 gallons a minute of fresh water into the circuit, which will come from the aquifer below Prairie Creek. And that is approximately 200,000 gallons a day.

MS. L. MENICOCHÉ: I'm just wondering how concrete is your plans here. You say, "Current plans call for the extraction of groundwater from a well, rather than from Prairie Creek."

Is that definite, or not?

MR. G. HAMILTON: At the present time, that is our intention. We are satisfied that the well that we are using to service our camp has sufficient capacity to supply the operation. And in order to satisfy both ourselves and Water Resources, and other interested parties, it is the intent of Cadillac to conduct what is called a draw-down test on that aquifer to ensure that there's sufficient water in the aquifer to supply the needs of the plant.

MS. L. MENICOCHÉ: Could you further explain this sentence to me. It's on page 11. "However, an imbalance will exist between the mill water requirements and the tailings pond inflows which will necessitate a discharge to Prairie Creek." The last paragraph.

MR. G. HAMILTON: Well what we're saying here is that in the normal mining practise that the capacity of our tailings pond, we cannot take all the water back into the mill circuit. It goes into the tailings pond. We end up with more water in the tailings pond than we can use. And, therefore, in order to dispose of that water, we are

prepared to install a treatment plant in order to treat that water before we discharge it into the water course.

MS. L. MENICOICHE: Is that that drawing up there?

MR. G. HAMILTON: That is the plant on the wall, yes.

MS. L. MENICOICHE: Where it says, "... it was agreed that Cadillac would not discharge industrial effluent to Prairie Creek unless the flow in Prairie Creek was at least 20 times as great as the rate of effluent discharge."

I just marked down here what seasons? I assume that will be in the springtime. Where you guys had an agreement with the members of the Technical Advisory Committee. This was an agreement or ... page 11.

MR. G. HAMILTON: That could be at any time.

MS. L. MENICOICHE: Any time?

MR. G. HAMILTON: Any time that the flow in Prairie Creek, whatever the flow in Prairie Creek is, we will not discharge any effluent, or the quantity of effluent that we will discharge will have a ratio of 20 to one to the flow in Prairie Creek, there'll be 20 times as much water going down Prairie Creek as there is effluent being discharged into the Creek at any point in time.

MS. L. MENICOICHE: But that depends on, it depends on your water licence, right? What if they decide, if they decide to say 25, then you would have to do 25, right?

MR. G. HAMILTON: That is correct.

MS. L. MENICOICHE: I didn't understand that because the way it was written, right. I realize what that means now. On the last paragraph on page 12. I'm just wondering how was this experimented on?

MR. N. GUILD: Could you just repeat your question.

MS. L. MENICOCHÉ: The last paragraph on page 12, it says something about, I'm just asking how was this experimented on? You must have experimented on it somehow to come to this sort of thing.

MR. N. GUILD: There wasn't any experiments conducted. It simply was a mathematical exercise. We used the concentration of cyanide of .1 milligrams per liter. And we took the dilution, as we've discussed that would be available in Prairie Creek, and we simply divided that dilution into the concentration in the effluent, and then we projected from that what the concentration would then be in Prairie Creek. For example, on page 14, if you go to page 14, okay, there's two lines there, concentration and dilution. If you look on the first line it says, "Prairie Creek at the End of the Effluent Pipe", that's where the water is coming out of the treatment plant. Concentration of cyanide, if it were .1, the dilution would be 1 because it had not entered Prairie Creek yet. Once it had entered Prairie Creek the dilution would be 370 to one. Now that's based on average flows in Prairie Creek, in other words at a time when there would be about 200 cfs in Prairie Creek. And then, as I say, we divided that factor into the 0.1 and came up with the projected level in Prairie Creek at Harrison Creek, which is .0003. And we were trying to illustrate that, if you look down at the bottom of that table, that the maximum acceptable concentration of cyanide in drinking water is .2 milligrams per liter. So we were trying to show that by the time that concentration of cyanide ended in the South Nahanni River at Nahanni Butte, and you can see the number of decimal places there are before the very last



figure in the column of concentration. That was the purpose of developing that.

MS. L. MENICOICHE: But when you're discharging, you won't be doing one little mg at a time, you'll be doing a whole bunch, right?

MR. N. GUILD: We'd be doing one little mg for several different parameters, yes. For example, like copper and zinc, we would be having different concentrations for those, that's right.

MS. L. MENICOICHE: If you drank this maximum acceptable concentrate of cyanide, is .2 ...

MR. N. GUILD: .2.

MS. L. MENICOICHE: If you drank that, what would happen?

MR. N. GUILD: Well according to the Canadian Drinking Water Standards, nothing would happen to me. That is the maximum acceptable concentration the human being can drink without toxic effects.

MS. L. MENICOICHE: That's what they say, right?

MR. L. MORRISROE: Mr. Chairman, can I have a word?

MS. L. MENICOICHE: Yes.

MR. L. MORRISROE: I don't think it's quite fair on this here situation. We started here at 10:30 this morning. All this here material was covered this morning, it was covered in the afternoon. We had people come here late in the afternoon, and then we have people coming here after supper. Then we have people coming here later in the evening. They don't come here and hear all the history. These questions have been answered that this same girl has been asking now for the last hour, they've been all answered four or five times previously, you know what I mean, in the day. So we get people here that will be coming in,

there's no end to this situation. And now they're talking about an adjournment. I want to tell you what this situation's costing the company at this time. We started in on this here situation two years ago, we spent over a million dollars on environmental and protective association on water on this situation. We went through three Hearings now on this here water, and every Hearing costs us \$35,000, and every day that this here is carried over it costs the company, you know what I mean, another \$10,000. And I don't think it's fair that people come in here after supper and ask the same questions that were started here this morning and tonight. This here lady, I got nothing against her, but the Denes have hired their expert, John Bayly. John Bayly went through the situation very thoroughly this morning. I think everybody used their best efforts to answer his questions; he's technical, he understands them, and so forth. And we got people here now that said that it's too technical, they don't understand it. And it seems there's no end to it so ...

MS. L. MENICOCHÉ: Could I say one thing then?

MR. B. CASE: A point of order, I think that I can understand Mr. Morrisroe's concern, but this Board is set up to hear the opinions and the questions of everybody that might be concerned with respect to Cadillac's application. I think that in view of the questioning and the questions that I know are yet to come, that it would be best for all parties concerned that we adjourn this meeting until 9:30 in the morning. And I so decree.

MR. R. MICHAUD: Mr. Chairman, before you adjourn, I just have a slight presentation. Contrary to some of the people here, I do have to

work in the morning; and I'm one of those people that comes in after five. I have just a short presentation, and I'd like to try to get it in tonight. I have been sitting here since five o'clock, since four o'clock to be exact, and for me to get off tomorrow morning would be almost impossible.

MR. B. CASE: Lorayne, would you have any objection to him ...

MS. L. MENICOCHÉ: Sure, that's okay. No I don't.

MR. B. CASE: Okay, can you carry on then in the morning, Lorayne?

MS. L. MENICOCHÉ: Yes, I will.

MR. B. CASE: Okay.

MR. R. MICHAUD: My name is Raymond Michaud. I'd like to direct, do you guys have a chemical expert on your Board. I know you're dealing with a lot of chemicals, chlorine is one of them. Is it gas, or is it powdered chlorine?

MR. N. GUILD: It's powder, calcium hypochloride that we use in it.

MR. R. MICHAUD: And the other chemical that was brought up quite a number of times was, what is it, flouride, not flouride ...

MR. N. GUILD: Sodium cyanide.

MR. R. MICHAUD: Sodium cyanide. That comes in 45 gallon drums, am I correct, with plastic lining?

MR. N. GUILD: It comes in 45 or 200 gallons drums with plastic liners.

MR. R. MICHAUD: Okay, just to get to my point, my taxes pay all these environment people sitting behind me which we've been listening to for quite awhile, and the mine itself I will leave. My main concern is these disasters that do happen on these probably situations, example, the two oil rigs that have sunk in the last couple of years. I'm

sure the engineers that designed them would have stated like you people are stating now that the impossibility, they wouldn't consider it happening. But it has happened.

Yellowknife had a problem with their tailing pit a number of years ago and now they have arsenic poisoning in their lakes. B.C. has had problems with rivers damming up and flooding. And now we're faced with this situation here at Cadillac. I've tried getting up there to look at it first-hand and at this point I have to leave my environment people do the actual decision.

My main concern is directed not to Cadillac but to all communities who would deal with water treatment plants or who deal with chemical. I'm just wondering what precautions, or how would someone treat, say pertell the probability that will likely never happen but still it is there; what would happen if, say for instance, your truck carrying chlorine, or as far as that goes a Village truck carrying chlorine, would power out at Trout River for instance, and the truck would find itself in the river, dumping its cargo on a small creek? I'd like to know if you have a chemical expert that could tell me what harm would this have say if, another probability, if your truck carrying these drums would go through the ice and your concentrated chemical, would end up underneath the ice conditions which does happen. We've put a few trucks through the ice. What would happen to a 45 gallon drum? How highly concentrated is this chemical? How dangerous is it?

MR. M. BATH: Murray Bath of Kilborn Engineering. I'm not a chemical expert. I don't propose to try to answer your question in a lot of

detail, but as you yourself mentioned, accidents do happen to trucks and in the eventuality that a truck did turn over, it's quite possible that its cargo would be dumped.

The chemicals that are being taken to Cadillac are as well packed as any suppliers prepare to pack them at this point. They're packed in, as you mentioned, 45 gallon drums with plastic liners and lock-on lids. However, if a drum were to break, and it were to break into a stream, obviously the contents of that drum would enter the stream.

I would point out that transport of these chemicals is being confined to the winter months, over a winter road, and as most streams over which the trucks pass are frozen and, therefore, any spill of chemicals would be onto the ice and not into flowing water. This would make clean-up a lot easier. In fact, complete clean-up could probably be achieved.

MR. R. MICHAUD: I used to haul fuel up towards Wrigley, and we met with one big problem with overflows. And if the chemical was dumped, say on an overflow situation where the water is flowing, like if you drive to Enterprise presently, you'll notice that almost all creeks have overflows on it. So therefore you do have an activity of water flowing. I'm just concerned on the effect of this chemical, the basic concern. Maybe the best way to phrase the question, do these chemicals, like I know chlorine will but I'm concerned about this other stuff, will it eventually dissipate?

MR. M. BATH: Murray Bath, Kilborn Engineering. Sodium cyanide is a toxic chemical; it dissolves in water. It also degrades by various naturally occurring processes. A concentrated spill of sodium cyanide

into a water course would certainly affect life in that water course; in its immediate vicinity, fish would almost certainly be killed close to the point of the spill. However, over a matter of days the cyanide would be diluted, would be broken down by exposure to sunlight and oxygen and would, of itself, be converted into less harmful, or harmless substances.

MR. R. MICHAUD: Okay, that was my primary concern because, like Yellowknife, I think they still have an arsenic problem and that's been quite a number of years.

I have to stress the point that the hauling of dangerous chemicals in the Territories, on the road conditions that we do have, and that includes everything, like I said, water treatment plants; Simpson alone uses flouride, alum, catfloc, phosphate, and chlorine. And this has always been a concern of mine saying, okay fine, we are bringing these chemicals up here and I don't think we have anything to deal with it. I listened to Cadillac about their 150 gallon oil spill. I remember us, we spilled 6,000 gallons in the river when one of the tankers rolled over. It's a situation that I can try to understand, but yet I also think of the powdered chemicals, like chlorine. In Fort Smith a child died because he consumed some of these concentrated chemicals. These are the chemicals that I'm really concerned, and not when they get to Cadillac but I'm concerned about when they're being transported. And I'd just like that to be put on record.

MR. B. CASE: Maybe I can give you some information, Ray, that'll make you feel maybe a little bit better. At the present time, the transportation of hazardous goods, such as cyanide and other chemicals, that

goes across provincial borders, is governed by Federal Legislation. At the present time, the Federal Regulations that are up for review and presumably tightening up. Also, the Territorial Government in the Northwest Territories, at this time, is contemplating regulations for the transportation of hazardous goods within the Northwest Territories. So presumably in the not-to-distant future, there will be tighter regulations concerning the handling of such materials.

MR. R. MICHAUD: Okay, that's basically all I have to say. I don't want to drag it on.

MR. B. CASE: Thank you very much, Ray. And ladies and gentlemen, as I indicated, there's still a considerable amount of questioning, both from Mr. Bayly and some of our Board members, so that we'll reconvene at 9:30 in the morning.

MR. B. CASE: Good morning, ladies and gentlemen, I would like to reconvene our Public Hearing. We don't have a very good track record; we're late again this morning. I'll not attempt to make any apologies.

As you are aware, we are at the final questioning stage of the Public Hearing procedure. After the questions are all finished the applicant will have a chance to make a closing statement. I'd like to give the first opportunity for more questioning to Mr. Gamble.

MR. D. GAMBLE: Yes, I just have a number of items related to the water licence that I'd like to clear up. Perhaps Mr. Hamilton, Mr. Guild, at least these first questions would be probably best answered by yourselves. The first item refers to the quantity of water that is not to be exceeded. In the draft licence that was prepared by the Technical Committee, they have suggested 1150 cubic meters per day. You had originally asked for 3,450 cubic meters, and I see in your submission today, or yesterday, for 200,000 Imperial gallons per day, which I haven't yet converted. Can you tell me how many cubic meters per day you're now asking for, and also with reference to the letter that you had written to the Controller of Water Rights on February the 10th, what the unusual circumstances are that you envisage that may require you to exceed that, and whether or not you're asking for that to be included in the licence.

MR. N. GUILD: The quantity that we were asking for was 250,000 gallons a day. Now that converts to approximately 1150 cubic meters per day, which is the figure that was actually given in the draft water licence. Now originally we had asked that for short-term durations we could



exceed that by a factor of 3, in other words, 750,000 Imperial gallons a day. Now the way that that figure was developed simply was by taking the 250,000 gallon a day normal requirements, and adding to that the reclaim waters that we were using from the tailings pond. In other words, if the reclaim system was non-operational for a short period of time, we would need an additional 382 gallons a minute. Now when you factor that up, that would require to have a daily use of 750,000 gallons a day. Now that 750,000 gallons a day would, therefore, be made up of a normal water requirement of 250,000 gallons a day plus an additional 500,000 gallons a day for the reclaim waters that would have to be replaced if the system wasn't operational.

MR. D. GAMBLE: In fact, in this licence application, are you asking the Board to consider this sort of extraordinary demand, what you call, to account for these unusual circumstances.

MR. N. GUILD: We had originally asked the Board to consider adding to the licence an allowance so that we could in fact discharge, sorry, so that we could in fact withdraw 750,000 gallons a day. However, at a recent meeting with Andy Cullen, he informed us that the Board is able to issue short-term amendments to the licence which would cover this event, if it occurred. And we indicated in our letter, our recent letter to the Technical Advisory Committee that we were prepared to accept this, rather than have it written into the licence.

MR. D. GAMBLE: Well that's what's causing me some problem, because if we can avoid these emergency amendments in the writing of the licence, that's the preferred route. An emergency amendment is for emergencies only, in my view. Can you tell me the frequency with which, the frequency

you expect these unusual circumstances to occur and the number of days that this might drag on, in the extreme. Are we looking at a week?

MR. N. GUILD: We can't really define an exact period of time. We had originally indicated that a two week period should be enough to suffice any emergency of that nature.

MR. D. GAMBLE: And what sort of frequency would you expect this? Would this happen perhaps once a year, once every two years, once during the life of the mine?

MR. N. GUILD: I really can't give you a firm figure on that. I wouldn't expect it would happen more than once a year.

MR. D. GAMBLE: So this is something that we should very definitely be anticipating then.

MR. N. GUILD: Well we anticipated the problem could occur, so we tried to convey that in our request to the Water Board.

MR. D. GAMBLE: Can you be a little bit more explicit on why these unusual circumstances will arise. Is it you're expecting the tailings pond to freeze, or pumps to break down, are there back-up pumps, or what is the problem here?

MR. G. HAMILTON: The occurrences that we can envisage happening is, one would be losing the pump; we could have problems with our treatment plant for whatever reason, or with our reclaim pumping system and not be able to reclaim; the transformer that controls our reclaim pumping system is sitting on, exposed on the dyke, if it was struck by lightning and that transformer went out we would want then to take the water from the aquifer rather than reclaim it from the tailings pond. They're varied circumstances like this that can occur and

there's a time interval between the time of the occurrence and the time that the repairs can be made.

MR. A. REDSHAW: Just to follow-up on Don Gamble's question, the 250,000 Imperial gallons per day, that's your average or is that the peak fluctuation? What exactly is that? Are you going to exceed it every time you go into a peak situation? What exactly, is that the average for the day?

MR. G. HAMILTON: That is the average daily consumption when we're milling at the rate of 1,000 tons per day.

MR. A. REDSHAW: Which means normally that your milling rate is not that constant, so that you could be exceeding this 250,000 gallons for the odd period of time during the ... I'll explain what my problem is, and it follows on from Don's, is that the licence is written up and says you shall not exceed  $x$  gallons per day. If you deal with averages on the licence, then every time you exceed this quantity you're in violation of the licence. So we cannot deal with averages. We basically have to put some sort of limits in there. So this is where the licence has two parts in it. It has an average quantity over the year, but it also has a daily average, a daily peak in there. So I think in your considerations with the Technical Committee, you'll have to define what this upper average, if you want to put it that way, is.

MR. M. BATH: Murray Bath, Kilborn Engineering. In any mining and milling operation, particularly the milling part of the operation which is the major water user in the entire operation, the aim is to try and operate as steadily as possible. It has all sorts of benefits, and therefore the rate of use of water would be constant over the day and the 250,000

gallon average per day would not, in general, show any sharp peaks during that day, or any one day. However, inevitably there are circumstances where very short, probably talking about hours or parts of hours, where that figure would be exceeded. We have, up til now, always talked about a daily average figure, rather than any short-term peak within any one day.

MR. A. CULLEN: I understood when we went through this that there was 50,000 gallons in that 250,000 gallons that were allowed for excess over above what you required on an average daily. Is that not approximately right?

MR. N. GUILD: I was just going to mention that point, that in fact if we take the flows that we have in the water balance, this is the figure that we mentioned in here of 200,000 gallons a day. However, we had asked for 250, so there was a buffer in there to allow for small fluctuations.

MR. A. CULLEN: Just one other question. When we went through also your recycling system and this extra 750,000 gallons a day, maybe you could just again for us, Norm, go through that recycling system and tell us what back-up you have to it so that we can understand the 750,000 maybe a little better, or why I gave you the advice that I thought most of this was in emergency situations, and emergencies are emergencies, and that's the way I felt about it. Maybe you could go through the recycling system.

MR. M. BATH: Murray Bath, Kilborn Engineering. We could increase the amount of new water put into this system by operating two pumps instead of one. And that's basically how we would increase the water demand above the 250,000 under emergency circumstances.

MR. G. HAMILTON: Andy, to answer your question, I believe, about the reclaim. We reclaim the water from a pump barge located in the tailings pond, and that pump barge has two pumps in it, either one of which is capable of supplying the volume of reclaim water to operate the plant. So we have a back-up pump. However, we have, as I indicated, we have a single power line, and the transformer is sitting on the side of the dyke, and under normal circumstances, and with good maintenance practise, I would expect that the unusual occurrences, as I indicated, would be probably lightning striking the transformer and knocking the transformer out on us, and knocking out our reclaim pump which would then, as Murray has indicated, necessitate us drawing additional water for the period of time, for such period of time as it takes to replace that transformer.

MR. L. MORRISROE: I may be going to have to get some help from my own people in regards to this question, but my understanding when we put together 1,000 tons a day, that's 365,000 tons a year. But there's sometimes when things is going good and the ore goes going through well, some days you may do 1300 tons. Then you may drop down and you may have to change liners or so forth, and you have period down, and there may be some days you'll only do 700 tons, and break down periods. So at the end of the year you hope to come out, you know what I mean, with 365,000 tons. So I'll have to ask them, if you're up in the mill three or four of them days, do they take the extra water out of the tailings pond or is the 250,000 gallons in there for that leadway?

MR. G. HAMILTON: It has been indicated in asking for 250,000 gallons a day there is an extra 50,000 gallons in there to cover the variations in

the milling rate. Normally the mill is set to operate at 41.6 tons an hour and this can fluctuate slightly up and down, as Mr. Morrisroe has indicated. The capacity of our plant, the normal capacity of our plant is 1,000 tons a day, and that is the rate which it is designed to operate. Undoubtedly, through experience, we will find out just what the capability of the plant is as it is designed at the present time, and generally in plants there is a certain amount of safety factor placed in by the design engineers which allows the operators to increase the tonnage. Having 250,000 gallons asked for in the application, and at a thousand tons a day, only requiring some 200 or 220 of that, I think we feel confident that that will take care of any fluctuations in our circuit.

MR. L. MORRISROE: Thank you, Gerry.

MR. B. CASE: I would just like to re-affirm what Don Gamble has said about this matter of emergency amendments. An emergency amendment must be approved by the Minister, and it has been our experience that the Minister does not receive these requests for emergency amendments very kindly. And there always is the possibility that the Minister will not approve an emergency amendment. So, therefore, in writing the licence, as Don has indicated, we must take every possible precaution to eliminate the need for these emergency amendments.

MR. G. HAMILTON: That's quite acceptable to us. We were under the impression, wrongly I gather, that the way we selected was the easiest way to do it and satisfy the Board. If it does not then we'll revert to the other procedure.

MR. D. GAMBLE: I'll leave this, but I would suspect, in my judgement a strike by lightning to a transformer is an emergency situation.

I don't think we have to worry about that type of extraordinary event. But if, in fact, you are anticipating the possibility, as Mr. Guild has outlined, that you may require this once a year for up to two weeks, then I think we could write the licence, perhaps, in a way that could cover that without having to go the emergency amendment route which makes it easier for you, and it certainly makes it easier for the Board and the people who are responsible for enforcing the licence.

MR. G. HAMILTON: That would be quite acceptable to us, and we see no problems there, and if that's the way to do it, let's do it that way.

MR. D. GAMBLE: I'd like to pass on to some questions about the tailings ponds, and these are just very general questions and perhaps, Mr. Guild, you could handle them but it's possible that Mr. Fletcher would have to assist you. Can you describe for me what the daily, weekly, and annual maintenance of the dykes for this tailing pond might entail.

MR. B. FLETCHER: Brian Fletcher, Golder Associates. Your question is what would the anticipations for maintenance be on a daily, weekly, monthly, annual scale, sort of thing.

MR. D. GAMBLE: Just in very general terms, what do you see as being required?

MR. B. FLETCHER: I would expect that the principal maintenance, or actually it's a non-maintenance activity, would simply be inspection. I'm not anticipating any serious things to go awry with the tailing embankments themselves. The design and the construction has been such that we've kept in mind the notion that they have to be intact for a very very long period of time, defined as indefinite, I think, consequently the maintenance anticipations are absolutely minimal. Is that clear?

MR. D. GAMBLE: So you're anticipating then just a visual check of the dykes?

MR. B. FLETCHER: Plus, of course, monitoring the piezometers and the settlement plates in the embankments themselves.

MR. D. GAMBLE: The current design, as it stands today, do you anticipate any structural maintenance over the life of the tailings pond?

MR. B. FLETCHER: No.

MR. D. GAMBLE: None. If the mine life is extended beyond the period that's indicated by the application, and new tailings areas are established, would that change your view about the amount of maintenance that might be required on this existing tailing pond after it was abandoned? Are we then still just talking about sort of periodic visual checks, or is it possible that say in 50 years, 75 years, that there would be a need for some structural work there?

MR. B. FLETCHER: No, I think when, Brian Fletcher, Golder Associates. Once this tailing pond is abandoned and covered, or whatever is ultimately decided to do with it, and contoured, etcetera, I would expect it to stay intact for a very long period of time.

MR. D. GAMBLE: I want to ask you a hypothetical question. Feel free not to answer it if you think it's unreasonable. If an extraordinary event did occur and we lost the embankment between the tailings pond and Prairie Creek, what would be the consequence of that in the long term? And suppose nothing was done. I'm talking now about 50 years from now where some sort of extraordinary flood or whatever other event caused a failure of that embankment. I'm just trying to get somebody to describe for me, if they can, what would happen. We'd



probably see the erosion, for example, of the material that was inside.

MR. B. FLETCHER: Brian Fletcher, Golder Associates. I would certainly agree that your question is hypothetical. The response to it is not. If that did happen, obviously you'd have what remains of the tailings, behind the embankment, over some area depending on the extent of the damage, in Prairie Creek.

MR. D. GAMBLE: I wonder if, Mr. Guild, somebody could tell me what the impact of that might be on Prairie Creek and particularly downstream inside the Park.

MR. L. MORRISROE: Maybe I could help you a little bit here, Mr. Gamble. I've looked at four or five tailings ponds that have been finished, leveled off, you know what I mean, completed, down in Idaho and down in Virginia and Kentucky. And I don't know if you saw this one on Prairie Creek but I can visualize when that thing is full in six or seven years and leveled off, and if you could get some grass growing on there we'd have an instant soccer field. Go ahead, Norman.

MR. N. GUILD: As you said, this tends to be totally hypothetical, so using your hypothetical reason for the fact that the tailings impoundment is impaired and certain solids enter Prairie Creek, that same flood that would cause that to happen would also be eroding Prairie Creek upstream, downstream all the way to South Nahanni River. Now the additional erosion that would come from the tailings impoundment at that time would probably be small in relation to the total erosion that was happening naturally in Prairie Creek. And the amount that would come would depend on how far eroded back, and the affect it

would have on Prairie Creek would be a function of how far it travelled and what areas it deposited, and in what relation it would be to the natural erosion that was happening. So that's about all I can say.

MR. D. GAMBLE: Is the suspended sediment load, I can quite see that if it was an event that would be so catastrophic as to cause this to happen, I can accept that and I wouldn't worry about it too much. But what about the nature of what's, the toxic effects of this particular substance. It's quite a bit different than material that would be eroded everywhere else.

MR. N. GUILD: Well basically the tailings is going to be dolomite, limestone which is the host rock, also would be inert sulfides which in solid form of the metals that are being mined, ones that have lasted through the ions, that's why they're there and why we're mining them, and also ones that couldn't have been recovered during the process of extracting the concentrates. That's how stable they are. So in that form they are really, you can consider them, once they enter a creek, as suspended solids.

MR. D. GAMBLE: Okay, thank you. Based on the work you've done to date, Mr. Guild, on other possible sites for tailings ponds, can you tell me what you would anticipate the life of the mine would be if we worked backwards, instead of what the reserve is, if we worked backwards of what the capacity is in that immediate area in the Prairie Creek floodplain to contain the tailings.

MR. N. GUILD: The only other area that we have really looked at in detail that we feel is suitable at this point in time is the site T3 which is about 2000 feet downstream. Now that area could be developed

for a capacity greater than T2, but probably not greater than twice that capacity. So if you put, okay, I stand corrected here that there is more capacity in the T3 area. Brian Fletcher of Golders feels that we could be three to four to five times more capacity actually in the area of T3.

MR. D. GAMBLE: Okay, thank you. I'd like now to go to the thing that's causing me the most difficulty and that's the numbers on these, that have been proposed by yourselves and other people, for the effluent quality. First let me come at in in a general way. I've gone back through the files and tried to see how we've got to where we are today with these numbers. I notice in a letter that you had sent on the 27th of May, 1981, that, and I'll just quote, it's item 3 under Nahanni Park water quality. And you say there that, "We agree it is imperative to maintain the pristine nature of the waters of Nahanni Park and do not take exception to any reasonable statistically valid receiving water quality requirements proposed by the Water Board."

Now with yourself and later, when I get to some of the briefs, particularly that submitted by DOE, I'd like to explore what this all really means. What do you mean by "pristine", and what is "statistically valid" mean? Now if you can answer that in general, fine. If you can't then we'll just carry on and then we'll come back to it as we see where the disagreements might arise.

MR. N. GUILD: I think it would be better if we just concentrate on the table that I had sort of shown to you earlier. I think that sort of clarifies the three positions that are in existence at this point in time.

MR. D. GAMBLE: Okay, would you like to just, I understand from some of the, what you showed me yesterday, that you sort of summarized the three different views; yours, Department of Indian and Northern Affairs, and Department of Environment, and I don't think in this forum we can go through the numbers. But what I would like you to do is to highlight for the Board the areas that you think are substantially different and that will cause difficulty to the operators of this mine.

MR. N. GUILD: At present, we have proposed certain levels to the Board in a letter early this year. Now we had asked that we would have the ability to use dilution rates up to approximately 40 to one in Prairie Creek, to assist us in our, diluting our effluent. Now the levels that we proposed at that time, using the dilution rate of approximately 40 to one, are now equal to, or better than, the levels that are proposed in the DOE brief that was submitted the other day, yesterday. However, we are equal to, but slightly higher than several of the levels submitted in the Department of Indian Affairs brief. But the differences between ourselves and the Department of Indian Affairs are a factor of 1.5; we're not even double in some of the parameters. I think that's as concise a summary as I can say. The only other point I might add is that, as you can see, I think we are almost all in agreement in what we believe the effluent quality should be in Prairie Creek and of our understanding of say the pristine waters of Prairie Creek.

MR. D. GAMBLE: So you're satisfied now that on the basis of, and I'll just deal with the DOE brief just to make it simpler, that the numbers that are proposed are technically and practically achievable.

MR. N. GUILD: Yes, at this point in time. And what we intend to do is, now that we're in receipt of these briefs, which we only received yesterday, we will formally reply to the Technical Advisory Committee and/or the Board and state this in writing.

MR. D. GAMBLE: Okay. That would be really helpful and I just wonder if you could help me with just two other things. In the tables that have been put forward, the words "maximum average" is used in many cases. Can you be a little bit more explicit on what exactly that means? Are we talking about a continual running average, an average of how many samples, over what period?

MR. N. GUILD: I'll just read you what it says in the draft licence on maximum average concentration. "Maximum average concentration means the average of the last, of the last four analytical results submitted to the Board in accordance with the sampling and analysis requirements specified in the surveillance network program."

MR. D. GAMBLE: Okay.

MR. N. GUILD: So virtually it's a rolling average.

MR. D. GAMBLE: Okay. And that causes you no difficulty.

MR. N. GUILD: No.

MR. D. GAMBLE: The second point is these numbers are all based on an assumption that there is complete mixing, and that there will be no slug flow due to say temperature differences between the effluent and what's in Prairie Creek. How can we be sure that that's going to happen?

MR. N. GUILD: We are presently preparing plans for review by Cadillac for future submission to the Technical Advisory Committee of a diffusal system to introduce the effluent into Prairie Creek.

MR. D. GAMBLE: Okay. Those are all my questions for Cadillac, but I would like to go to some of the submissions that were submitted by other people, other government departments. I can do it now, or later.

MR. B. CASE: Perhaps, Don, could you just wait. Mr. Kennedy would like to ...

MR. C. KENNEDY: My question to you is I'm still concerned about transport, storage and security of this chemical cyanide. You've answered it in part by saying that you believe you will be sending something to the Water Board later on on how you prepare to do this. What I'd like to know is would you have any idea whether you're going to store this in an open area, keep it in the open area? Will you have a fence around it, secure? Or will you be erecting a building to contain it? How much of this do you use in a year?

MR. G. HAMILTON: On the storage of the chemicals, there are several alternatives available to us. We certainly want to ensure that they're stored properly and stored in a safe manner and protect them as the best of our ability. At the present time, as I've indicated previously, the chemicals are stored in behind the flood dyke. We are concerned that we store them in a manner where, should there be any spill, that we can clean up that spill. If there is any water inside the berm that we propose to store them behind, that we have a pumping facility to take that water out and put it in behind the tailings pond and not let it overflow into the yard drainage system. We have some problems in that the particular site where we are located, as you are aware, has constraints as far as surface area is concerned in order to erect buildings and plant, and it has been in the past, and we hope will

continue in the future, that between the various government departments with whom we have to, who have supervision over our operations, that we can submit alternatives, one of which will be acceptable to all of us.

MR. C. KENNEDY: Okay, thank you. I have another comment I'd like to make here. It's on the concern of Mr. Morrisroe of repetitive questioning at a Public Hearing. I'd like to remind you that this is why we have a Public Hearing and I, as a member of this Water Board, would find it very difficult to put in certain guidelines in which may hinder or stop local people from participation. Because if we want to have a Hearing in which we'd only hear from lawyers and technical people, we could well have it in Yellowknife in our own Board room. The reason why we travel to the communities is to hear from each and every person who has a concern, and I think that must be addressed. I realize at times, of course, there are some people who may carry on longer, and some of them not really a good state to do so. However, it's something I think we have to put up with. Thank you.

MR. B. CASE: Thank you, Mr. Kennedy. Mr. Gamble, do you want to carry on?

MR. D. GAMBLE: Yes, I wanted to address some of the issues raised in the Indian and Northern Affairs brief yesterday. My first question is related to your opening paragraph where you point out that your comments are limited to the specific issues regarding the present application and does not discuss the management and development of Nahanni River basin. And while I welcome that, many other people, particularly DOE and a lot of the people from this area, have addressed the problem

in a much broader context. You added to your brief a comment which, if I understood correctly, that you said you acknowledged that. I wondered if you agreed with the position taken by DOE?

MR. D. STENDAHL: I think as explained, as you indicated, in that ...

MR. B. CASE: Will you identify yourself first.

MR. D. STENDAHL: Oh, I'm sorry. Doug Stendahl, Water Resources. As you just explained, there is the qualifier that we are concerned about Nahanni National Park and the quality of water in Prairie Creek. And my reasoning for not dealing with it in this brief is because it was adequately dealt with by other briefs, which I read, and I did not get into any, go to much detail in, you know, going through those briefs to decide if the Water Resources position is exactly the same as theirs. But I felt that they had addressed that question adequately.

MR. D. GAMBLE: Okay. So the principle of the broader look is something which ...

MR. D. STENDAHL: Oh yes, that would have to be addressed, there's no doubt. The Water Board has already indicated that to the Technical Advisory Committee, in fact.

MR. D. GAMBLE: Yes. If you turn to page 4 of your brief, under the heading "Sewage Treatment System", you note, you suggest that the sewage treatment system needs to be modified "to meet the proposed effluent quality requirement for coliform bacteria."

I don't quite understand what you're asking the Board to do here. We set the effluent quality criteria. It's up to other people, and I had assumed it was you, to look after the enforcement



of this, which would include the requiring modifications. This isn't something that you're really asking the Board to do.

MR. D. STENDAHL: Let's see if I get your point. It was in the draft licence, there have been three parameters that have dealt with the quality of the domestic waste; the suspended solids, BOD, and coliform count. Now the system that's presently in place, we believe can probably achieve the levels indicated in the draft licence for BOD and suspended solids. The problem is the quality of effluent once it reaches the disinfection stage will probably be not of a quality that can be dealt with using ultra-violet sterilization. And that is our problem with coliforms.

MR. D. GAMBLE: Is the Department doing anything to require Cadillac to replace that UV system?

MR. D. STENDAHL: There are some problems, Don, in that, as has been indicated, the system has really not aged. It's a biological system that requires some aging, so we haven't confirmed that what the literature states will apply to the system that they have now installed. They may, in fact, be able to get suspended solids levels below those levels. It's a possibility, and we have to acknowledge it and, therefore, we're waiting to see what the extended aeration can do to the waste, and once we have confirmed that the suspended solids levels are too high, and we had given that four week period to do that. If the ultra-violet sterilization will not deal with it afterwards, there'll have to be some pre-treatment, or go to an alternate system for sterilization.

MR. D. GAMBLE: And that enforcing that kind of decision about changing or modifying the system is basically a Departmental responsibility, is that right?

MR. D. STENDAHL: Yes, that's right. We're looking at that through the Technical Advisory Committee.

MR. D. GAMBLE: Okay. Mr. Guild, on page 4 of his brief, at the bottom, under the title "Abandonment and Restoration" he suggests, "that a plan be requested from Cadillac addressing the progressive abandonment and restoration of the site."

Is that feasible?

MR. N. GUILD: I believe in the draft water licence that we have received, there is a requirement to produce an abandonment plan by January, 1983.

MR. D. GAMBLE: I understand that. The operative word I'm concerned with here is "progressive abandonment" plan, particularly as it might relate to say the tailings pond.

MR. N. GUILD: Using the words "progressive abandonment" with the tailings impoundment, no, it's not feasible.

MR. D. GAMBLE: Okay.

MR. D. STENDAHL: If you want to take that in the context of progressive abandonment for the tailings pond, that would be to be doing some vegetation studies with native species in the area to assess whether they can, in fact, be implanted over the tailings cover later.

MR. D. GAMBLE: Oh, I see.

MR. D. STENDAHL: So they should be looking at studies such as that all through the life of the project. You don't wait til it's abandoned and then decide what species you're going to use to put over on the cover of the tailings pond once it's been reclaimed.

MR. D. GAMBLE: Okay. So you're talking about studies and not the actual implementation of the plan in sort of a ...

MR. D. STENDAHL: Well in that case, regarding tailings pond, that would be studies, yes.

MR. D. GAMBLE: Okay.

MR. G. HAMILTON: Mr. Chairman, could I add to Mr. Stendahl's remarks. It is the intention that Cadillac will institute these studies. The exact sequence of how we will deposit the tailings into the tailings pond has not been evolved, as yet. It is possible in a mining operation that in the disposition of tailings you create areas which are available for restoration prior to abandonment. A lot of areas this is done to prevent dusting, and we will certainly be looking at this and carrying out these studies.

MR. D. GAMBLE: Just one final question then, and this relates to the effluent quality requirements which are discussed in part on page 5 of your brief. And you've proposed a dilution of 25 parts Prairie Creek water to one part effluent, and you've based the numbers on that. Cadillac has suggested something slightly different and DOE has suggested something slightly different again. I would like you to tell me if you can, if you can summarize for me what you would see as being the difficulty in going the route that has been proposed by Cadillac. They are proposing numbers which would vary according to dilution factors and, as the Inspector, can you tell me of what problems you might envisage in trying to enforce that or in trying to keep records or whatever.

MR. D. STENDAHL: In choosing an approach such as indicated by Cadillac, where you would have this variable dilution, although I have never dealt with this problem, I don't even know if this approach has ever

been used in the past, I foresee some difficulties in knowing what exactly the dilution is available in Prairie Creek, whether it was available, and it seems to be a lot of calculations and makes the enforcement more difficult, no doubt. I foresee that.

The reason why I went to 25 parts Prairie Creek water to one part effluent was because I foresaw if we went to higher dilution rates than that, as indicated, it's been spoken about today, this 40 to one, I anticipate that the effluent at the end of the pipe would be acutely toxic and, therefore, may create a mixing zone in Prairie Creek that may prevent fish passage. And that was one reason why I did not want to go to higher concentrations, and even further higher dilution, as indicated by DOE and by Cadillac.

And so what I tried, what Water Resources' position that was taken here, is to derive concentrations that we thought, although they are very close to what can be achieved with present technology, we felt that these could be achieved by present technology, and if they couldn't, they're so close that the system proposed by Cadillac could be modified to meet these, by polishing. And we wanted them to further address this rather than give them higher values than the ones we have indicated, and allow them to now, I think they feel quite confident that the present system that they have proposed, which is the same one they have proposed all through the IEE, and unmodified, except possibly for dechlorination, can meet the levels indicated both in their own brief and at the 40 to one dilution for the DOE position.

MR. D. GAMBLE: Mr. Guild, do you agree that the numbers that are proposed here could be met with the system modified as has just been described here?

MR. N. GUILD: There are some values, as I said, that are in agreement with our figures; there are some that tend to be a little bit more stringent. Those values, at the present time we would doubt if we can, in fact, meet with available technology. The values proposed by the DOE, using the dilution factor that we've mentioned, we believe we can meet.

Could I add one more thing?

MR. D. GAMBLE: Yes.

MR. N. GUILD: The dilution rate of 40 to one, we prepared a table of the method in which we propose to discharge our effluent. And during the months that we will be discharging, the lowest dilution rate on that table was 38 to one. All the other dilution rates were considerably greater, up to 600 to one. So we feel that there's enough leeway above the 40 to one that we can control the effluent in accordance with dilutions in Prairie Creek. If it was that every month was borderline 40 to one dilution throughout the whole year, obviously I could see the concerns of Water Resources. But we feel there's enough dilution beyond the 40 to one over most of the period that we're discharging we will be able to closely control the discharge of effluent.

MR. D. STENDAHL: In essence then, if you look at the DOE position, I don't think Cadillac would have to address very often in the year the 20 to one dilution concentrations and in fact, as Norm Guild has just indicated, they would be looking at the latter two columns which deal with higher concentrations in which case, I believe, the effluent could be acutely toxic and, therefore, one of the notes which we have

included with the effluent quality requirements, that is that it not be acutely toxic to fish as outlined in Guidelines for Measurement of Acute Lethality in Liquid Effluents for Metal Mines may not be able to be met and, therefore, would create an enforcement problem if that condition is still maintained.

MR. D. GAMBLE: Mr. Guild, in your written reply, when you're discussing these numbers, would you address the specific problem.

MR. N. GUILD: Yes, we will do that.

MR. D. GAMBLE: Those are all my questions on this brief.

MR. B. CASE: Do you have questions on other briefs, Mr. Gamble?

MR. D. GAMBLE: Yes. I can wait if somebody else feels anxious here.

MR. B. CASE: Well, maybe we'll give somebody else a chance. Mr. Sutherland, did you have some questions? Anybody else from the government? Mr. Comin.

MR. L. COMIN: I just have one question to Cadillac, and it's about their wildlife surveys. In March of 81 you done linear transects for moose and caribou. How far apart they were, and what amount of coverage did you get?

MR. N. GUILD: I'd ask Wayne Dwernychuk to address that, from Beak.

MR. W. DWERNYCHUK: Wayne Dwernychuk, Beak Consultants. I can't specifically recall the distance. I believe the standard is a quarter mile on either side of a particular transect. That's the standard wildlife procedure. I don't really recall the exact distance, but that is the standard distance that we do use on all our wildlife transects.

MR. L. COMIN: What I need to know is the percentage area covered in the area of concern, and along the road, and around the minesite?

MR. W. DWERNYCHUK: There was a corridor of, I believe, ten kilometers around the road.

MR. L. COMIN: What percentage intensity of cover did you survey?

MR. W. DWERNYCHUK: I can't recall the specific numbers in the reports. The reports have been filed. I can't recall the exact numbers.

MR. L. COMIN: I've seen the reports. What they didn't give me was the amount of flight coverage given the area.

MR. W. DWERNYCHUK: I don't recall specifically. I can get back to you with the exact coverage, if you'd like.

MR. L. COMIN: Okay. Following that, you saw 16 moose scattered along the 100 mile corridor, you say. What age/sex classification were they?

MR. W. DWERNYCHUK: I don't think that was presented. They were just spotted visually and there wasn't any ground truthing on that, so I have no idea.

MR. L. COMIN: On the tables, one table that I saw, all except two I think, I believe, were classified as females.

MR. W. DWERNYCHUK: You could be right, yes.

MR. L. COMIN: So if 16 moose were seen, 14 of them were females. I don't know what in percent intensity you covered, maybe 10%. If you extrapolate that, maybe there's 160 moose in that area and they're all, 140 of them are females. Is that right?

MR. W. DWERNYCHUK: You could be right, yes.

MR. L. COMIN: So then in actual fact, this area along the road and the minesite could be a real critical area for female moose.

MR. W. DWERNYCHUK: If the relationship between the presence and habitat was formulated in the report, and I think it was covered quite adequately there.

MR. L. COMIN: I don't think so. How could you tell in the report, the difference between a cow and a bull moose in March?

MR. W. DWERNYCHUK: I wasn't on the surveys. We did have three wildlife biologists there. So I can't specifically answer you.

MR. L. COMIN: So I'd ask the Board to get this information because I'm sure some of your members there realize that cows and bulls are difficult to tell from the air in March. You pretty near have to be right there looking up their rump. Thank you.

MR. A. REDSHAW: Mr. Chairman, if I could, the Wildlife Service of the GNWT have requested that we hold a meeting with the consultants to discuss this report, since it's identified that the main thrust of the report is outside the mandate of the Water Board. When we do have that meeting I'll ensure that Parks Canada representation is present. Thank you.

MR. B. CASE: Mr. Dwernychuk, would you be able to get the information that Mr. Comin requested?

MR. W. DWERNYCHUK: Yes, I will.

MR. B. CASE: Would you pass a copy to the Board, as well as to Mr. Comin please. And a copy to the Dene Nation too, please.

We might as well stick to technical questions. Mr. Bayly, are you going to be technical questions, or ...

MR. J. BAYLY: (not audible)

MR. B. CASE: Okay, well we seem to be in a technical mood at the present time.

MR. J. BAYLY: Mr. Guild, or perhaps Mr. Hamilton, I'm not sure, yesterday Lorayne Menicoche was asking some questions about cyanide, its presence



and storage on site. I understand the cyanide is being brought on because you hope to be able to be milling within a matter of months. Is that correct?

MR. G. HAMILTON: That's correct.

MR. J. BAYLY: I further understand that your trucking season is limited to approximately three months, so you would anticipate bringing in sufficient cyanide to supply you for the next year, including the next winter road season. Is that also correct?

MR. G. HAMILTON: That is correct.

MR. J. BAYLY: In that regard, is my calculation of approximately 140 tons of cyanide more or less correct?

MR. G. HAMILTON: It is of that order, yes.

MR. J. BAYLY: You have talked about submitting a plan for storage of this cyanide above the floodplain. Can you tell me when you expect to be submitting that plan either to the Water Board or Territorial Land Use people.

MR. G. HAMILTON: I expect that that would be submitted the latter part of next week, or the week following.

MR. J. BAYLY: Have you asked for date of approval, and have you proposed, or do you intend to propose, a schedule for constructing the facility or preparing the site where you would want to store this material?

MR. G. HAMILTON: If I understand your question correctly, we will make a submission to Water Resources and following a reply from them we will then proceed. We have to be assured that Water Resources and Land Use, and other people involved, are in agreement with the location and with the type of installation we may propose.

MR. J. BAYLY: If you were given permission at the end of next week, when would the earliest be that you could remove the cyanide from the present storage area to the one that you would be proposing in your plan?

MR. G. HAMILTON: That is rather difficult to answer at the exact time. We are as concerned about the storage problem as anyone else is. Once approval is given, we'll move expeditiously to relocate the cyanide into an approved location.

MR. J. BAYLY: Could that possibly be done before spring break-up?

MR. G. HAMILTON: Yes, I believe it could.

MR. J. BAYLY: Is that dependent more on the authorities you must seek permission from or on your own ability to prepare the site?

MR. G. HAMILTON: That, again, is a rather difficult question to reply to. Again, all I can say is that we would anticipate that the authorities will move as expeditiously as we're prepared to move.

MR. J. BAYLY: Can you tell me what permits, if any, you transported the cyanide to the site under and what permits, if any, you're storing it on the site under?

MR. G. HAMILTON: I'm sorry, I can't answer that.

MR. J. BAYLY: Is there anybody on the panel who has the answer to that question?

MR. L. MORRISROE: It's under the land use permit.

MR. J. BAYLY: Is that a land use permit, Mr. Morrisroe, for the transportation, or transportation and storage?

MR. L. MORRISROE: Transportation and storage.

MR. J. BAYLY: Mr. Chairman, I have one area of questioning for Mr. Cullen that came up as a result of some discussion last evening. Mr. Cullen,

there was a discussion yesterday regarding a minewater in relation to whether or not Cadillac was presently using water in its pre-mining operation, if we can call it that. My question to you is, first of all, are your Inspectors not checking the minewater that is coming out of the mine for its quality in relation to heavy metals and suspended solids?

MR. A. CULLEN: Yes, they are checking the minewater coming out for heavy metal content.

MR. J. BAYLY: Are your Inspectors not then treating the water that is coming out of the mine in any event as water under your responsibility?

MR. A. CULLEN: Yes, we are.

MR. J. BAYLY: I believe you were here when Mr. Hamilton was talking about using water in the mine to act as a dust suppressant, and that that was proceeding satisfactorily. Do you recall that evidence?

MR. A. CULLEN: Yes, I do. And I stand corrected yesterday evening by the Inspector that there is an authorization to use water in the mine.

MR. J. BAYLY: I was getting to that, and I was wondering whether that was just an oversight on your part.

MR. A. CULLEN: Yes it was.

MR. J. BAYLY: So you're treating the water being used in the mine as water that you're in a position to authorize or not authorize.

MR. A. CULLEN: Yes we are now.

MR. J. BAYLY: Yes. Mr. Chairman, my only other area of questioning is as a result of some questions that Ms. Menicoche asked last night regarding the Technical Advisory Committee/Board role, and it arises

out of your ruling that this is a new Hearing and, therefore, that new evidence is what will be considered as evidence and other things will be considered as part of the public record. And, what I'm wondering, and I wasn't clear in the interchange between yourself and Ms. Menicoche is how you intend to treat meetings between yourselves, the Technical Committee, and Cadillac Mines personnel that precede this Hearing that we began yesterday, whether you feel that those will have to begin again or whether you will consider those as part of the Technical Committee/Board work in relation to this Hearing.

MR. B. CASE: First of all, I'm not aware of any meetings between the Board and the Cadillac personnel, now I could stand corrected on that. I'm not aware of that, Mr. Bayly.

MR. J. BAYLY: I see. So the meetings so far have been with the Technical Committee and Cadillac only?

MR. B. CASE: That's my understanding, yes. With respect to those meetings, and the interchange of ideas and discussions, what should we say, it would be extremely difficult to purge the minds of all concerned with what transpired. But what this Board does intend to do, first of all in its own deliberations, to confine itself to considering the transcript of this Hearing as the evidence upon which to make decisions with respect to the licence. I think, and I will not commit the Board at this time, but I think it would be proper for the Board, and the Board will discuss this, that the Technical Advisory Committee be directed, when considering this licence, that they also deal with the transcript of this meeting, and not the previous meetings.

MR. J. BAYLY: I understand your point then, sir. I have, in relation to that then, one request, or I'll put it in the form of an application,

one of the residents of Fort Simpson, Mr. Rene LaMothe, was wondering about the status of evidence he'd given previously when the May Hearing took place. And I was not able to assure him that that was before the Board in this application. He was not able to be here after supper last evening, or today. He has asked if I would read a portion of his evidence into the record much as Mrs. MacQuarrie read the submission of Janet Grand from the National Parks Association, and I would apply to do so prior to the completion of this Hearing.

MR. B. CASE: I think that that would be, would clear up any uncertainty, Mr. Bayly, if you took that course.

MR. J. BAYLY: Alright. Since we're in technical questioning, I would propose just to wait until later because you've embarked on that, and just before the end of the Hearing perhaps I'd just read that into the record if I might.

MR. B. CASE: That's fine, Mr. Bayly.

MR. J. BAYLY: Those are my questions, sir.

MR. B. CASE: Thank you. Further questions? Mr. Falk.

MR. M. FALK: Mel Falk, Parks Canada. Two areas of questions; first of all to deal with the Environmental Technician as outlined in Cadillac's summary, on page 34. First of all, when would this person be on site, at the minesite?

MR. G. HAMILTON: We are actively recruiting an Environmental Technician and, as we are all aware, it takes time to find a suitable candidate. Once you find a suitable candidate it takes time for him to resign his present position and join our staff. We have not engaged an Environmental Technician at this point, we're still assessing applications

and looking at the various individuals. We have, however, engaged a Mill Superintendent who has had, spent the last six years in the Northwest Territories and is familiar with the environmental requirements. And once this Environmental Technician is retained by Cadillac, he'll come under the direction of the Mill Superintendent.

MR. M. FALK: This Environmental Technician would be subject to the normal rotation of 19 days on and whatever, nine days off. From your answer then, recognizing the need for a back-up person, would that be the Superintendent as well?

MR. G. HAMILTON: At this moment, that is our planning. As you can appreciate, in a rotating schedule, you have these difficulties of providing coverage, and we are busily trying to come up with our schedules, not only for the overall work force, but for individuals such as an Environmental Technician, of how we can rotate our people to ensure that we do have the adequate back-up.

MR. M. FALK: From your staffing action that you're presently going through, what are your basic requirements for training and education for this person?

MR. G. HAMILTON: Again, we are considering an applicant who is presently working as an Environmental Technician; he's a graduate from the University of British Columbia. And we are looking fairly hard at him, and if we can attract him into our operation, there's a strong possibility that we will make an offer to him. They are not easy people to find.

MR. M. FALK: I appreciate that, and that's one of the reasons I'm asking this series of questions. Part of the statement on page 34 relates

to liaison with mining personnel, government agencies. Would this person liaise directly with Parks Canada personnel at the Park level, for example, the Park Superintendent, and maintain liaison with this person on a day-to-day basis as required?

MR. G. HAMILTON: That's what we would envision, working under the direction of our mine management.

MR. M. FALK: Related to this Environmental Technician's responsibilities, it's perceived it would be a considerable requirement for laboratory facilities and support, I don't know whether a question or a comment, that perhaps the advice and expertise available in Environmental Protection Service or Department of Indian and Northern Affairs should be sought in the design and set-up of this laboratory facilities, and also some form of cooperative quality control program established for any analysis that are conducted.

MR. G. HAMILTON: Cadillac has engaged a consultant to assist ourselves and our design engineers in the setting-up of our laboratory facility. The same gentleman is also working with us to staff that facility. He is also preparing the standard analysis that he would recommend we conduct, the standard methods that we use in all our analysis, and these will be submitted to Water Resources for their comments before we establish the procedures in the lab.

MR. M. FALK: I think that the underlying thing here is that the quality control, or the exchange of samples for cross-checking purposes, it's quite often a problem with different laboratories to compare results without such a quality control program. And it's a standard practise, I believe, that is followed and there are quality control programs in existence which, for example, Cadillac could participate in.

MR. G. HAMILTON: We're prepared to participate in such programs and our practise will be in establishing our lab that we will run parallel samples in an independent laboratory until we have confidence in the quality control within our own laboratory.

MR. M. FALK: Okay, thank you. Another area of questioning, and I think I'd like to follow-up on Mr. Carter's comments of yesterday with respect to background levels, or baseline water quality conditions in Nahanni National Park. Just to go back one step here before going into, or trying to explain further.

Part of the rationale for a maintenance of background water quality in the Nahanni National Park in a pristine condition is, there's a number of reasons for this, one of which it's inherent in the purpose of the Park, as I previously stated in my submission, or the DOE submission, I'm sorry. That's one of the reasons the Park is there. It's reflected clearly in Parks Canada policy, which is a widely accepted, reviewed and approved document, which sets forth Parks Canada's policy with respect to National Parks, and I can leave this copy with the Board if there is not already a copy with you. On page 41, dealing with National Parks under the subject of resource protection, and it states, "Natural resources within National Parks will be given the highest degree of protection to ensure the perpetuation of a natural environment essentially unaltered by human activity."

And we have to go back to this document since it's been supported and had input from the public at large, and has been approved and accepted by the government at large; so one has to go back to it. Also, it's Departmental position which has been clearly enunciated by



Department officials that measurable increases over background of Nahanni National Park water quality, for example, would not be accepted. And the submission to the Board presents this and I think everybody recognizes this aspect.

So if there's any, I just wanted to respond further. If you have any other questions on that.

MR. G. CARTER: I think the evidence is clear, and you will admit that this mine, Cadillac's mine is not within the perimeters of the Park. Now I understand that if there is a designated park area that includes a pre-existing economic use, a commercial use, that some sort of compensation has to be paid to that user in the event that additional costs are imposed upon him or that he has to shut down. Isn't that correct?

MR. M. FALK: I'm not really familiar with that area at all. The whole subject of compensation, I'm really not able to talk about that.

MR. G. CARTER: Well, your two other gentlemen here. Thomas, can you help us? I'm sorry, Mr. Young, I beg your pardon.

MR. J. YOUNG: That's alright. John Young, Counsel. Really, one of the problems that is faced in setting up parks is to attempt to take over a park, the integrity of which can be more or less guaranteed. The normal pattern in setting up parks is to enter, the historical pattern and present policy is to enter an agreement with the Province whereby subject to agreed cost-sharing formulae the Province will acquire lands and later turn over the administration and control of these lands, which normally include the total freehold of the lands, including all mineral and other rights, to Her Majesty The Queen and Right of Canada.

Thereafter, the Parliament of Canada designates the parklands under the schedule of the National Parks Act; this can be done either by amendment or it can be done by a proclamation procedure, which has caused a little bit of problems in one of the Parks in New Brunswick.

Initially, compensation has only arisen really in relation to parks at the outset, when interests are being, in essence, bought out. I don't think that it has been, in fact I know that it hasn't been a major problem in dealing with applications such as the one presently before the Board. One of the reasons, quite simply, being that the park planners are conscious of the desire, or the desirability of pretty well working the park boundary along the lines of a watershed, as far as possible. It's perhaps slightly ironical that in the National Park area, which is perhaps most closely allied to the water aspects of the Park, that this has not been done and that, in fact, the preservation of the Nahanni River includes only a relatively small part of the total watershed.

I can appreciate that this creates a few problems which I suppose the Board, to some extent, has to adjudicate on. I can also appreciate what the Chairman of Cadillac said about him having spent, or his company having spent, quite a bit of money in developing his mining interests. It's equally true to say that the Government of Canada, through Parks Canada, has spent quite a lot of money in developing and attempting to preserve the Park interests within the Park.

MR. G. CARTER: Well, sir, in our Act, if you'll read it, you'll see that where priority uses are set within a water management area the question of compensation has to be faced ...

MR. J. YOUNG: That's right.

MR. G. CARTER: It's written right into the Act. Now it's all fine and good to talk about priority of uses, that's fine, but I think something has to be addressed in terms of who's going to pay the cost of this priority. Because it might be very hard to put the entire cost, or the increase in operating costs required of a particular applicant, on that applicant. In other words, to throw the whole of the burden of the national interest in the preservation of water quality standards on a particular applicant. It seems to me that the people who talk about priority of use are in fairness, not to mention legality, required to address the issue of who's going to pay, or how that cost is going to be shared between the applicant and the public that's allegedly protected.

MR. J. YOUNG: I had the ...

MR. B. CASE: Gentlemen, I wonder, we're getting into a bit of a legal discussion, which is very interesting, but I would like to carry on with questioning. I know you two gentlemen could maybe get in a corner and discuss this further.

MR. J. YOUNG: Thank you very much, indeed.

MR. L. MORRISROE: Mr. Chairman, I'd like to say this here today. Parks Canada is the same as anybody else here at this Hearing today. I don't want anybody to think because Parks Canada says something it's right. I think there's Parks Canada's ideas, our ideas, and the other people's idea, and it's got to be the Water Board here that's going to make the decision. The reason I'm bringing it up, I don't want you to think that Parks Canada are any experts because we all know, in Canada

today, there's probably more problems caused by the government, you know what I mean, than all the rest of the people. So I think that we're here today to let the Water Board here to make the decision and on their own merits in that regards.

MR. B. CASE: Thank you, Mr. Morrisroe. We will take the presentations of everybody into consideration when we make our decisions. Are there any further ... did you have any more questions, Mr. Falk?

MR. M. FALK: No.

MR. B. CASE: Any further questions at all? Okay, Mr. Bayly, would you like ...

MR. L. MORRISROE: Pardon me again, Mr. Chairman, maybe I'm wrong. I haven't got the transcripts in front of us of Rene's that he's going to read in. But my recollection, they were very long and I think that Rene took very near an hour to put his in that time. Now we got no objection on putting them in, but maybe we could complete the Hearing and then Rene can read them in, we got no objection but I don't see, it would help us a great deal the sooner we could get away. If it's going to be an hour delayed, Rene could read them in after we've finished the meeting.

MR. B. CASE: I think, Mr. Morrisroe, Mr. Bayly said he was only going to read a short excerpt.

MR. J. BAYLY: I believe it's ten pages of transcript, Mr. Chairman; that's all that I intended to read. You've made a ruling that I can't file it. That's the dilemma I'm in.

MR. B. CASE: Well, we'll think about that because we have some more questions here. Mr. Gamble.

MR. D. GAMBLE: I've got one question, Mr. Guild or Mr. Hamilton, that arises from the Government of the Northwest Territories brief, and they are talking about, on page 3 of their brief, they point out that they had strongly opposed the issuance, originally, of land use and other permits. They express some concern about the plans, that appear now to have been withdrawn, for increasing the number of stream crossings, of permanent crossings, and so on, this proposal that Mr. Morrisroe said yesterday had been subsequently withdrawn.

But you'll notice in the middle of page 3 that they're asking the Board one very specific thing. They say, "Both water licencing and leasing of the project must be comprehensive of the proponent's plans. To that end, a tentative timetable for further development of the site should be requested so that careful consideration of the possible impacts, and mitigation of these effects can be planned."

Would it be possible to produce such a forecast?

MR. G. HAMILTON: We, in discussions that we have had with the various agencies, Cadillac recognize the lack of planning that we have had in the past, both short and long range, particularly long range. And we have consented in our preparing, commencing to prepare a long range plan for the development, as we foresee it, in order that the agencies will have sufficient time to address any problems that they may see appearing over the longer term.

MR. D. GAMBLE: Would a copy of this be available to the Board during the process of our preparing the licence, or is that something you see of coming much later?

MR. G. HAMILTON: I am not, at this point I cannot say the timing when we would expect to have that completed. We have a lot, a fair amount of work to do on it. The work has commenced and, just one of the difficulties, one difficulty that we have is trying to indicate a sequence of how we would go about the work. But our main thrust, at this point, is to indicate to land use, and to others, the areas of interest that we will have over a period of time.

MR. D. GAMBLE: Well I don't want to try and persuade you to do something that's not possible, but there's a clear request here to the Board that they consider this type of thing in the process of licencing. And, if you could, I would like you to respond to that, perhaps the best way is in as general a way as is necessary you could outline what you see ahead and you could, of course, do that at your convenience after the Hearing, but I think it would be quite helpful and it would certainly respond to this concern by the Territorial Government.

MR. G. HAMILTON: We'll be pleased to do that.

MR. D. GAMBLE: Mr. Chairman, I wonder if I could ask Mr. Bayly some questions related to the Dene Nation brief.

MR. B. CASE: Yes, go ahead, Mr. Gamble.

MR. D. GAMBLE: Mr. Bayly, these are just questions for clarification.

The brief is quite tightly written, and I guess what I'm asking you is if you could expand on a number of points that are raised by the brief. On page 1 of your brief, at the bottom of the paragraph number 2, the last sentence.

It says, "It is therefore further submitted that the Water Board consider, as Parks Canada has recommended, the future development

potential of the proposed Prairie Creek Project in relation to the present water use and waste disposal application by Cadillac Explorations Limited."

Now clearly, as Mr. Hamilton's answer has indicated, there's limits to what we can try and forecast. What are you asking for here? What do you mean by "the future development potential"?

MR. J. BAYLY: When the brief was written, it was prepared after a review of the Water Register, among other things. On that Register was a request to Mr. Andrew Cullen for permits to build a permanent road of 25 miles, an airstrip, and some bridges. And the rationale was to open up other zones of mineralization which appeared to be necessary for the ordinary operation of the mine. That, we are told at this point, is no longer an application but at the time that the brief was written, it was not only submitted in letter form but it was backed up with the report to say that the mine needed this expansion to operate. The submission, therefore, to the Board was that if that's what the mine looks like, it should be licenced as one, rather than licenced piecemeal, or licenced in part and authorized in part. I appreciate that five years from now, two years from now, there may be a cause for either a Hearing to consider an amended application or a new application for some other facilities. I've raised this before with the Board, particularly in relation to Interprovincial Pipeline, and whether the whole project should be considered in relation to its water use, or whether it could be considered in works, in individual works. And the Board did not agree with me at that time. I think I would make the submission though with regard to a mine, that one would have to be very careful not to

say authorize the water use in a camp that was part of the mine and licence it for mine use or so divide the uses of water that they could all fit within the authorization category and no licence would ever be necessary. That's the thinking behind that point.

MR. D. GAMBLE: In response to the concern, similar concern raised by the Territorial Government, Mr. Hamilton has undertaken to provide some information. Would that satisfy you, in the context of this particular submission you've made.

MR. J. BAYLY: It would certainly go some distance to satisfy me. I don't know what that information would be in advance.

MR. D. GAMBLE: Could we go to page 2, on item 4, and this comes back to some things that Mr. Carter was beginning to touch on, and I don't want to get into the heavy duty legal arguments, but you say here, you're submitting that the Water Board and the Minister should make recommendations regarding priorities prior to the issuance, prior to the issuance of a licence to Cadillac Explorations. I want you to tell me in the best way you can, how we would go about this, in your view, the criteria you would suggest the Board might use to establish such priorities, and what other implications that you would see for this. And Mr. Carter has raised one which relates to compensation. But if there are others in your view that would arise here.

MR. J. BAYLY: First let me say that it's subsection (d) of Section 26, rather than (b), I was referring to.

And I won't get into the legal part of this because you have Legal Counsel to advise you. But the submission is that, and it's been made before by the Dene Nation, and in this case it's been



supported by Parks that there should be established certain water use priorities. The Board in a sense has already begun that using another part of the Section 26. And I just don't have it right here, but you've set, for example, effluent quality guidelines; you now have sewage guidelines for municipalities. In a sense that is one way of setting priorities.

Another way, and you now have water management zones within the Northwest Territories, there's a question of whether they're too big to be treated as management zones or not, but that's something that the Board and the Minister would have to wrestle with from an administrative point of view. That what we presently do, and I think the Board expressed this frustration as well, is we react to the applications of individuals or companies who seek to use water for specific purposes. We're often placed in the position of a partly completed project, or one like the Cadillac Mine which is substantially completed. It becomes much more difficult then to say well that doesn't fit into our water use plan for an area. To start with, we don't have one.

But it seems to me that it's time that this Board and the Minister addressed the question of priorities. And I know that there's an issue, how do you do that? Do you have to have an application, or don't you? And one view would be that yes, if the Dene for example, or Parks Canada, wanted to establish a priority that they should make an application to the Board.

I think Betty Menicoche talked about that in a very simple way saying well, where do the Dene fit into all this. They've, in a

sense, looked after the waters in their own way for many thousands of years, and suddenly here's the Board. Do they have to submit to and make application to the Board. The Board has certain responsibilities to look after the waters. They're specifically to look after them for certain groups of people, the people of Canada and especially the people of the Northwest Territories.

That's, I think, a good thing but it's also old fashioned in a way. And that question has been raised in the United States in something the Board might want to look at. There's a very good brief to the Supreme Court of the United States in the Sierra Club case against the Disney Studios, involving certain redwoods in California. And the issue there was whether trees should have standing in the courts and who should speak for the trees. The brief is in book form in a book called Should Trees Have Standing.

The reason I raise that is because I leave with you the problem, does everybody who uses water have to apply to the Board to establish a priority for his use? And if he does, how do the fish apply to the Board, or the trees? Some of them may be protected because they're apparently useful to people, but the Slimy Sculpin may be left out. Who speaks for him. And it sounds absurd but it raises the point, do you have to have an application before you to protect waters for people and for their own value.

And I expect if you don't set priorities groups like the Dene may apply for the use of all the waters in the Northwest Territories, or in the Denendah Region of the Northwest Territories, to force you to set priorities. But I don't know that you have to do

that, that they have to do that under your Act. Again, that's something you should seek legal advice on.

But the question I have raised, and Section 26 (d) doesn't say you must have a Hearing, so that you and the Minister can set priorities. It just says that the Governor-in-Council may make regulations if the Minister and the appropriate Board agree and can convince the Cabinet to set those priorities.

And I realize there are problems of how you compensate priority users if there is damage. Whether you prevent certain uses of water, in other words, whether you discourage certain people from applying because they can't possibly meet the standards that you have set up. But again I stress, you've already embarked on that with certain effluent quality guidelines for both municipalities and mining companies.

MR. D. GAMBLE: Well I don't want to drag this out unduly but you've asked us here, both in 4 and 5, and in a sense even under item 9 when you refer to FEARO, to take a broader look, and in some cases you've asked us very specifically to do certain things like establish priorities. Now it seems to me that the traditional way of handling this is for the Board to react to applications, and you've noted that. You've also suggested that we could hold, perhaps, Public Hearings pursuant to other sections of our Act to seek public advice in a management region such as this one. And barring all those things you seem to say that the whole thing should be scrubbed and we should persuade the Minister or on our own refer the whole thing to the Federal Environmental Assessment and Review Office. Is that a fair summary?

MR. J. BAYLY: Yes, those are three alternatives that I think you may have. Every time you have a Hearing you end up with somebody applying for use of water and then you have a number of other people and groups saying but there are other users of that water and we think their uses may be as important, or more important, and therefore you either have to set stricter standards in your licence or not licence a certain operation. So in a sense, you're always having a Hearing into the competing uses for water, even though only one group may be applying.

MR. D. GAMBLE: I guess this is something we'll have to pursue later. Thank you.

Mr. Chairman, I just have some final questions related to the DOE and Fisheries and Oceans brief.

MR. B. CASE: Brief questions?

MR. D. GAMBLE: I hope so.

MR. B. CASE: Mr. Sutherland and Mr. Falk, would you want to come up here.

MR. D. GAMBLE: Mr. Sutherland and Mr. Falk, in your brief you've asked the Board to consider things that go well beyond the particular application, and this is consistent with what the Dene Nation and others have asked for. Can you tell me how large the zone of influence is around this Park that you're asking the Board to consider?

MR. M. FALK: The zone of influence ...

MR. B. CASE: Would you identify yourself.

MR. M. FALK: Mel Falk. By virtue of the position of Nahanni National Park in the South Nahanni watershed and the fact that all tributaries,

streams flow into and/or through the Park, our concern and our area of concern is the South Nahanni watershed and developments within that watershed.

MR. D. GAMBLE:       Okay. So within that area you're asking, as I understand it, that the Water Board provide some assurance by some mechanism that the natural environment remain essentially unaltered by human activity, that's from page 2 of your brief; that the waters remain essentially unpolluted, that's from page 3; and at the bottom of page 3, that the qualities inherent in the Park be maintained. And then other places the words "pristine" and "statistically significant" and everything else appear.

Now you've heard the discussion that we've had related to numbers that were both contained in your brief and the response of Mr. Guild. Is the present position of this mining company, and their undertakings to meet the numbers in their brief, sufficient in your view to meet these types of concerns that I just described from page 2, 3 and elsewhere in your brief? Is that, will that be under the statistically significant requirement? Will that meet "leaving it essentially unaltered by human activity" as you've suggested here? Or are you asking for something even more?

MR. M. FALK:       I think I'll ask Dave Sutherland to answer part of this. Through the deliberations of the Technical Advisory Committee, Parks Canada has been represented quite well and what is presently drafted in that licence, I believe, is generally satisfactory. However, I guess that present licence has to go through a number of hoops, and what will come after those deliberations I don't know. But presently,

I think that the limits are within the area as required, or as reflecting Parks Canada's concerns. Dave.

MR. D. SUTHERLAND: I think if you go to our Table 1, the one with the figures on it, the page with the figures on it, and you look at the columns there, you'll see that those numbers represent the combination of effluent concentrations at maximum average effluent concentrations and dilution rates which we feel, or which we state will meet our objectives of no significant increase at the Park boundary. So if you take those and compare them to what Cadillac has submitted, and especially what they have submitted in their February 20th letter to the Board where they offer two alternatives, you'll see that for their alternative one, it will exceed, or their values will exceed our values under our table for 20 to one dilution.

MR. D. GAMBLE: Yes.

MR. D. SUTHERLAND: For a number of the parameters. I've just forgotten which ones they are, but under our column for 40 to one dilution based on their alternative number one, I believe chromium is the only value, or only parameter that would be above our values.

MR. D. GAMBLE: So the more stringent requirements that have been suggested by Indian and Northern Affairs, in your view, are unnecessary. Well you've said here that this will protect the Park, this is your submission. Now my reading of the Indian and Northern Affairs' numbers are that they're more stringent yet.

MR. D. SUTHERLAND: Okay I think, right, we say this will protect Park waters, and these are suggested values. Because the company has indicated in their effluent discharge strategy that they can meet dilution rates

of 40 to one on an average basis, based on the average flow records, that in fact they could then for the amount of effluent that they have arrive at some sort of accommodation between the concentrations that they've suggested and dilution factors between 20 and 40, but above 20, or between 20 and 40 somewhere but above 20.

Now I recognize, or acknowledge I should say, the concern that Mr. Stendahl pointed out about acute toxicity, and we realize that our column for 40 to one dilution is, some of the values are at or very close to levels which could be acutely toxic. So that probably, you know, based on that a more ideal value, in terms of meeting all those requirements, would be somewhere between our 20 to one dilution and our 40 to one dilution. But that makes a number of assumptions. That assumes that this is feasible for the company to meet. You know, it assumes you can measure accurately the flows, you know, within certain levels of error and that sort of thing.

MR. D. GAMBLE: Okay. On page 9 of your brief, under the heading "Long Term Disposal of Wastes", you suggest, "If necessary the Board should require an independent review of the proponent's final plan for abandonment and restoration."

Isn't this something that DOE does as a matter of course? Why do we need yet another? Are you suggesting yet another outside reviewer for an abandonment plan, other than what would be provided by Department of Environment, Department of Fisheries and Oceans, and the Department of Indian and Northern Affairs?

MR. D. SUTHERLAND: I guess my response is that we certainly would review what has been submitted in terms of a restoration or abandonment plan, or

any other matter for that sake. But within the constraints of people that we have available, and expertise that we have available, I think, in a sense what I'm saying is, I guess, that we would offer our services, I guess, in assessing this thing and offer our advice to the Board based on the assessment that we may do, but we may not have the people or the expertise to do it.

MR. D. GAMBLE: Well, everybody's getting anxious to go here, but you're not asking for an independent private firm to be engaged later to review this? Surely there's a capability within the Government of Canada to determine whether an abandonment plan is sufficient or not, in addition to whatever expertise the Board itself can bring to bear.

MR. B. CASE: Do you wish to reserve judgement on that, Mr. Sutherland?

MR. D. SUTHERLAND: I think I would, yes. I would like to reconsider our meanings as Mr. Gamble is reading into this.

MR. B. CASE: More questions, Don?

MR. D. GAMBLE: Item 1 on page 11, you say that, "The Water Board should support the proposals that South Nahanni watershed be designated as a water management area."

First of all, as was outlined by Mr. Bayly, this has already taken place has it not? Item 5 under the Dene Nation brief points out that a water management area's already been established. Number 5 on page 2.

MR. M. FALK: I'm not aware of any designation for the South Nahanni watershed, as such, as a water management area. There may be. I'm not aware of it.



MR. D. GAMBLE: Maybe you could, with reference to item 5 of the Dene Nation brief, if you could let me know later on what it is that you're asking for in addition to what has already been established under the Northern Inland Waters Act regulations.

MR. M. FALK: Parks Canada has communicated to the NWT Water Board in writing, previously, with respect to this matter and has not received a response to my knowledge. Perhaps that might be one further avenue of clearing this up.

MR. D. GAMBLE: Well let's just deal with what your submission says here. You're asking that the watershed be designated as a water management area. It's my understanding that that has been done and that what you're in fact asking is something much more specific than that. And what I would like you to do later is tell me what that is, or how it is different from what Mr. Bayly points out in item 5 of his brief. And I'd also like you, in that reply, to tell me how you expect the Water Board to recognize the National Park as a priority water user, exactly what mechanisms are you suggesting that the Water Board use there, and in light of what Mr. Carter has said, whether or not Parks Canada is willing to accept some of the costs that that involves, particularly that related to compensation. Now these are things that are legal in nature, and that's the reason that I'm asking for them in a written reply.

Those are all my questions.

MR. B. CASE: Thank you Mr. Gamble. Thank you, gentlemen. Mr. Bayly, would you ... fine.

MR. A. CULLEN: Just for a point of consideration on the table and the conditions applied to the table, you have under condition 6, excuse

me it's Andrew Cullen, effluent shall not be acutely toxic to fish. But yet under column, under 40 to one dilution, I ask the question if you don't think that those levels would be acutely lethal and that maybe you shouldn't reconsider your condition of acute lethality. From my discussions with in-house biologists in Water Resources, they indicate to me that the numbers of .2 for copper, .3 for nickel, and .4 for zinc, if in combination if not individually would certainly kill fish in the 96 hour bioassay. So I ask you that maybe you shouldn't maybe take that to the Board as to what you feel about that.

MR. D. SUTHERLAND: Well I think my response to that is certainly, we'll consider this aspect, and as you suggest we haven't looked at it closely enough. What you're suggesting then is that in light of our basis of maintaining water quality, we should be looking at, in order to meet the requirement for non-acutely toxic effluent, at a dilution rate that's less than that. And I say fine, I think you know we're flexible to that. We have a lot of other things that have to be juggled, such as the company's ability to meet stringent levels.

MR. B. CASE: Thank you. Mr. Bayly, the Board has discussed the matter of Mr. LaMothe's presentation, and the Board is prepared to accept Mr. LaMothe's brief as new evidence, and we will have this typed into the transcript as read, but it's not necessary to read it if you can provide ...

MR. J. BAYLY: Page references, sir?

MR. B. CASE: Page references would be fine, just to ensure that we get the proper portion.

MR. J. BAYLY: Yes, this is from the May 20th, 1981 transcript of the Board of Hearing, starting at the bottom of page 69, finishing on the second line of page 79. There is, within that, which I was going to leave out, on pages 73 and 74, an interchange between Mr. Glenn Warner, the Chairman of the Board, and Mr. LaMothe. So I would ask that that be left out, since it's not capable of being put in brief form. It concerns the World Heritage situation, and so if that helps the reporter to delete that section. It begins, the brief will end then on page 73 with the sentence, "We stand on guard for who", and it will take up again on page 74 beginning with the first sentence of the last paragraph, "Okay, another area I wanted to just raise, I suppose you've heard these before but I guess it's my right to raise them". And as I say, going on to the second line of page 79.

MR. B. CASE: Very good sir. I direct that these be incorporated into this transcript as described.

MR. R. LAMOTHE: "I'll move onto another area. The social and economic implications of the project outlined by Cadillac. They've been reduced quite specifically to the creation of the jobs with the putting in place of workshops and sensitization of employees for Cadillac from management and workers to the cross-cultural situation that exist in this part of the world. In other words, there's going to be Dene people working with people from down South and that kind of a thing, and that brings to bear a lot of social pressures on both groups, and they have proposed to put together workshops, sensitization sessions, to prepare people to work in a cross-cultural-type situation as they are proposing.

"I have to return, though, to the reality that the primary thrust of the whole economic reality by the company is based on creating of employment and primarily that is an assumption that, I suppose, stems from an inherent belief that one's own way of life is the best way, or the right way, or the only way, and everybody else should adjust to it. You know, that in itself is the bottom line of what you need as far as sensitization is concerned, it's an inherent contradiction in your socio-economic plan is what I'm saying, because for many people jobs are not necessary to maintain a very positive self image. To many Dene, in fact, jobs are a threat to their way of life.

"In other words, the mine at Pine Point, for example, very much altered the way of life of a lot of people from Fort Resolution, and did it in a negative way. And when you look at the mine in Pine Point, or the two gold mines in Yellowknife, you find very few Native people working in there. Those who are working there now are, like in Yellowknife, are second, at least second, generation people since the mines have started up.

"There's been a lot of social pressures brought to bear by the reality of that economic activity on the people of the area and the pressure that's brought to bear is a negative one. It's inevitable and jobs don't offset that. I mean, I talked to that at the last Hearing, the idea that jobs just don't bring to bear enough weight to offset the negative impact of these kinds of projects on a people whose way of life does not flow in that way, does not really adjust or fit into that way of life.

"So I want to submit to the Board that the socio-economic study done by Cadillac is inadequate and is setting up the company to a lot of misgivings.

"The next area that I want to just identify, it has been identified by the Department of the Environment, they've urged that the Water Board take a holistic approach to, and a management-type approach, to water management. And when you start thinking about a holistic approach to these kinds of things you begin to move a lot more slowly, that's the first thing. It takes longer to look at, you know, to look at a 360° thing than it does to look at a 2° type scope, you know. It takes a lot longer. It's more comprehensive, it's more difficult. Things begin overlapping, things for awhile are more confusing, so people take more time. Some people say that people who live in a holistic way are backwards, you know, but that's just a matter, again, of value assumptions and the basis from which people live.

"I want to emphasize that to the Board, I think it is a really good recommendation on the part of the Department of the Environment, that the Board take a holistic approach in their decisions in relationship to the use of water and the granting of licences for the use of water. It's primarily as a result of a holistic approach to life on the part of the Dene that there is this conflict with industry that wants to move in the area, because once you've done it for a number of generations it becomes like second nature to a great extent. Any type of operation like this threatens the integrity of the land. I refer you again to the phrase used by the Department of

the Environment, shut the proposal down until the Cadillac can prove to you that there is no risk, that there is no risk of contaminating the pristine nature of the Nahanni National Park, it's what they're concerned about. But we're concerned about the whole Mackenzie Valley too, you know, we've got to drink that water here in Fort Simpson, and you're drinking it when you come to visit us too, and probably you're going to have to come back in the future 'cause I suppose there's going to be more mining companies applying to you, mineral extractions, in the area.

"I want to advise the Board, as well, of the development that is taking place right now within the region among the Dene. They are negotiating, at this time, with the Minister of Indian Affairs and with the Territorial Administration to set up an Advisory Board, if you want, or an authority, an economic development authority board for the Liard Valley and watersheds. Now this has direct bearing on applicants such as Cadillac. We don't know, at this time, what the authority of this board will have, those things haven't been defined, they're still in negotiating stages, but in a meeting two nights ago with both the Minister of Indian Affairs and the Commissioner, they were both very favorably impressed with the initial steps that have been taken in that area and they indicated they support it.

"So projects such as this prejudice the development of those kinds of things. People begin to wonder, well, what's the use, you know, people with more power turn around and override everything we want to try and do for ourselves, what's the use.

So that's the kind of reaction that comes from people who want to do things for themselves but everytime they try and do it, they're overridden by other agencies, or ignored. It might sound like a radical statement to say, but I think it's fair to say that projects such as this will prejudice the legitimate democratic right of people to govern their own areas. It does it by negatively affecting the minds of the individuals in the area who say we have no control over this area anyway, what's the use. You know, I bring it back to you, what's the use? That's how it prejudices it, in the sense that people just give up before they even start to fight for their rights so, and you know there's only one way of maintaining a democracy and that's by staying on guard. That's the same here as it is anywhere else in the world, like people have given up, they're not going to stay on guard. We stand on guard for who?"

"Okay, another area I wanted to just raise, I suppose you've heard these before but I guess it's my right to raise them. One of the areas that I feel quite concerned about is the cumulative impact of the development on the watershed. We're at the tail end of it, you know, we're getting the dirty end of the stick. We've got Alberta and B.C. dumping a lot of stuff in those rivers that are draining through this system. I can remember ten years ago when you went up from Simpson on the Mackenzie, the water was just crystal clear and it's foggy now, it's getting foggy. Now we've got one of the biggest distillation units over there on Great Slave Lake in the world and that water on the Mackenzie's getting foggy up from Simpson. People will go into the creeks to take water to drink rather than from the Mackenzie now. The effects are there already.

"It's going to get a lot worse and I recognize that it's difficult for you to handle within the scope of your mandate, possibly, but I also recognize that by identifying the limitations that you are experiencing with your mandate in front of people in the communities you are in a position to advise those who have given you the authority to make these decisions of the limitations of your scope and of the necessity of coordinating this thing in a better way. I would submit that the Water Board should commission an analysis of submissions to them in the last few years to attempt to identify the weaknesses in the structure, the present structure, of the Water Board. In other words, what kinds of submissions have been made to the Water Board that the Water Board had no authority over, but that do have bearing directly to applications that come before the Board, and in identifying those kinds of things make a recommendation, or at least advise the Minister and the Commissioner of the limitations of the Board's scope in the light of these kinds of applications. I think that would be relevant to the development of the Board as a body with credibility and more clout. So I would make that recommendation to the Board.

"These whole areas, though, of the holistic approach to the earth as identified by a number of people, the idea of attempting to develop in a no-risk situation, and the relationships with the earth that man has are centered, in many ways, to the concerns that are expressed by Dene people in front of a lot of things like this.

"One of the functions of the Western mind, and this has become very sub-conscious in the Western mind, is to relate to the



world as its master, to have dominion over the earth, and in the context of having dominion, you know it comes from the Bible, it comes from the Old Testament, from the Book of Genesis, go forth and multiply and rule, whatever it says. But it's been around a long time and people really feel that to have dominion over the earth means to be able to manipulate it physically. I think for a long time the Europeans have neglected to understand that the Bible is a spiritual document and when you have dominion over something spiritually you learn how to live with it in harmony and to leave it alone. The European mind has never really understood that.

"I want to refer you back to a number of statements that were made by old people to Berger on the Mackenzie Valley thing. The land is not only ours, they told him, many people told him this. They recommended to him that before you make a decision on changing the relationship of man with the land, you had best get the permission of all other creatures who use the land.

"You might feel like you're not confronted by that kind of a reality but I suspect that you are. Because we are responsible for what we do and the decisions that we take in our lives and the more public the decisions are, in other words, the more impact our decision has on a vaster number of people, the more accountable we become.

"I suspect that possibly as a group of people you're as much overwhelmed by everything that is put before you as anybody else is. You know, it just comes in like waves, rolls and rolls. How many submissions do you have to hear in a year? I mean, you've got a life to live at home; you've got a family. You haven't got time

to be reading these big technical documents night after night after night; I know you haven't. I haven't either, nobody does, and so you're confronted by it in the same way as everybody else and you're just swamped by it like everybody else. And I think, generally, as a result of that, in the past, you sit back and say what's the use, give them a licence, get them out of my hair.

"I think it's time though that you took a stand. I would recommend that, along with the Department of the Environment, the project should be shut down until there's no risk, and I would go further and say until the proper legitimate authorities are in place to set up the relationships that will not impinge on the people, the Dene from this area, in their feelings, in their beliefs as human beings with a specific way of life, that in fact they have some control over their lives and the area of the earth in which they have chosen to live, because giving them jobs is not going to do any good in that area.

"We've seen the effects of just a lot of money, it has broken up a lot of homes and you've seen it all over the place. I'll give you an example why I say that. In the Dene way, anything that is taken off the land, around here anyways, it's still like that, it's shared, it's given out all over the place. If it comes from the land it's shared, but I know many Dene fathers who go out and make \$2000 in one month working at Hire North, or somewhere else, and come home and that money is theirs, it doesn't go to their kids, it doesn't go to their wife. The kids belong to my wife, she can go and make money to feed those kids if she wants to, that's my money.

Money is a completely foreign thing to the mind of the Dene people. It has no bearing whatsoever on social responsibilities or on plain human common sense in many Dene minds.

"So jobs don't do a damned thing for Dene as far as aiding and abetting the development of a social existence generally. There are some who are the exceptional people but, in general, jobs do not answer the social needs for self image.

"I think if we're really concerned about the social well-being, and the applicant has made a part of their application in that area, are really well concerned of the social well-being of the people in the area from which they are extracting the resources, the ownership of which are in question, then we have to look at things from that perspective as well. And they have to have bearing on whether or not a licence is granted. That's not saying shut down development indefinitely, or for ten generations until the minds of the Dene changes, I'm not saying that. I'm saying until the authorities that are mutually acceptable to the Dene and the Government of Canada and of the Territories are in place such that when development like this goes ahead, the Dene feel we have had input through our leadership and we have some control on our land and the negative impacts of the development come into the kind of context that can be coped with by the leadership with their people, at least.

"I want to leave you with those considerations. Thank you for your time."

MR. J. BAYLY: Thank you, sir. There's one matter, just if this would clear it up for Mr. Gamble, my brief referred to water management

zone, water management area number three, which is the Mackenzie River and its tributaries and all the river basins of the Mackenzie River and its tributaries. I think that's a much bigger area that is a water management zone than the one referred to by Fisheries and Oceans and EPS. So that may clarify that we're saying different things, although I did raise earlier that that might be a bigger water management area than anyone could properly manage as such.

My understanding is that Ms. Menicoche is here and could complete herequestioning before the end of the Hearing.

MR. B. CASE: I don't think so, Mr. Bayly. This Hearing was reconvened at 9:30 in the morning, it was advertised last night, and Ms. Menicoche was invited at that time to be the first questioner, and she did not show up until approximately half an hour ago. Ms. Menicoche has better access to information than probably most of us in that she works with the Technical Advisory Committee and she has had opportunity for questioning. Therefore, I would like to declare the question period closed, and turn the floor over to Cadillac for their summing up. Now if you wish to object, sir ...

MR. J. BAYLY: Yes, I'll just formally raise that I do object to this.

The perceived Hearing is not over, sir, and I think leave it at that.

MR. B. CASE: Thank you.

MR. G. HAMILTON: We would like to state, for the record, that with respect to the development that we are contemplating in the Nahanni region that Cadillac Exploration Limited are fully aware of the importance of the area, both to the people of Canada, to the people who live in the area, and the importance of the watershed. For that very reason

Cadillac has solicited the aid of specialist engineering and environmental consultants to design and construct the facilities for our Prairie Creek operation.

As well, each consultant represented on the panel understands the need for the protection of the natural resources and has given due consideration of that need throughout his or her involvement with the project.

Furthermore, Cadillac and their consultants have to date endeavored to work closely with Government agencies to develop sound engineering design concepts with respect to environmental protection, and intend to maintain the same working relationship in the future.

With respect to some of the submissions that have been made, I would like to make one or two comments. Firstly, on the submission by the Department of the Environment/Department of Fisheries and Oceans, on their comment that the Water Board should review the design and operation and evaluate the adequacy of our systems. We have had considerable discussion on that and it is my understanding that in conjunction with the Water Resource people, our own consultants, and Cadillac, that that situation will be reviewed.

With respect to the longer term disposal of wastes, Cadillac would appreciate if the Board, at its pleasure, should require an independent review of our final submission for the abandonment and restoration.

On the submission by the Northern Affairs Program, I have one comment. And again it refers to our sewage treatment plant which it is questioned the capability of the ultra-violet radiation to

effectively sterilize the waste. Cadillac is prepared, again, to work with the Department should our system not prove to be effective, as we expected the design would, to suggest to the Department alternatives in order to correct the situation.

With respect to the letter from the Water Resources Division dated February the 11th, on the report prepared by Mr. Stendahl, a written reply to that report has been drafted and will be forwarded to the Water Resources Division the latter part of this week or early next week.

With respect to the letter from the Environmental Protection Service, dated September the 15th, 1981, with reference to the oil spill on June the 3rd, 1981, I'd like to clarify one or two points. In the previous statements that have been made by Cadillac in various briefs and communications, both to the public, to this Board, and to the various Departments, there seems to have been some confusion as to statements having been made with respect to existing or planned installations. Any confusion that has caused, we apologize for it. It is rather unfortunate it has happened.

I refer specifically to the quotation in the memorandum from Dave Tilden to Brian Wilson, of July the 14th, in which he says, "Fuel storage facilities at the Prairie Creek site are located within a dyked impervious area complete with an integrally recovery system."

This is a quote taken from a Ker, Priestman statement that was made at an earlier date, which referred to the installation that had been designed and was to be installed. And it was not referring

to the temporary storage facilities that were in use at the time of this quote.

On the, there was another quotation, again in the same document on page 7, again with reference to storage of fuel, at which in the previous submission it was intimated that the diesel would be stored in two separate locations. Subsequent to that submission the decision was made in consultation with others involved that we would go to a single tank farm, and that tank farm has been installed and our diesel fuel is now stored in one location in four tanks.

In conclusion, it's the firm intention of Cadillac Explorations Limited to achieve through good construction procedures and operational management negligible negative impact on the present or future environment of the project area. To assist in the attaining of this goal the construction of both the tailings impoundment earthworks, the plantsite perimeter dykes and the containment berms have been and will be under the direct field supervision of a field geotechnical engineer. As well, Cadillac will employ an on-site Environmental Technician for the life of the project to ensure adherence by project personnel to the environmental programs developed for Cadillac by their specialist consultants.

And finally, I would like to take this opportunity of thanking the Board, the other interested parties, and the members of the public who have sat with us for the last day and a half, and given us the opportunity to prepare our brief and have given us the opportunity to listen to their comments, their suggestions, and their concerns. We in Cadillac, and the people who work with us, will

endeavor to satisfy, to the best of our ability, such concerns and work closely with the agencies with whom we are involved, and with the Water Board.

Thank you very kindly.

MR. B. CASE: Thank you, Mr. Hamilton.

Just a few comments before we wind up. The transcript of this Public Hearing will be forwarded to the Board members and members of the Technical Advisory Committee. In due course the Technical Committee will forward to the Board its recommendations regarding any conditions to be attached to the licence. A meeting of the Water Board will be held to determine whether a licence should be approved or turned down, and if approved what conditions it shall be subject to. The licence will then be forwarded to the Minister of Indian Affairs and Northern Development for his approval. As I mentioned before, the Minister can either approve the licence and conditions as recommended by the Board, but he does not have the authority to alter the conditions. He can reject the licence and return it to the Board. In such a case, the Board may return the application to the applicant for amendment and the entire process could be repeated, which we hope will not be the case.

Before any licence is issued the applicant may be required to put up a security deposit of up to \$100,000, or 10% of the capital cost of the project, whichever is greater. This is part of the Northern Inland Waters Act.

The field staff of the Water Resources branch inspect the project during construction and operation to ensure licence conditions will be met.



In closing, I also would like to thank everybody concerned, particularly the Cadillac people and their consultants, and the intervenors, and the public who attended this Hearing. It has been a long Hearing, but thorough and it has been very beneficial to the Board and we're very appreciative of the time and effort spent by everybody.

Thank you, ladies and gentlemen.

This Hearing is adjourned.

ATTENDANCE

The following people registered with Mrs. Jo MacQuarrie, Executive Secretary, N.W.T. Water Board.

W.A. Case	Acting Chairman, N.W.T. Water Board Yellowknife, N.W.T.
D.E. Arden	Member, N.W.T. Water Board Prelude Lake, N.W.T.
D.J. Gamble	Member, N.W.T. Water Board Ottawa, Ontario
C.J. Kennedy	Member, N.W.T. Water Board Fort Smith, N.W.T.
W.L. Lyall	Member, N.W.T. Water Board Cambridge Bay, N.W.T.
A.G. Redshaw	Member, N.W.T. Water Board Yellowknife, N.W.T.
Dr. O. Schaefer	Member, N.W.T. Water Board Edmonton, Alberta
G.N. Carter	Legal Advisor, N.W.T. Water Board Yellowknife, N.W.T.
A.J. Cullen	Controller, Water Rights Yellowknife, N.W.T.
J. MacQuarrie	Executive Secretary, N.W.T. Water Board Yellowknife, N.W.T.
D.E. Wight	Secretary, N.W.T. Water Board Yellowknife, N.W.T.
M.D. Bath	Kilborn Engineering/Cadillac Explorations Vancouver, B.C.
W. Dwernychuk	Beak Consultants/Cadillac Explorations Richmond, B.C.
R. A. Emes	Cadillac Explorations Calgary, Alberta
B. Fletcher	Cadillac Explorations Vancouver, B.C.
N. Guild	Ker, Priestman/Cadillac Explorations Victoria, B.C.

ATTENDANCE (Continued)

G. Hamilton	Cadillac Explorations Calgary, Alberta
L. Morrisroe	Cadillac Explorations Calgary, Alberta
J. Antoine	Fort Simpson Dene Band Fort Simpson, N.W.T.
J. Bayly	Dene Nation/Metis Association Yellowknife, N.W.T.
G. Betsaka	Nahanni Butte, N.W.T.
M. Canadien	Wrigley Band Council Fort Simpson, N.W.T.
C. Cholo	Fort Simpson, N.W.T.
L. Comin	Nahanni National Park Fort Simpson, N.W.T.
T. Daniels	Chamber of Mines Yellowknife, N.W.T.
M. Falk	Parks Canada Winnipeg, Manitoba
P. Gammon	Village of Fort Simpson Fort Simpson, N.W.T.
P. Hardisty	Fort Simpson, N.W.T.
M. Labine	Renewable Resources/GNWT Yellowknife, N.W.T.
B. Menicoche	Fort Simpson, N.W.T.
K. Menicoche	Fort Simpson, N.W.T.
L. Menicoche	Fort Simpson, N.W.T.
R. Michaud	Fort Simpson, N.W.T.
A. Moses	Wrigley Dene Band Wrigley, N.W.T.
R. Nancarrow	Environmental Protection Service Yellowknife, N.W.T.
D. Stendahl	Water Resources/DIAND Yellowknife, N.W.T.
D. Sutherland	Environment Canada Yellowknife, N.W.T.

ATTENDANCE (Continued)

O. Watsyk	Mayor, Village of Fort Simpson Fort Simpson, N.W.T.
J. Young	Counsel Hull, Quebec
A. Anderson	Fort Simpson, N.W.T.
D. Antoine	Fort Simpson, N.W.T.
C. Antoine	Fort Simpson, N.W.T.
C. Antoine	Fort Simpson, N.W.T.
T. Betsaka	Nahanni Butte, N.W.T.
C. Clegg	CBC Yellowknife, N.W.T.
T. Cousineau	Yellowknife, N.W.T.
P. Cowie	Fort Simpson, N.W.T.
K. Davidge	Fort Simpson, N.W.T.
L. Dvorak	Fort Simpson, N.W.T.
A. Hardisty	Fort Simpson, N.W.T.
G. Hardisty	Wrigley, N.W.T.
R. Heming	Outcrop Ltd. Yellowknife, N.W.T.
D. Jessiman	Fort Simpson, N.W.T.
V. Kidd	Fort Simpson, N.W.T.
J. Konisata	Nahanni Butte, N.W.T.
E. Lamothe	Fort Simpson, N.W.T.
R. Lamothe	Fort Simpson, N.W.T.
T. Lennie	Wrigley, N.W.T.
W. Mawdsley	Fort Simpson, N.W.T.
M. Norwegian	Fort Simpson, N.W.T.
T. Smithson	Yellowknife, N.W.T.
R. Somerare	Hay River, N.W.T.
D. Spaulding	Yellowknife, N.W.T.

ATTENDANCE (Continued)

L. Thomas

Nahanni Butte, N.W.T.

A. Villebrun

Wrigley, N.W.T.

P. Wood

Fort Simpson, N.W.T.

JOHN U. BAYLY

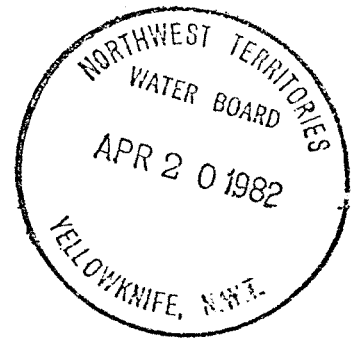
BARRISTER & SOLICITOR

Also a member of  
The Law Society of Upper Canada  
and The Yukon Bar

1 Bayly Burrow,  
Lot 754, Group 964,  
P.O. Box 2882, Yellowknife,  
Northwest Territories, Canada.  
XOE 1H0 (403) 873-8249

April 8, 1982

Mr. W. A. Case  
Acting Chairman  
N.W.T. Water Board  
P.O. Box 1500  
Yellowknife, N.W.T.  
X1A 2R3



Dear Mr. Case:

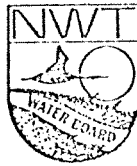
Re: Cadillac Explorations Limited  
Public Hearing, Fort Simpson, N.W.T.  
February 23, 1982

Thank you for your letter of March 8, 1982 to which was attached your statement taken from notes that made at the time regarding the Board's ruling on my request that the transcripts of the April and May 1981 Water Board hearings into the Cadillac Mines application be filed as exhibits and treated as evidence in the new hearing. As far as my recollection is concerned, your notes reflect your remarks. Before I was able to confirm that they reflected your total ruling, I think I would have to see the transcript including the submissions that I made on behalf of the Dene Nation and Metis Association and those made by Mr. Morrisé on behalf of Cadillac Explorations Limited.

Yours very truly,

  
John Bayly

JB/ss



March 8, 1982

Mr. John Bayly  
Legal Counsel  
Dene Nation  
Box 2338  
Yellowknife, N.W.T.  
XOE 1H0

Dear Mr. Bayly:

Re: Cadillac Explorations Limited  
Public Hearing, Fort Simpson, N.W.T.  
February 23, 1982

As you know my remarks regarding the status of the previous public hearing evidence were not recorded at the public hearing as R. Heming was out buying more cassettes at the time.

I have prepared my statement from notes made at the time and have attached them for your perusal and comment.

It is intended that these remarks are to be included in the transcript of the hearing.

Kindly advise.

Yours truly,

for W. A. Case  
Acting Chairman  
N.W.T. Water Board

Encl. (1)

cc to: Mr. G. B. Hamilton

Portion of Hearing that was Not recorded.

Chairman's Ruling on admissibility of transcripts of previous hearings as evidence at this hearing. Approximately 3:05 p.m., February 23, 1982.

Chairman:

Mr. Bayly, the notices of this hearing that were sent out by the Board on February 3, 1982, to all interested parties stated that this would be a NEW hearing. The first paragraph of the notice reads as follows:

"Please be advised that the N.W.T. Water Board is conducting a NEW hearing on Cadillac Mining Explorations application for Water Use and Waste Disposal at Prairie Creek, N.W.T."

In addition, the third paragraph of the notice states:

"Any issues which you may wish the Board to consider must be presented at this NEW hearing."

The Board has, therefore, decided that the transcripts of the previous public hearings concerning this application will NOT be introduced as evidence at this hearing. Nevertheless, the transcripts of the previous hearings are part of the Water Register and are, therefore, part of the public record.



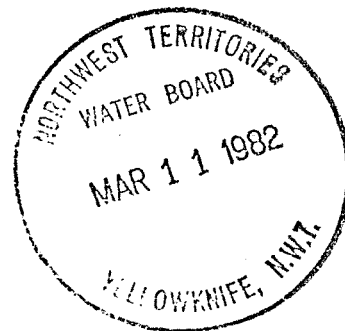
JOHN U. BAYLY  
BARRISTER & SOLICITOR

c c Bel  
15-3-82  
A. C. St.

Also a member of  
The Law Society of Upper Canada  
and The Yukon Bar

1 Bayly Burrow,  
Lot 754, Group 964,  
P.O. Box 2882, Yellowknife,  
Northwest Territories, Canada.  
XOE 1H0 (403) 873-8249

March 05, 1982



1 27/82  
Mr. W. A. Case  
Acting Chairman  
N.W.T. Water Board  
P.O. Box 1500  
Yellowknife, N.W.T.  
XOE 1H0

Dear Mr. Case:

Re: N.W.T. Water Board Public Hearing, Cadillac Explorations Limited, February 23, 1982, Fort Simpson, N.W.T.

In response to your letter of February 26, 1982, thank you for sending me the excerpt from the tape of the Fort Simpson hearing. May I say that the outset that I have no intention to dispute the efficiency, punctuality or the ability of your staff to tell the time. The fact which is not disputed is that the Dene Nation submission was late in that it was not filed before 4 o'clock on February 12, 1982.

The concern I have is with the statement of Mr. Morrisroe which reads, "and this morning there is another brief that ends up here on our desk from the Dene, which I don't think is quite fair to Cadillac to give us a brief at the last hour here and expect our consultants to read it, reply to it, you know what I mean, and everything intelligently."

Since receiving your recent letter, I have contacted Gabriella Lang, Solicitor for Cadillac Mines. I understand from her that when she contacted your Executive Secretary Joe MacQuarrie on February 12th that Mrs. MacQuarrie informed her that a brief was expected from the Dene Nation. Ms. Lang expected to be out of town the next week and left a memo to her secretary to call Mrs. MacQuarrie on February 15th which she did. Finding that a brief had been filed by the Dene Nation, Ms. Lang's secretary called both the Dene Nation office and the Water Board office and obtained a copy of the brief from the Water Board office on February 15th. Ms. Lang informs me that a letter dated February 15th to which was attached a copy of the Dene Nation brief was sent air express to Cadillac Mines office in Calgary. Ms. Lang further informed me that she was in telephone communication with Mr. Ron Emes of Cadillac regarding various briefs on February 18th and 19th.

The Water Board should therefore not be misled into thinking that Cadillac Mines did not receive the Dene Nation brief until the last hour. In fact, the brief was obtained by its Solicitors eight (8) days prior to the hearing and was, I expect, in the hands of Cadillac for approximately one week prior to the commencement of the hearing.

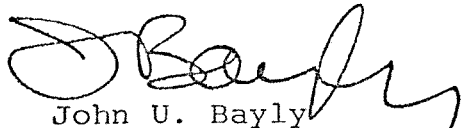
I regret any inconvenience to parties that the late filing of the Dene Nation and Metis Association brief may have caused. As your Board knows from other hearings, the Dene Nation and Metis Association have attempted conscientiously to comply with the rules of the Board with regard to filing a notice.

I understand the Water Board is considering changes to the rules. In light of the fact that interventions can best be prepared after reviewing the evidence and support of an application, may I suggest that in your rules you provide one date for the filing of evidence and exhibits by an applicant followed by a period of time of perhaps fifteen to twenty-one days prior to the deadline for filing of interventions by other parties.

As you will see from a record of these proceedings, Cadillac Mines evidence was filed on February 12 and therefore any intervention which was filed on time would have to be prepared before the applicant's brief was reviewed. In the case of a rehearing this is not particularly difficult, but in normal Board proceedings it puts the public which would intervene at a disadvantage.

You have also noted that there is no obligation upon intervenor to provide a copy of his or her brief to the applicant. You may wish to consider a requirement that copies be sent to the applicant or that sufficient copies be provided so that the Board can send copies to the applicant that is the procedure followed by the National Energy Board.

Yours very truly,

  
John U. Bayly  
Barrister & Solicitor

JUB/ss

NORTHWEST  
TERRITORIES  
WATERBOARD



ALBERTA  
B.C.

February 26, 1982

Mr. John U. Bayly  
Legal Counsel  
Dene Nation  
Box 2338  
Yellowknife, N.W.T.  
XOE 1HO

Dear Mr. Bayly:

Re: N.W.T. Water Board Public Hearing, Cadillac  
Explorations Limited, February 23, 1982  
Fort Simpson, N.W.T.

---

Attached for your information is an excerpt from the tapes of the above public hearing.

The Water Board has investigated your statement that your brief could not be submitted February 12th because the Water Board Office was closed before 5 p.m. The following information has come to light. The closing date for submissions was 4 p.m., February 12, 1982.

Although J. MacQuarrie, Executive Secretary, was on annual leave February 10, 11 and 12, she was in the office on February 12 from 2:15 - 3:30 p.m. John Bayly talked to Mrs. D. E. Wight, Secretary, N.W.T. Water Board, at 3:55 p.m., February 12, 1982, by telephone advising her that the Dene Nation/Metis Association brief was "in the machine being typed" and that he would try to get it over to the Water Board Office by 5 p.m., February 12, 1982.

Mrs. Wight did not leave the office until exactly 5 p.m. and no one from the Dene Nation Office came to deliver the brief by that time. The Dene Nation/Metis Association brief was not delivered to the Water Board Office until 9:45 a.m., Monday, February 15, 1982.

The Water Board Office hours are 8:30 - 12 noon and 1 p.m. - 5 p.m., Monday - Friday.

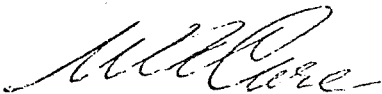
Because the Dene Nation and Metis Association brief showed copies to the Water Board and Cadillac, we did not DEX or Telex a copy to Cadillac immediately, something we would have normally done. The secretary of Gabriella Lang, Cadillac's solicitor in Yellowknife, was given a copy of the brief when she came to the Water Board office on Monday afternoon, February 15, 1982.

These facts were not presented at the Public Hearing in Fort Simpson because I felt that it would be in the best interests of all concerned not to.

I am satisfied that the report of the Water Board staff is true and accurate for both are extremely professional, conscientious, and honest employees.

In closing, I must acknowledge that there is nothing in the N.I.W.A. or in the Regulations which requires an intervenor to provide a copy of his or her brief to the applicant, or for that matter to the Board. Nevertheless, I feel that early submission of such briefs to the applicant will result in more and better information coming forth at the Public Hearings.

Yours truly,



W. A. Case  
Acting Chairman  
N.W.T. Water Board

Encl. (1)

cc to: Mr. L. Morrisroe  
Mr. G. Erasmus  
Mr. J. Bourque  
Mr. G. Carter  
Members, N.W.T. Water Board

M... CASE: ----- We have notice of several briefs. I will read them to you so you will know what is coming up. We have a joint presentation, brief by the Department of the Environment and the Department of Fisheries and Oceans. We have a separate brief by the Department of Fisheries and Oceans. We have a brief from the Dene Nation and Metis Association of the N.W.T. A brief from the National and Provincial Parks Association of Canada. A brief from the Water Resources Division of the Department of Indian and Northern Affairs, and the last one, a brief by the Renewable Resources Division of the Government of the Northwest Territories. Those are the ones of which I know at this time.

MR. L. MORRISROE: Mr. Chairman, Lawrence Morrisroe of Cadillac. As you will note according to your regulations, all these briefs are suppose to be in ten days, you know what I mean, previous to the hearing, and at the time of the ten-day period there were only two briefs, one from the Parks and one from the Water Situation. We got a copy of another one that came a few days later, which was sent to us by our solicitor in the mail. And this morning there is another brief that ends up here on our desk from the Dene, which I don't think is quite fair to Cadillac to give us a brief at the last hour here and expect our consultants to read it, reply to it, you know what I mean, and everything intelligently. So I want to point out, if you are going to hear these briefs here this morning at the last hour, which I don't think is really fair, we will have to let our consultants, we will get them read and they will reply accordingly to you. Maybe they can do a first-class job, I don't know, but I want to point out that if there are some problems you will know the reason.

MR. CASE: Thank you, Mr. Morrisroe. The Board understands your concerns and will take note.

MR. J. BAYLY: If I can just say for the record, the brief of the Dene Nation, which has been referred to by Mr. Morrisroe, was filed the Monday following the ten-day cut off, if we can call it that, the brief was taken to the Water Board Office on Friday and the office was closed, actually slightly before five. As a result of that we got a telephone call from the solicitors from, in Yellowknife of Cadillac Mine. They requested a copy of the brief. A copy was offered to them. They were aware of it. I understood they had picked one up and sent it to Cadillac. If they haven't received it, they were certainly aware of it nine days ago.

MR. CASE: Thank you for your explanation, Mr. Bayly. Just a couple of more points as far as procedure. The next item will be, the meeting will be open to anyone, including Board Members, who wishes to ask a question of the applicant or any of the intervenors. Finally the applicant will be given an opportunity to respond to any points raised -----.

Excerpt from Cadillac Explorations Limited public hearing  
Tape No. 1, held in Fort Simpson on February 23 and 24, 1982.