Mining Industry Questionnaire to Accompany Water Licence Applications to the Mackenzie Valley Land and Water Board

Mackenzie Valley Land and Water Board
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Regulating the use of land and waters and the deposit of waste, and enabling residents to participate in the management of resources to provide optimum benefit to the residents of the settlement areas and of the Mackenzie Valley and to all Canadians.

October 2003

The purpose of this questionnaire is to solicit supplemental information from an Applicant to support his/her application for a water licence (or renewal). It is anticipated that the completion of this questionnaire will reduce delays arising from the Board's having to solicit additional information after an application has already been submitted. This information will also be useful during the pre-screening of your application, which must be undertaken prior to development and approval of a water licence to determine if the project needs to be referred to the Environmental Impact Review Board.

The Applicant should complete the questionnaire to the best of his/her ability, recognizing that some questions may not be relevant to the project under consideration. For questions that do not relate to his/her operation, the Applicant is requested to indicate "N/A" (Not Applicable).

If any questions arise while completing the questionnaire, the Applicant may wish to contact the Mackenzie Valley Land and Water Board at (867) 669-0506.

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Please Print Or Type Your Responses

NOTES:

If space is insufficient for any of the responses on this questionnaire, use the back of the sheet or an attachment.

A number of sections in the questionnaire solicit information on water quality and waste management which must be provided in accordance with specific policies and guidelines: the Board's *Water and Effluent Quality Management Policy*; the Board's *Guidelines for Developing a Waste Management Plan*; and INAC's *Guidelines for Spill Contingency Planning*. The Board's policies and guidelines are accessible at www.mvlwb.com or by calling the Board. INAC's *Guidelines for Spill Contingency Planning* are available at http://www.ainc-inac.gc.ca/ai/scr/nt/pdf/SCP-EUD-eng.pdf). Please provide separate plans and/or reports to address these information requirements as part of the completed application package. Reference the relevant title(s) of the plans and/or reports in the body of the questionnaire.

Section 1 – General

Date: **October 18, 2013**

1.1 Applicant Dominion Diamond Ekati Corporation 867 669-6100
(company, corporation, owner) **(telephone no.)**

1102 4920-52nd St. Yellowknife, NT X1A 3T1
(postal address)

Property name: Ekati

Closest community: Wekweeti

Latitude/Longitude: 64° 33' to 64° 42' and 110° 17' to 109° 58'

1.2 Environmental contact: Eric Denholm 867-669-6116
(name) **(telephone no.)**

Superintendent – Traditional Knowledge and Permitting
(title)

1.3 Indicate the status of the mine and/or mill on the date of application. (check the appropriate space)

	Mine	**Mill**
Design	X	
Under construction		
In operation	X	X
Suspended		
Abandoned		

1.4 If a change in the status of the mine or mill is expected, indicate the nature and anticipated date of such change.

The Ekati Diamond Mine has undergone two previous environmental assessments. The initial proposed design was approved in 1998 and the addition of three pits and associated infrastructure was approved in 2001. The proposed development of the Jay-Cardinal Project is currently in the design phase and construction could begin as early as 2017. For further details regarding the Project schedule refer to Section 4.2 of the accompanying Project Description.

1.5 Indicate the present (or proposed) mine/mill operating schedule.

	Mine	**Mill**
hours per day	24	24
days per week	7	7
weeks per year	52	52
shift periods	2 x 12 hr	2 x 12 hr
number of employees	approx, 800 on site and 600 contractors	

1.6 Attach a detailed map, drawn to scale, showing the relative locations of the (proposed) mine, mill, water treatment facilities, sewage and solid waste facilities, and tailings areas. The plan should include the water intake and pumphouse, fuel and chemical storage facilities, any existing and proposed concentrate, ore and waste rock storage piles, any existing and proposed drainage controls, piping distribution systems, gas, electric and water utility route locations, and transportation access routes around the site. The map also should include elevation contours, water bodies, and an indication of drainage patterns for the area.

Please refer to the accompanying Project Description provided for the following figure references.

- Figure 1.3-1 illustrates the regional location of the Ekati Diamond Mine;
- Figure 1.3-2 shows the Coppermine River Watershed;
- Figure 1.3-4 shows the natural topography of the Jay-Cardinal Project Area;
- Figure 4.1-1 indicates the location of the proposed open pit mine, spur roads and piping systems; and,
- Figure 1.3-3 presents some existing operation facilities, including water treatment facilities, sewage and solid waste facilities, the Long Lake Containment Facility, waste rock management areas, and related infrastructure.
- Figure 4.4-1 presents the Jay-Cardinal Project, facilities to be constructed.

The extraction of ore from the Jay and Cardinal pipes will involve the use of a number of existing components of the Ekati mine, including:

- Misery mining infrastructure (e.g., fuel facility, explosive magazines);
- primary roads and transportation infrastructure (e.g., Ekati airstrip);
- Ekati camp and supporting infrastructure;
- processing plant; and
- fine processed kimberlite management facilities (e.g., mined-out Panda and Koala open pits supported by the Long Lake Containment Facility.

In addition to the existing mine components, the Jay-Cardinal Project will require:

- a new access road to the Jay-Cardinal site;

- an aggregate quarry (i.e., borrow source) to obtain construction material;
- construction of roads, pads, and incidental support buildings;
- construction of three dikes and a water diversion structure to isolate the portion of Lac du Sauvage overlying the kimberlite pipes;
- fish removal from the isolate portion of Lac du Sauvage;
- drawdown of the water level in the isolated portion of Lac du Sauvage;
- the North Arm Water Management area; and
- excavation of the Jay and Cardinal open pits.

1.7 If applicable, provide a brief history of property development which took place before the present company gained control of the site. Include shafts, adits, mills (give rated capacity, etc.), waste dumps, chemical storage areas, tailings disposal areas, and effluent discharge locations. Make references to the detailed map.

Please refer to the accompanying detailed Project Description (specifically, Subsection 3.5.2 [Existing Ekati Mine] and Section 4.3 [Existing Facilities]). Further, Figure 1.3-3 depicts existing plant facilities, including water treatment facilities, sewage and solid waste facilities, the Long Lake containment facility, waste rock management areas, and related infrastructure.

1.8 Give a short description of the proposed or current freshwater intake facility, the type and operating capacity of the pumps used, and the intake screen size.

Freshwater for Ekati operations is currently permitted to be drawn from Grizzly Lake, Little Lake, Thinner Lake (Misery Camp), and Two Rock Lake. A water treatment plant for potable water is located at the Ekati main camp. Potable water for the Misery site is trucked from the Ekati main facility.
Process water for the process plant is recycled within the process plant or pumped back from the LLCF.
The freshwater intake pumps operate in accordance with the Fisheries and Oceans Canada (DFO) Freshwater Intake End-of-Pipe Fish Screen Guideline (1995) or subsequent editions.

1.9 At the rate of intended water usage for operations, explain water balance inputs and outputs in terms of estimated maximum draw down and recharge capability of the river or lake from which fresh water will be drawn.

As per the approved drawdown plan, a maximum of the following can be withdrawn from each water source per year:

a) Pigeon Pond 18,500 m^3
b) Sable Lake 393,000 m^3
c) Two Rock Lake 143,500 m^3
d) Grizzly Lake 200,000 m^3
e) Little Lake 400,000 m^3
f) Thinner Lake 15,000 m^3
g) Falcon Lake 100,000 m^3
h) Lac de Gras 100,000 m^3

These volumes are considered insignificant to the water balance of the sources lakes and as such, no drawdown effects are anticipated.

1.10 Will any work be done that penetrates regions of permafrost?

Yes ___X___ No _____

1.11 If "Yes" above, is the permafrost continuous or discontinuous?

Ekati is in a region of continuous permafrost, although development of the Jay and Cardinal will occur within

an area with a talik (unfrozen ground beneath a relatively large lake), it is anticipated that the Project will penetrate regions of permafrost (for further details please refer to the accompanying Project Description).

1.12 Were (or will) any old workings or water bodies (be) dewatered in order to bring the present property into production?

Yes X No

1.13 If "Yes" above, indicate the name of the water body, the total volume of water to be discharged, and the chemical characteristics of that water.

Water body: Lac du Sauvage (500,000 m^3)

Total volume: 305,000 m^3

Receiving watercourse: The receiving waterbody will be determined based on erosion criteria, and may include Duchess Lake, the southern portion of Lac du Sauvage, or Lac de Gras.

Dewatering flow rate into above: At a rate established to prevent erosion in the downstream, natural channel.

For further details refer to Subsection 4.6.6 in the accompanying Project Description.

Chemical characteristics of discharge:

Rescan Environmental Services Ltd. (2006) analyzed a large number of parameters from water samples in the Jay-Cardinal Project area. Results for all parameters are provided in the appendices of the accompanying Project Description (Appendix 3A: 2006 Jay Pipe Aquatic Baseline Report. Only a select number of parameters are presented in Table 1.13-1 below. These include: pH, total suspended solids, turbidity, total dissolved solids, potassium, sulphate, total ammonia, nitrate, nitrite, ortho-phosphate, total phosphorus, total aluminum, total arsenic, total cadmium, total chromium, total copper, total molybdenum, total nickel and total zinc. These parameters are the same parameters currently evaluated for the AEMP (Rescan, 2007).

Table 1.13-1: 2006 Lac du Sauvage Water Quality

Water Quality Parameters	Lac du Sauvage, Ice-covered Season[1] Average 2006	Lac du Sauvage, Open-water Season[2] Average 2006
pH	6.76	6.75
TSS (mg/L)	<3.0	<3.0
Turbidity (NTU)	0.27	0.88
TDS (mg/L)	8.1	6.1
Potassium (mg/L)	0.64	0.52
Sulphate (mg/L)	1.67	1.20
Total Ammonia (mg/L)	0.023	0.0068
Nitrate (mg/L)	0.021	<0.0050
Nitrite (mg/L)	0.0010[3]	<0.0010
Ortho-Phosphate (mg/L)	0.0021	<0.0010
Total Phosphorus (mg/L)	0.0053	0.0068
Total Aluminum (mg/L)	0.0069	0.0099
Total Arsenic (mg/L)	0.00030	0.00029

Total Chromium (mg/L)	0.00019	0.00010[3]
Total Copper (mg/L)	0.00065	0.00063
Total Molybdenum (mg/L)	<0.000050	<0.000050
Total Nickel (mg/L)	0.00035	0.00035
Total Zinc (mg/L)	0.0010[3]	0.0010[3]

Source: Rescan 2007

Notes: [1]Ice-covered season from February to May (n=71);
[2]Open-water season from July to August (n=76);
[3]Concentration provided is the detection limit as measured values were reported as nd, not detected, as only 5 to 50% of the reported values were greater than the detection limit; and,
> indicates that at least 95% of the measured values were below the detection limit, for the derivation of averages the values were substituted as 50% the detection limit.

Overall, lake water quality parameters from the 2006 open-water season in the Jay-Cardinal Project area were similar to samples analyzed from un-impacted Ekati area lakes. Most water quality parameters from the area were low and well below the federal guidelines for the protection of aquatic life. Sampling locations are identified in the Rescan 2006 Jay Pipe Area Aquatic Baseline Report. For further details refer to Section 3.9.2 of the accompanying Project Description.

Only water meeting the water quality discharge requirements will be released from site to the receiving environment.

1.14 Was (or will) the above discharge (be) treated chemically?

Yes _____ No X

If "Yes" above, describe the applied treatment.

During the initial stages of Lac Du Sauvage Lake dewatering, clean water will be pumped to Duchess Lake, the southern portion of Lac Du Sauvage, or Lac de Gras. Operating experience at the Ekati Mine suggests that concentrations in the water to be pumped may increase beyond acceptable levels during the final stages of drawdown. Therefore, the sediment levels will be monitored and, if necessary, the late stages of drawdown will be pumped through the North Arm Water Management Area. The North Arm Water Management Area acts as a sedimentation cell, residence time in the facility improves the water quality, which will be released to the environment (Paul Lake to Lac de Gras) once it meets discharge limits specified in the Water Licence. For further details refer to Section 4.6.7 in the accompanying Project Description.

SECTION 2 -- GEOLOGY AND MINERALOGY

2.1 Physiography: Provide an analysis and interpretation of the geologic and hydrologic environment in the immediate vicinity of the mine or plant. The investigation should extend from ground surface downward to the base of the glacial drift. Include large scale topographic map(s) covering the area where the mine, mill, and waste disposal basin are (or are to be) located. The map(s) should provide information on groundwater patterns and permafrost variations in the area.

The Ekati Diamond Mine lies within the northwestern Canadian Shield physiographic region, where the landscape is bedrock controlled. Surficial, mostly glacial materials are thin and discontinuous, and permafrost is present to an average depth of 320 m. Please refer to Figure 3.7-1 in the accompanying Project Description.

DDEC's claim block is located in the upper reached of the Coppermine River Drainage Basin. The Coppermine River winds about 845 km from its headwaters in the Lac de Gras Watershed until it empties into the Cornation Gulf near Kugluktuk. The Jay and Carindal kimberlite pipes are located within the Lac de Gras Watershed, approximately 7 km from the Misery Pit. The physiographic characteristics of this region have produced a landscape that contains approximately 8000 lakes within the DDEC claim block, representing approximately one-third of the total area.

A more detailed description of the geology, hydrogeology, and hydrology are provided in Section 3.7, Section 3.8, and Section 3.9.1, respectively of the Existing Environment Chapter of the accompanying Project Description. Further, more specific project information regarding the geology and hydrogeology conditions anticipated to be encountered are provided in Section 4.5.

2.2 Briefly describe the physical nature of the ore body, including known dimensions and approximate shape.

The Jay pipe has a roughly circular outline in plan view, with a surface area of approximately 13 ha (375 by 350 m) and a steep-sided vase shape as illustrated in by the isometeric view. The sides of the pipe are interpreted to be roughly planar with minor concavities and bulges. The shape, particularly the north side, is believed to be coincident with geological structures. A plan view and an isometric view of the Jay kimberlite pipe are provided as Figure 4.5-1 and Figure 4.5-2 of the accompanying Project Description.

The Cardinal pipe has a roughly circular outline in plan view and a steep-sided vase shape as illustrated in by the isometeric view (Figure 4.5-3 and Figure 4.5-4, respectively, in the accompanying Project Description). The sides of the pipe are interpreted to be roughly planar with minor concavities and bulges. The shape, particularly the north side, is believed to be coincident with geological structures.

The diameter of the Jay pipe at the proposed open pit bottom is about 200 m and the diameter 200 m below the ultimate pit bottom is estimated at approximately 160 m. The Cardinal pipe diameter at the bottom of the proposed pit is assumed to be approximately 60 m and the diameter 150 m below the proposed pit is assumed to be approximately about 50 m.

A more detailed description of the area geology is provided in Section 4.5 of the accompanying Project Description.

2.3 Briefly describe the country rock in the general vicinity of the ore body (from the surface to the ore body).

The Jay pipe is hosted within granitic rocks, ranging from granite to granodiorite in composition. A regional contact with meta-sedimentary rocks occurs to the west, and a diabase dyke trending approximately east-west occurs to the north of the pipe. Early interpretation of the regional airborne magnetic images

suggested the presence of two linear features extending northeast-southwest (E-W lineament) along the northern Jay pipe contact and northwest-southeast (N-S lineament) to the west of the Jay pipe that could be related to geological structures. The east-west structure to the north of the Jay pipe may be associated with the diabase dyke; however, other zones of increased jointing have also been recognized in two core holes. The north-south structure may be associated with the metasediment-granite contact.The pipe lies within Lac du Sauvage and is covered by approximately 30 of water as well as boulder and overburden that is 5 to 10 m thick. Static and kinetic testing has been completed at other sites at the Ekati Diamond Mine and reveals that country rock reacts very slowly and indicated negligible potential for acid generation.

The geological logging, summarized for the Jay kimberlite pipe in Table 2.3-1, indicates that four geological units exist at the Jay site: granite; biotite schist (metasediment); diabase dike; and, kimberlite. Approximately 20% of the logged rock was granite or granodiorite, 68% kimberlite and 5% metasediments. Metasediments constituted less than 9% of the logged country rock.

Table 2.3-1 Summary of Lithology from Exploration Holes for the Jay Kimberlite Pipe

Material	Length (m)
Diabase (DIAB)	186
Granite (GR) and Granodiorite (GD)	1,471
Water (H20)	939
Kimberlite (K and K2)	5,366
Metasediment (MDST)	492
Overburden (OVB)	385

The geological information currently available for the Cardinal pipe is limited; conservatively, the local geological setting is expected to be similar to what was found for the Jay Pit. However, the Cardinal pipe is expected to be hosted solely within granitic rocks ranging from granite to granodiorite in composition.

The geological logging, summarized in Table 2.3-2, indicates that two geological units exist at the Jay site: granite and kimberlite. The logs also indicate that approximately 67% of the logged rock is kimberlite, and 33% is granite, granodiorite, or pegmatite.

Table 2.3-2 Summary of Lithology from Exploration Holes for the Jay Kimberlite Pipe

Material	Length (m)
Granite (GR) and Granodiorite (GD)	445
Water (H20)	128
Kimberlite (K and K2)	891
Overburden (OVB)	83

A more detailed description of the area geology is provided in Section 4.5 of the accompanying Project Description.

2.4 Provide a geological description of the *ore minerals* of the deposit. (If possible include the

percentage of metals.)

The host to mineralization is characterized as diamondiferous kimberlite. Generally similar varieties of kimberlite occupy each pipe. Physically, the kimberlite is a relatively soft, hybrid rock comprised of olivine, phlogopite, Mg-ilmenite, pyrope, Cr-spinel, and Cr-diopside inequigranular crystals hosted by a fine-grained matrix of monticellite, phogophite, serpentine, calcite, spinel, perovskite and apatite. The kimberlite also contains variable lesser quantities of host rock (granite) material, and trace amounts (<0.5%) of sulphide. Diamonds are present as discrete particles within the diamoniferous kimberlite at concentration levels of parts per billion.

A more detailed description of the area geology is provided in Section 4.5 of the accompanying Project Description.

2.5 Describe the geochemical tests which have been (or will be) performed on tailings solids and different geological units of ore, country rock, and waste rock to determine their relative acid generation and contaminant leaching potential. Outline methods used (or to be used) and provide test results in an attached report (i.e., static, kinetic tests).

Geochemical tests have been conducted on the various geological units at Ekati, involving pre-mining and on-going characterizations, and routine geochemical monitoring. This includes both static and/or kinetic testing for waste rock, ore, and fine processed kimberlite. Over 2000 samples have been collected from the various open pits since mining began in 1997. The same testing will be conducted for the Jay-Cardinal Project.

Static testing is conducted by the collection of samples for off-site analysis at an accredited laboratory, to determine whether a sample is potentially acid-generating (PAG). Samples are analysed using the standard Sobek et al. (1978) procedure for acid-base accounting (ABA), includes total sulphur, neutralization potential (NP) and paste pH. These analyses along with calculations of acid potential (AP) or maximum potential acidity (MPA), net neutralization potential (NNP) and neutralization potential ratio (NPR, or NP/AP) provide a useful estimate of a sample's acid generating and neutralizing potential. The metal content of samples is determined by inductively coupled plasma emission spectrometer (ICP-ES) analysis following an aqua regia digestion.

Kinetic testing is conducted in a laboratory as well as on-site, and includes humidity cells, column tests and barrel tests. The results of kinetic testing, along with additional mineralogical analyses, are used to refine and calibrate the (static) geochemical assessment, and to evaluate the leaching behaviour of the waste materials and predict drainage quality. The humidity cell operational procedure introduces a sample to accelerated weathering by exposing it to dry air permeation, humid air permeation, and water washing, under standardized conditions. Column tests aim to monitor leachate quality with time in a similar fashion, however, column tests are fairly site/project specific with respect to sample particle size and size range, sample mass, water flow rate and degree of oxygenation. Because laboratory cells are not subjected to climatic events that can occur at the minesite, field barrel tests are conducted on-site to provide site-specific verification and calibration of the laboratory kinetic test results.

Further characterization is conducted through seepage surveys of all constructed waste rock storage areas and ore stockpiles. These are conducted twice a year, during freshet and again in late summer or fall before freeze-up, to detect potential chemical changes that may be produced by the waste rock. Laboratory testing of seepage samples includes the set of parameters defined under Water Licence W2009L2-0001 Part G.4 (c and d) and under the Surveillance Network Program (SNP). Field testing includes measurement of volume and rate of flow, field pH, and conductivity.

Summarized analytical results for the Ekati site are presented in the Waste Rock and Ore Storage Management Plan, 2011.

2.6 Estimate the percentage of sulphides in the orebody:

All of the waste rock mined is granite which contains only a negligible amount of sulphide minerals. No other

sulphides or sulphide mixtures have been observed or detected with sampling to date.

Kimberlites are known worldwide to contain only trace amounts of sulphides. Observations on several kilometres of drill cuttings from each pipe indicate sulphide content is highly variable locally from nil to less than 1%. The nature of the observed sulphide is usually pyretic gobules disseminated in the kimberlite groundmass and very rarely as fine needles of millerite (NiS).

Section 3 -- The Mine

3.1 Indicate the type of mining method to be used on the property.

Open pit	X
Underground	X
Strip mining	

Other mining activity? Explain.

N/A

3.2 Outline any possible operational changes and when they might occur (i.e., open pit to underground).

N/A

3.3 Describe the type(s) of explosives to be used in mining operations.

Mining will be advanced using an ammonium nitrate – fuel based explosive

3.4 Indicate the number of shafts or other openings that are presently on the property. Signify whether or not the openings are presently in use: (submit measurements in metres)

Shaft (name or number)	Present depth	Proposed depth
N/A		

Adit (name or number)	Present depth	Proposed depth
N/A		

Open pit (name)	Jay Pit; Cardinal Pit
Present surface length	not yet opened; not yet opened
Maximum future surface length	~960 m; ~420 m
Present surface width	not yet opened; not yet opened
Maximum future surface width	~960 m; ~420 m
Present depth	not yet opened; not yet opened
Maximum future Depth	

Waste rock dump Jay Waste Rock Storage Area; Cardinal Waste Rock Storage Area

(name)

Area occupied 292; 37 hectares

Height 50 m

3.5 Are any entrances to shafts, adits, etc. below groundwater level?

N/A

3.6 Are permafrost conditions expected?

Yes X No

3.7 Indicate the expected life of the mine.

The Jay-Cardinal Project would extend the Ekati Mine life by 10 to 20 years.

3.8 Indicate the *present average* rate of production from all ore sources on the property.

~12,200 tonnes ore/day

Production in 2011 was 4,599,849 tonnes of Kimberlite ore

3.9 Indicate the *expected maximum* rate of production form all ore sources on the property.

12,500 tonnes ore/day

3.10 Outline all water usage in the mine, indicating the source and volume of water for each use.

	Source	Use	Volume (m^3/day)
1.	Grizzly Lake	Freshwater for camp	89,458 m^3/year (2011)
2.	Long Lake Containment Facility	Process Water	4,424,903 m^3/year (2011)
3.			
4.			

3.11 Indicate the volume of natural groundwater presently gaining access to the mine workings.

N/A m^3/day

3.12 Outline methods used (planned) underground to decrease mine water flow. (i.e., recycling)

Overland flows into the pits will be diverted by the construction of three dikes and one water diversion structure. Mine water that accumulates in the pit during operations will be pumped, after being collected in internal sumps, to the North Arm Water Management Area.

A reclaim barge in Cell D of the Long Lake Containment Facility is used to supply recycled water to the process plant; further, process water within the process plant is recycled before being pumped back to the LLCF.

3.13 Indicate the average daily volume of water to be discharged *from the mine* during normal operations.

A preliminary water balance for the Jay-Cardinal controlled area during operations is shown in Table 3.13-1 for mean annual conditions. The controlled area is defined as the drawn down area of Lac du Sauvage and surrounding land areas draining to that area, within which runoff will be managed.

Table 3.13-1: Preliminary Monthly Water Balance for Jay-Cardinal Project (Mean Annual Conditions)

	Inflows (m^3)							Outflows (m^3)		
	GW Inflow[a]		Dike Seepage		Precipitation		Total Inflows	EVAP	Pumping[b]	Total Outflows
Month	Jay	Cardinal	JP1	JP4	Direct	Runoff				
January	223,200	120,900	84,932	365,205	140,831	0	935,068	0	935,068	935,068
February	201,600	109,200	76,712	329,863	146,849	0	864,225	0	864,225	864,225
March	223,200	120,900	84,932	365,205	196,200	0	990,437	0	990,437	990,437
April	216,000	117,000	82,192	353,425	230,426	58,295	1,057,337	0	1,057,337	1,057,337
May	223,200	120,900	84,932	365,205	377,116	10,605,402	11,776,755	0	11,776,755	11,776,755
June	216,000	117,000	82,192	353,425	690,619	2,127,213	3,586,448	1,294,527	2,291,921	3,586,448
July	223,200	120,900	84,932	365,205	1,016,522	3,131,044	4,941,803	2,452,788	2,489,015	4,941,803
August	223,200	120,900	84,932	365,205	1,280,401	3,943,833	6,018,471	1,612,481	4,405,990	6,018,471
September	216,000	117,000	82,192	353,425	856,205	2,637,243	4,262,064	794,885	3,467,179	4,262,064
October	223,200	120,900	84,932	365,205	519,264	160,893	1,474,394	0	1,474,394	1,474,394
November	216,000	117,000	82,192	353,425	311,754	0	1,080,370	0	1,080,370	1,080,370
December	223,200	120,900	84,932	365,205	207,033	0	1,001,270	0	1,001,270	1,001,270
Annual							37,988,642			37,988,642

a) Groundwater inflow values are based on preliminary estimates of 7,200 m3/d for Jay Pit and 3,900 m3/d for Cardinal Pit. The water balance assumes that the quality of groundwater inflow to the pits will be acceptable for release into local settling ponds or the remnant waters of Lac du Sauvage. If groundwater quality is not acceptable, it will be managed as a separate stream.

b) These values differ from those in the lake drawdown alternatives report because they consider additional contributing areas, including pit inflows and dike seepage.

GW = Groundwater; EVAP = Evaporation; m3 = cubic metres

For further details refer to Section 4.6.6 of the accompanying Project Description.

3.14 If a mill will be operating on the property in conjunction with mining, will all mine water (underground, open pit, etc.) be directed to the mill for reuse?

Minewater from the open pits will be pumped or trucked (during the winter) to the North Arm Waste Management Area, which acts as a sedimentation cell and residence time in the facility improves the water quality. Once the water meets discharge criteria specified in the Water Licence, the water will be released to the receiving environment. For further information please refer to Section 4.6.6 in the accompanying Project Description.

3.15 If not, indicate the proposed point and volume of discharge for the mine water.

Point of discharge Paul Lake or Lake E1

Volume of discharge Mean annual average 54,800 m^3/day

For additional information, refer to Subsection 4.6.6 in the accompanying Project Description.

3.16 What are the chemical and physical characteristics of the preceding mine water?

Sump water from the open pits will be pumped into the North Arm Management Area. Water from these ponds are then pumped into the receiving environment if it meets discharge criteria specified in Water Licence. Criteria reported here is maximum average concentration presented in the current Water Licence W2012L2-0001. Maximum concentration of a grab sample is also specified in the water licence.

Parameter	Maximum Average Concentration (mg/L)	Maximum Concentration of Any Grab Sample (mg/L)
Total Ammonia-N	1.34	2.68
Total Copper	0.004	0.008
Nitrate – N	$2.27(e^{(0.9518(\ln[\text{Hardness}])-2.032)})$	$4.54(e^{(0.9518(\ln[\text{Hardness}])-2.032)})$
Total Potassium	41	82
Total Sulphate	$2.27(e^{(0.9116(\ln[\text{Hardness}])+1.712)})$	$e^{(0.4163(\ln[\text{Hardness}])+4.878)}$
Total Suspended Solids	15	25
Total Petroleum Hydrocarbons	3.0	5.0

3.17 Are there any treatment plans for mine water and will any chemicals be used in such treatment? Explain.

The North Arm Water Management Area acts as a sedimentation cell; residence time in the facility improves the water quality, which will be released into the receiving environment. It is not expected that chemical treatment will be required prior to discharge. The use of flocculent and/or coagulant is a contingency that DDEC would use if necessary to settle suspended sediments. Should water in the North Arm Water Management Area require further treatment prior to discharge, DDEC will apply adaptive management actions.

Section 4 -- The Mill

4.1 Attach a copy of the (proposed) mill flow sheet. Indicate the points of addition of all the various reagents (chemicals) that are (or will be) used.

The Process Plant is an existing facility. The processing of the Jay and Cardinal kimberlite does not require any changes to the operation of the Process Plant and as such this section of the questionnaire is not applicable to the current application.

Additional detail on the Process Plant can be found in the Wastewater and Processed Kimberlite Management Plan, 2012.

4.2 If milling is in progress on the property at the present time, indicate the rate of milling.

_____ not applicable (check) OR _____tonnes/day

4.3 What is the present (or proposed) maximum capacity of the mill?

_____ tonnes/day

4.4 List the types and quantities of all reagents used in the mill process (in kg/tonne ore milled).

	Reagent	**Kg/tonne ore milled**

4.5 Is the (proposed) milling circuit based on autogenous grinding?

Yes _____ No _____ Partially _____

4.6 Indicate the amount(s) of concentrate(s) produced in the mill.

_____ kg/day _____ kg/day

4.7 Will fresh water undergo treatment prior to use in the mill process? Explain.

4.8 Indicate all uses of water in the mill. Include the quantity and source of the water for each use.

	Use	**Source**	**Volume (m^3/day)**
i.			

4.9 Indicate the total volume of water discharged from the mill.

_____ m^3/day

4.10 Of the preceding volume, what quantity is (will be) recycled to other areas on the property (mine, mill, etc.)? Indicate location of use and quantity.

Location		
_____	_____	m^3/day

4.11 Based on yearly production, indicate the average quantity of tailings (dry weight) discharged from the mill.

_____ tonnes/day

4.12 What is the average liquid solid ratio of tailings leaving the mill?

By weight _____ : _____ (liquid : solid) By volume _____ : _____ (liquid : solid)

4.13 If applicable, identify any chemical treatment applied to the liquid phase before being discharged to the tailings area. (Attach flow sheet if available.)

4.14 Based on present production or bench test results, describe the chemical and physical characteristics of liquid mill wastes directed to the tailings area.

4.15 Provide a geochemical description of the solid fraction of the tailings.

4.16 Identify the current source of power production.

4.17 Other properties (or will the mill be handling any in the future)?

4.18 If so, specify ore characteristics and describe any mill processes which will change as a result.

4.19 If tailings are being recovered in the mill or elsewhere for use as backfill (etc.) in the mine (etc.), indicate the quantity of solid tails (tonnes/day) recovered form the mill process.

4.20 Will exits be bermed to prevent spills from escaping the mill?

4.21 Will all sumps for process tanks have the required 110% holding capacity of the largest tank?

Section 5 -- The Tailings Area

5.1 Is the tailings containment area (being) designed for total containment?

The fines processed kimberlite tailings containment area for the Project will be the mined-out Panda and Koala open pits supported by the Long Lake Containment Facility. These processed kimberlite containment areas are facilities already included in the Ekati Mine Wastewater and Processed Kimberlite Management Plan. The addition of the Jay-Cardinal Project does not change the means by which these facilities are operated and as such, this section of the questionnaire is not applicable to the current application.

Additional detail can be found in the Wastewater and Processed Kimberlite Management Plan and Section 4.6.8 of the accompanying Project Description.

5.2 Attach detailed scale plan drawings of the proposed (or present) tailings area. The drawings must include the following:

(a) Details of pond size and elevation;

(b) Precise details of all retaining structures (length, width, height, materials of construction, etc.);

(c) Details of the drainage basin, and existing and proposed drainage modifications;

(d) Details of all decant, siphon mechanisms etc, including water treatment plant facilities;

(e) The plan for tailings deposition and final tailings configuration;

(f) Details with regard to the direction and route followed by the flow of wastes and/or waste waters from the area; and

(g) Indications of the distance to nearby major watercourses.

Note: Individual detailed large scale drawings of any facility (dam, decant system, ditch, dike, water treatment plant, etc.) (to be) constructed *must* be attached. Specific details with regard to the methods of construction, materials (to be) used, etc., are required.

5.3 Explain your choice of location for the tailings pond design by rationalizing rejection of other options. Consider the following criteria in your comparisons: subsurface strata permeability, abandonment of tailings, recycling/reclaiming waters, and assessment of runoff into basins. Attach a brief summation.

5.4 The total area for the existing tailings basin is _____ hectares and for any proposed tailings area is _____ hectares.

5.5 The *average* depth of the tailings basin is _____ metres.

5.6 Indicate the total capacity for the *existing* tailings area by using water balance and stage volume calculations and curves. (Attach a description of inputs and outputs along with volume calculations).

5.7 Indicate the total capacity for any *proposed* tailings area by using water balance and stage volume calculations and curves. (Attach a description of inputs and outputs along with volume calculations).

5.8 Will the *present* tailings area contain the entire production from the mine mill complex for the life of the project?

5.9 If "No" above, or if production output increases tailings volumes, indicate what plans have been made for future tailings disposal on the property.

5.10 Has any land in the immediate area been identified as native or Crown land or withdrawn pending Native Claim Settlement?

5.11 Do the tailings area and all related treatment facilities lie on company held claims?

5.12 If not, indicate mine claim boundaries (and owners) on tailings area plan map (see Q.58). Also, attach a copy of all pertinent agreements signed with the owners of the claims not held by the company.

5.13 Will the proposed tailings area engulf or otherwise disturb any existing watercourse?

Yes _____ No _____

5.14 If "Yes", attach all pertinent details (name of watercourse, present average flow, direction of flow, proposed diversions, etc.).

5.15 If any natural watercourse will gain access to the proposed tailings area, what methods will be used to decrease the amount of runoff water entering the containment area? Indicate the volume of water which will enter the tailings area from the source(s) in question and attach all pertinent details of proposed diversions.

	Name of source	Volume (m^3/day)
1.	_____	_____

Nature of Diversion(s):

5.16 Indicate on the tailings area plan drawing (see Q.61) all sources of seepage presently encountered in the vicinity of the tailings area, the volume of each seepage flow (m^3/day), and the direction of each flow.

5.17 Are the seepage flows from the property presently being treated chemically? If so, describe how.

5.18 If not, explain.

5.19 Please attach a conceptual Abandonment and Restoration Plan for all tailings areas being developed. Describe the measures that have been (or will be) taken to contain and stabilize the tailings area(s) against leaching and seepage after operations on the property cease.

5.20 Describe the proposed or present operation, maintenance, and monitoring of the tailings area.

Section 6 -- Water Treatment

6.1 Describe the methods of chemical treatment that are presently being used and/or will be used to control the quality of the tailings effluent. Attach engineering drawings where applicable and a process flow chart. If a pilot test has been conducted, please attach description of methodology and results.

There is no chemical treatment of water undertaken at the Ekati Mine. The LLCF is an existing minewater management area regulated under the current Ekati Mine Water Licence. The addition of the Jay and Cardinal pits does not change the means by which these facilities are operated. Further, the North Arm Management Plan will be settling pond (similar to the existing Kings Pond Settling Facility) and as such, this section of the questionnaire is not applicable to the current application.

6.2 List the names of chemicals to be used in the water treatment process.

6.3 What is the proposed or present *average* rate of effluent treatment of the plant (if applicable)?

_____ m^3/min

6.4 What is the proposed or present *maximum* effluent treatment capacity of the plant (if applicable)?

_____ m^3/min

6.5 Will treated effluent be discharged directly to a natural water body or will polishing or settling ponds be employed? Describe location, control structures, and process of water retention and transfer. Attach any relevant design drawings.

6.6 Name the first major watercourse the discharge flow enters after it leaves the area of company operations.

6.7 In terms of rate of effluent release and volume and flushing rate of the receiving watercourse, estimate the extent of the mixing zone within the receiving waters and where background levels of constituents for that watercourse will be attained.

6.8 Describe the present (proposed from pilot tests) chemical and physical characteristics of the tailings effluent (decant).

Section 7 -- Environmental Monitoring Program

7.1 Has any baseline data been collected for the main water bodies in the area prior to development?

Yes X No _____

7.2 If "Yes", include all data gathered on the physical, biotic and chemical characteristics at each sampling location. Identify sampling locations on a map.

Rescan Environmental Services Ltd. 2007, outlining the available baseline data, has been included as Appendix 3A in the accompanying Project Description. Further, a summation of the 2006 data is provided in the Existing Environment chapter of the accompanying Project Description, specifically refer to Section 3.9.

7.3 Provide an inventory of hazardous materials on the property and storage locations. (attach separate map)

Fuel storage on site has capacity of 98 M litres. A central bulk fuel tank farm, which contains eight tanks and approximately 68 M litres, is located at the Main Camp. Other fuel tank farms are currently located at the Misery, Fox, and Koala North sites. The fuel tanks are double-lined and housed within bermed areas on an impervious liner. Due to the close proximity of Jay-Cardinal pits to the existing Misery fuel storage infrastructure, no mobile equipment fuel storage is planned for Jay-Cardinal. Fuel will be supplied daily with mobile fuel trucks from the Misery workshop complex. A 5,000 litre site tank will be installed to feed the generators and will provide at least 10 days running time.

The primary explosive used is a 70/30 mixture of emulsion and ammonium nitrate and fuel oil (ANFO). In addition to existing explosive magazines, new magazines may be required for the Jay-Cardinal pits. These would be appropriately permitted.

Figure 1.3-3 in the accompanying Project Description presents existing plant facilities, including water treatment facilities, sewage and solid waste facilities, the Long Lake containment facility, waste rock management areas, and related infrastructure.

7.4 Attach the present or proposed contingency plan which describes course of action, mitigative measures, and equipment available for use in the event of system failures and spills of hazardous materials.

Ekati has an approved Spill and General Contingency Plan, Spill Response Procedures and an approved Hydrocarbon-Impacted Materials Management Plan. These Plans will be updated to include the Jay-Cardinal Project site.

7.5 Provide a brief overview of the conceptual abandonment and restoration plan for the site.

The approved Interim Closure and Reclamation Plan will be updated to include the Jay-Cardinal Project site. A Final Closure and Reclamation Plan will be required for approval two years prior to mine closure.

The overall goal of the plan is to return the Ekati site, as practical, to a viable, and wherever practicable, self-sustaining ecosystem that is compatible with a healthy environment, human activities, and the surrounding environment. The success of the plan will be measured through setting closure criteria and performance-based standards.

The plan also includes reclamation research plans that address key uncertainties related to mine closure, such as water quality, wildlife safety, and sustainability of vegetation cover. A closure monitoring plan is also detailed, where observed performance will be measured against closure criteria. This monitoring will either indicate that the reclamation activities are successful and whether there is a need for further reclamation work.

A progressive reclamation schedule is included in the plan for those sites that are no longer required for current operations and are available to be progressively reclaimed. Reclamation and closure studies currently focus on reclamation research, field trials, and engineering designs.

For more details on closure and reclamation refer to Subsection 4.6.9 in the accompanying Project Description.

Section 8 – Pre-screening

In addition to providing sufficient technical and related information for licensing to proceed, applicants must provide adequate descriptive information to ensure that an initial pre-screening decision can be made prior to a project's proceeding for regulatory approvals.

Your application and other project details, such as this questionnaire, will be sent out for review by local aboriginal, as well as, territorial and federal government agencies. Their comments (e.g., regarding the significance of project impacts) are considered before a decision is made to allow the project to proceed.

8.1 Has this project ever undergone an initial environmental review, including previous owners?

Yes _____ By whom/when No ___X___ Unknown _____

8.2 Has any baseline data collection and evaluation been undertaken with respect to the various biophysical components of the environment potentially affected by the project (e.g., wildlife, soils, air quality), in addition to water related information requested in this questionnaire?

Yes ___X___ No _____ Unknown _____

8.3 Has any meteorological data been collected at or near the site? (e.g., precipitation, evaporation, snow, wind)

Yes ___X___ No _____

8.4 If "Yes", please include data and attach copies of reports or cite titles, authors and dates.

The local climate is monitored annually in support of the current monitoring programs at the site. Monitoring of the local climate is conducted at two stations at the Ekati airstrip. The data collected includes air temperature, wind speed and direction, relative humidity, an precipitation. To monitor lake evaporation, an automated micro-meteorological station is operated at Polar Lake during the open water season. These data are reported annually in the Aquatic Effects Monitoring Program report (Ekati Diamon Mine: 2012 Aquatic Effects Monitoring Program. Summary Report, Part 2: Data Report. March 2013. Prepared by Rescan Environmental Services Ltd., Yellowknife, NWT). Further, for a brief summary refer to Section 3.6 in the accompanying Project Description.

8.5 If "No", are such studies being planned? Briefly describe the proposals.

8.6 Has authorization been obtained or sought form the Department of Fisheries and Oceans for dewatering or using any water bodies for containment of waste?

Authorizations from additional agencies such as Fisheries and Oceans Canada and Transport Canada will also be obtained.

8.7 Please attach an outline briefly describing any options or alternatives considered or rejected for the various mine components outlined in this questionnaire (e.g., mill site, water supply sources, locations for ore and waste piles).

A number of alternatives to the Project and alternative means of carrying out the Project have been considered for the mining and associated infrastructure for the Jay-Cardinal Project:

- not mining the project;
- mining methods for accessing the kimberlite pipes; and,

- waste rock storage area locations.

Detailed information on alternatives can be found in Section 4.4 of the accompanying Project Description.

8.8 Has a socio-economic impact assessment or evaluation of this project been undertaken? (This would include a review of any public concerns, land, water and cultural uses of the area, implications of land claims, compensation, local employment opportunities, etc.)

Yes ___ No ___X___ Unknown _____

8.9 If "Yes", please describe the proposal briefly.

Socio-economic baseline data has been collected and will be considered as part of the anticipated Environmental Assessments. Please refer to the Existing Environment chapter of the accompanying Project Description, specifically sections 3.2, 3.3, 3.4, and 3.5.

SECTION 9 -- List of Attachments

List of Figures
Please refer to accompanying Project Description for all referenced figures:

List of Attachments
None