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July 26, 2002 GLL 22-933

Mackenzie Valley Environmental Impact Review Board
Box 938
200 Scotia Centre, 5102-50th Avenue
Yellowknife, NT X1A 2N7

Attention: Mr. Joe Acorn, Environmental Assessment Officer

Dear Mr. Acorn:

Re: Review of DeBeers Response to Gartner Lee's Information Request Number 1, Snap Lake Diamonds Project

Please find enclosed the results of our review of the DeBeers response to Gartner Lee's Information Request (IR) No.1 for the Snap Lake Diamonds Project, Environmental Assessment Report. The review consisted of three primary tasks:

1. Identifying if the original IRs were answered;
2. Identifying if supplementary IRs were required to followup on issues raised by the responses to the original IR;
3. Developing supplementary IRs, where necessary.

The technical disciplines and individuals involved in the review are outlined in the following table.

Technical Discipline	Discipline Leaders
Terrestrial Ecology (Vegetation)	Glenda Fratton, M.Sc., P.Biol., Ecologist (GLL)
Geotechnical	Mark Watson, P. Eng., Kevin Jones, P. Eng. (EBA Engineering Inc.)
Reclamation and Mine Engineering	Tony Keen, P. Eng., (AJ Keen Mining Consultants Ltd.) Eric Denholm, B.A.Sc., Engineering Geologist (GLL)
Socio and Economic Issues	Shannon Ward, Ed Weick, Peter Usher (Consilium)
Traditional Knowledge & Traditional Land Use	Shannon Ward, Ed Weick, Peter Usher (Consilium)
Hydrogeology	Rob Dickin, M.Sc., P. Geo., Senior Hydrologist (GLL) Forest Pearson, B.Sc., EIT, Engineering Geologist (GLL)
Water and Aquatic Resources	Neil Hutchinson, PhD., Sr. Surface Water Specialist (GLL) Dave Osmond, B.Sc., R.P.Bio., Senior Biologist (GLL)

The review information related to tasks 1 and 2 is outlined in Table 1. Twelve (12) supplementary IRs were developed to satisfy task 3, and are crossed referenced in Table 1. Table 1 and the supplementary IRs are appended to this letter.

Should you have any questions, please do not hesitate to contact me at (403) 262-4299, extension 120 or Glenda Fratton at extension 121 if you have any questions.

Yours truly
GARTNER LEE LIMITED

S. R. Morison

Stephen R. Morison, M.Sc.
Manager Northern Canada and Alberta

Table 1. Summary of Review of DeBeers Response to Gartner Lee's Information Request #1

Topic	First Round GLL IR No.	DeBeers Response No.	Task 1: Were the original IRs answered? (Y-Yes or N-no)	Task 2: Are supplementary IRs required to follow up on issues raised by the responses to the original IRs? (Y-Yes or N-No)	Task 3: Supplementary GLL IR No. (IRs attached)
Terrestrial Ecology (Vegetation)	1.1	1.1	N	Y	2.1
	1.2	1.2	N	N	-
	1.3	1.3	Y	N	-
	1.4	1.4	Y	N	-
	1.5	1.5	Y	N	-
	1.6	1.6	Y	N	-
	1.7	1.7	Y	N	-
	1.8	1.8	Y	N	-
	1.9	1.9	Y	N	-
	1.10	1.10	Y	N	-
Geotechnical	1.11	1.11	Y	Y	2.2
	1.12	1.12	Y	N	-
	1.13	1.13	Y	N	-
	1.14	1.14	Y	N	-
	1.15	1.15	Y	Y	2.3
Reclamation & Mine Engineering	1.16	1.16	Y	N	-
	1.17	1.17	Y	N	-
	1.18	1.18	Y	N	-
	1.19	1.19	Y	Y	2.4
Social & Economic Issues	1.20	1.20	Y	N	-
	1.21	1.21	Y	N	-
	1.22	1.28	(GLL) Y	(GLL) Y	2.5
	1.23	1.29	Y	N	-
	1.24	1.30	Y	N	-
	1.25	1.31	Y	N	-
	1.26	1.32	Y	N	-
	1.27	1.33	Y	N	-
	1.28	1.34	Y	N	-
	1.29	1.35	Y	N	-
	1.30	1.36	Y	N	-
	1.31	1.37	Y	N	-
	1.32	1.38	Y	N	-
	1.33	1.39	Y	N	-
	1.34	1.41	(GLL) Y	(GLL) N	-
Traditional Knowledge & Traditional Land Use	1.35	1.42	Y	No – it should be left to Aboriginal organizations to raise further questions or to challenge information.	-
	1.36	1.43	Y	N	-

Topic	First Round GLL IR No.	DeBeers Response No.	Task 1: Were the original IRs answered? (Y-Yes or N-no)	Task 2: Are supplementary IRs required to follow up on issues raised by the responses to the original IRs? (Y-Yes or N-No)	Task 3: Supplementary GLL IR No. (IRs attached)
Traditional Knowledge & Traditional Land Use *(continued)*	**1.37**	**1.44**	No, not at this time – DeBeers states that they "will respond to this issue in the response to Non-conformity Item 5 of the MVEIRB's Conformity Decision (April 26, 2002)"	Depends on DeBeers response when made available	-
Hydrogeology	**1.38**	**1.45**	Y	Y	2.6
	1.39	**1.46**	Y	N	-
	1.40	**1.47**	Y	N	-
	1.41	**1.48**	Y	N	-
	1.42	**1.49**	Y	N	-
	1.43	**1.50**	Y	Y	2.7
Water & Aquatic Resources	**1.44**	**1.51**	No – but the data (bathymetry) that will answer this IR is being collected in 2002	No – but will depend on review of information when available.	-
	1.45	**1.52**	Y	Y	2.8
	1.46	**1.53**	N	Y	2.9
	1.47	**1.54**	Y	N	-
	1.48	**1.55**	Y	N	-
	1.49	**1.56**	Y	N	-
	1.50	**1.57**	Y	Y	2.10
	1.51	**1.58**	Y	N	-
	1.52	**1.59**	Y	Y	2.11
	1.53	**1.60**	Y	N	-
	1.54	**1.61**	Y	Y	2.12
	1.55	**1.62**	Y	N	-
	1.56	**1.63**	Y	N	-
	1.57	**1.64**	Y	N	-
	1.58	**1.65**	Y	N	-
	1.59	**1.66**	No – but the baseline data (fish and habitat surveys) that will answer this IR is being collected in 2002	No – but will depend on review of information when available	-
	1.60	**1.67**	Y	N	-

Topic	First Round GLL IR No.	DeBeers Response No.	Task 1: Were the original IRs answered? (Y-Yes or N-no)	Task 2: Are supplementary IRs required to follow up on issues raised by the responses to the original IRs? (Y-Yes or N-No)	Task 3: Supplementary GLL IR No. (IRs attached)
Water & Aquatic Resources *(continued)*	**1.61**	**1.68**	Y	No – Assessment provided is debatable, however this will be refined with data collected in 2002	-

Notes:

- *Dash (-) indicates no supplementary IR required*
- *GLL means that this is a GLL review answer. Ellis IRs 1.7 and 1.9 were also responded to under DeBeers Responses 1.28 and 1.41.*

De Beers Canada Mining Inc. (De Beers)
Snap Lake Diamond Project

Gartner Lee Limited (GLL) Information Request No. 2
(Supplementary IRs Based on Review of DeBeers Response to GLL IR No. 1)

Terrestrial Ecology (Vegetation)

2.1 Source: DeBeers Response 1.1 to GLL IR 1.1d)

Reference: EAR Section 10.3.1.4.3, p. 10-65

ToR Line: 228

To: De Beers Canada Mining Inc.

Preamble: GLL IR 1.1 d) "asks the proponent to identify community types within the identified ELC units…"

DeBeers Response 1.11 was "ELC units were not classified into community types…"

However, page 10-65 of the EAR states that: "The total number of plant communities is the ***total number of communities present in each ELC unit*** and was estimated based on field observation. For example, the heath tundra unit supports a mean of four different community types…" This sentence leads GLL to believe that community types were identified within the ELC units.

Request: It is unclear how the plant communities with each ELC unit were identified. Please:

(a) Describe the basis for identifying and classifying community types within ELC units (were the community types defined prior to field investigations? Are these community types used elsewhere as a standard?)
(b) List the community types for each ELC unit

Geotechnical

2.2 Source: DeBeers Response 1.11 to GLL IR 1.11a)

Reference: EAR Appendix III.1, Sections 5.4 and 5.5

ToR Line: 328 to 331

To: De Beers Canada Mining Inc

Preamble: Subject: North Pile Slope Stability

Excerpt from Previous Request (GLL IR 1.11):

Please provide:

(a) More information about the details of the sensitivity stability analyses and how they were linked with the thermal analyses and seepage analyses.

(b) More information about what analyses were performed to illustrate the stability of the North Pile during intermediate stages of construction. Given that the thermal analyses and seepage analyses have not been coupled, what bounding assumptions have the designers made with respect to the effects of freeze-thaw and consolidation on the stability of the North Pile Face.

DeBeers reply is that: "the worst-case scenario considered assumed thawed north pile conditions (Figures 1.11-1 to 1.11-6) as follows:

- low shear strength parameters for contained slimes;
- low shear strength parameters for full mix; and
- elevated phreatic surface.

The stability analyses were conducted on thawed pile conditions and were not coupled with the thermal or seepage analyses. Although, the pile is **expected to freeze** as it is developed, the **expected** conditions were not used in the stability analyses. A frozen pile will have significantly higher shear strength and significantly less seepage (almost negligible) than for thawed pile conditions.

The sensitivity analyses were used to identify the parameters, which will have the largest influence on pile stability. As with all stability analyses, the sensitivity analyses were not linked to the results of thermal and seepage analyses. A range of values was considered for each analysis to assess their individual level of sensitivity. The range

of parameters considered cover the worst cases with respect to the thermal and seepage analyses, by using strengths below the expected unfrozen strengths and incorporating phreatic surfaces beyond the range predicted by the seepage analyses."

Discussion:

The North Pile is a large earth structure that is constructed during both long winters and short summers. Numerous assumptions have been made with respect to the possible ranges of parameters. These assumptions must represent the spectrum of possibilities for short term and long term, with respect to the native soil profile, the material properties of the fills and pore pressures.

Based on the information provided by DeBeers it appears that stability sensitivity analyses have been carried out. The friction and cohesion parameters appear to approximate short and long-term strength parameters that are consistent with our experience.

Tables IR 1.11-1 to 1.11-3 below summarize the results of the stability analysis results provided.

Table IR 1.11-1 Strength Parameters from Figures 1.11-1 through 1.11-6

PK Material	Minimum Strength Parameter	Maximum Strength Parameter
Coarse and Grits	Phi = 32 degrees	Phi = 32 degrees
Full Mix	**Phi = 20 degrees**	**Phi = 30 degrees**
Slimes	Cu = 5 kPa	Cu = 5 kPa

Table IR 1.11-2 Factors of Safety from Figures 1.11-1 through 1.11-6

	Full Mix PK c'	Full Mix PK Phi'	Static Factor of Safety	Pseudo- Static Factor of Safety
Case 1	0 kPa	20 degrees	1.25	1.20 (-4%)
Case 2	0 kPa	25 degrees	1.6	1.5 (-6%)
Case 3	0 kPa	30 degrees	1.95	-4 to –6 %??
Case 4	5 kPa	20 degrees	1.33	-4 to –6 %??

Table IR1.11-3 Phreatic Surface Effects from Figures 1.11-2 and 1.11-6

Height of phreatic surface above foundation (measured at location of crest) Case 2 Condition	Static Factor of Safety	Psuedo-Static Factor of Safety
0 m	1.6	1.50
6 m	1.56	-4 to –6 %??
17 m	1.35	-4 to –6 %??

Using the above information, if a high phreatic condition (17 m) is assumed with Case 1 soils, a Pseudo-Static Factor of Safety of 1.01 to 1.1 is estimated.

It is indicated in your response that the pile is "expected to freeze", however, DeBeers chooses to use unfrozen soil properties. Partial freezing (frozen and unfrozen zones) and the pattern of freezing that might be predicted in a two-dimensional thermal analysis could presumably influence seepage rates and consolidation rates. The presence of water could also alter the material properties as ice segregation occurs during freezing temperatures.

Request: Please provide information on the following:

a) What is the predicted temperature profile in the Full Mix PK in the time frame after start up of construction of the shell when the pile first reaches full height? Please provide any calibrations of the thermal model that compare the measured foundation temperatures with the ground temperatures predicted by the thermal model.

b) Does your thermal analysis consider any period of time during construction of the North Pile when air temperatures will be above normal? If so what return-event is the warm spell supposed to simulate?

c) Is it possible that the pile could reach full height and still have layers or substantial zones of material that have not frozen? If so how would this affect pore pressures in these zones/layers?

d) How was the 17 m high phreatic surface arrived at as an upper bound value?

e) What material properties have been assumed for the native subgrade soils? Is there any possibility of these materials containing excess ice? Assuming these materials are initially frozen, what frozen soil parameters have been assumed in the stability analysis?

2.3 Source: DeBeers Response 1.15 to GLL IR 1.15,

Reference: EAR, Sections 3.4 and 3.5

ToR Line: 106, 116, 126, 127, 132, 134, 148, 149, 150, 167-169

To: De Beers Canada Mining Inc

Preamble: Subject: Paste Backfill for Mine

Abbreviated Previous Request:
"Outline the proposed paste backfill performance criteria that have been targeted for application of this material in the underground mine and, if applicable, in the North Pile."

DeBeers reply:
The targeted paste performance for underground is outlined in Tables 1.15-1, 1.15-2 and 1.15-3 below. Performance criteria for the north pile are not applicable because cement is not added to the north pile.

Table IR 1.15-1 Summary of Paste Fill Properties (obtained from testwork)

Property	Value
slump (mm)	230-255
bulk density (t/m^3)	1.92
pulp density (%wt)	73.5
internal friction angle (degrees)	21.2
cohesion (kPa)	32
average solids (specific gravity)	2.75
friction gradient (kPa/m)	4.0

mm= millimetres
t/m^3 = tonnes per cubic meter
%wt = percent weight
kPa = kilo Pascals
kPa/m = kilo Pascals per metre

Table IR 1.15-2 Paste Fill Strengths (obtained from testwork)

Slump (mm)	Cement (%wt)	Cure (days)	Ultimate Compression Strength (kPa)
255 (10")	2.5	2	39
255 (10")	**2.5**	**3**	**44**
255 (10")	2.5	7	52
255 (10")	2.5	28	93

mm= millimetres
" = inches
%wt = percent weight
kPa = kilo Pascals

Table IR 1.15-3 Three-Day Fill Strength Requirements (calculated)

Stope Height (m)	Three-day Strength Required (kPa)
2	17
3	25
4	33
5	41
6	48

m = metres
kPa = kilo Pascals

Request:

a) What type(s) of cement was used for the testwork?

b) Under what temperatures were the paste cylinders cured at for the determinations of Ultimate Compressive Strength? What is the expected impact on strength when the paste backfill cures underground in typical in situ temperature conditions?

Reclamation and Mining Engineering

2.4 Source: DeBeers Response 1.19 to GLL IR 1.19,

Reference: EA, Sections 3.10, 10.2.2.2.2, 3.2.2.2, 4.2.2.2, Appendix III.1

ToR Line: 569 to 581

To: De Beers Canada Mining Inc

Preamble: De Beers were requested to provide a breakdown of the $25 million estimate and a description of cost assumptions and basis. De Beers did provide a more detailed estimate with a revised total

of $35 million along with details of cost assumptions. One item, which they note is not included, is an estimate of the cost of post closure monitoring activities.

Request: Please provide a schedule and cost estimate for post closure monitoring.

Social and Economic Issues

2.5 Source: DeBeers Response 1.28 to GLL IR 1.22

Reference: EAR, Sections 3.9.1.4 and 5.3.2.3

ToR Line: 462 to 464, 468 to 469

To: De Beers Canada Mining Inc.

Preamble 1: De Beers was requested to provide information on the assumptions used in the Economic Impact Assessment for the construction, operations and closure phases regarding the percentage of total expenditures made in the NWT.

In 1.28 (a) De Beers responded by stating: "In each phase (construction, operation and closure), the economic modelling was based on the assumption that all (100%) project specific expenditures are made in the Northwest Territories. The assumptions exclude potential overhead expenditures by De Beers outside of the Northwest Territories that are not used directly at the project site."

Request 1: Please describe the general nature of "project specific expenditures" and "potential overhead expenditures", and indicate what proportion of total project costs each of these categories will comprise. In the case of "project specific expenditures", can payments made outside the NWT be regarded as costs incurred within the NWT for accounting purposes?

Preamble 2: De Beers was requested to provide an indication of the types, volumes and values of goods and services De Beers would expect to purchase in the NWT.

In 1.28 (c) De Beers responded by stating that "At this time, detailed engineering has not been completed, thus a breakdown of the types, volumes and values of goods and services that De Beers would expect to purchase in the NWT cannot be identified. De

Beers has recently hired a business development coordinator, and one task of this position will be to examine goods and service purchasing in the north."

Request 2: Please explain how the response in 1.28(c) should be understood in light of the following sentence in 1.28(a): "In each phase (construction, operation and closure), the economic modelling was based on the assumption that all (100%) project specific expenditures are made in the Northwest Territories." Specifically,

Hydrogeology

2.6 Source: DeBeers Response 1.45 (Figure 1.45-1) to GLL IR 1.38

Reference: EAR Section 9.2 pages 9-21 to 9-76, and Figure 9.2-3.

ToR Line: 255 and 388

To: DeBeers Canada Mining

Preamble: Regional groundwater flow directions in the deep system are based on water elevations in large lakes that are assumed to be connected via taliks. Assumptions are made as to which lakes have taliks but there is little supporting data.

Snap Lake has a high water elevation relative to other lakes in all directions and therefore groundwater flow is interpreted to be radially outward in all directions (see EAR Figure 9.2-3 and Response Figure 1.45-1). A local study area was selected that included Snap Lake and the two lakes to the north that have water elevations below Snap Lake. The local study area lake levels suggest northward groundwater flow. However, lakes that have even lower water elevations are present to the east (Lac Capot Blanc), west (Camsell Lake) and south (several lakes as shown on Response Figure 1.45-1 Lake Elevations). Groundwater flow directions to the east, west and south could also be inferred from the available data.

Detailed groundwater flow models and impact predictions are based on the inferred northward flow direction for deep groundwater.

Request: Please:

a) Provide a discussion of how the current uncertainty in the deep groundwater flow direction could affect the predictions regarding long term impacts on groundwater and surface water resources in all directions.

b) Explain why the lake elevations on Response Figure 1.45-1 are approximately 11m higher than the elevations for the same lakes on EAR Figure 9.2-13.

2.7 Source: DeBeers Response 1.50 (Figure 1.50-1) to GLL IR 1.43

Reference: EAR Section 9.2.3.2 page 9-76

ToR Line: 383 to 385

To: DeBeers Canada Mining

Preamble: Regional groundwater flow directions in the deep system are based on water elevations in large lakes that are assumed to be connected via taliks. Snap Lake has a high water elevation relative to other lakes in all directions and therefore groundwater flow is interpreted to be radially outward in all directions (see EAR Figure 9.2-3 and Response Figure 1.45-1). A local study area was selected that included Snap Lake and the two lakes to the north that have water elevations below Snap Lake. The local study area lake levels suggest northward groundwater flow. However, lakes that have even lower water elevations are present to the east (Lac Capot Blanc), west (Camsell Lake) and south (several lakes as shown on Response Figure 1.45-1 Lake Elevations). Groundwater flow directions to the east, west and south could also be inferred from the available data.

Future monitoring well locations, proposed in Response 1.50 and Figure 1.50-1, are also based on inferred northward groundwater flow.

Request: Please indicate how the proposed deep monitoring well locations could more accurately determine groundwater flow directions and potential impacts in all directions(not just to north) and also address background groundwater quality.

Water and Aquatic Resources

2.8 Source: DeBeers Response 1.52 to GLL IR 1.45

Reference: EAR, Section 9.4.2.2.4

ToR Line: 413

To: De Beers Canada Mining Inc

Preamble: DeBeers provided a response which was based on measured bioconcentration factors for Cd in Snap Lake fish and comparison of these with published BCFs for lake and rainbow trout which concluded that "potential impacts to fish are negligible." Part of the rationale for their conclusion was the statement that *"BCFs measured for liver tissue are higher than published BCFs but cadmium is stored in the liver and published BCFs are **likely** based on whole fish or muscle tissue only".* DeBeers analysis was *that "predicted fish concentrations are 0.1 milligrams per kilogram (mg/kg) (muscle only) and 0.2 mg/kg (liver and muscle)."* and this was compared to *"tissue residue no-effect levels for lake trout growth, reproduction and survival (Jarvinen and Ankley 1999), which are around 2 mg/kg for liver tissues and 0.1 to 2.8 mg/kg for rainbow trout muscle tissue".*

DeBeers predicted levels of 0.1 mg/kg (for muscle) match published effect levels for rainbow trout muscle, leaving a small margin for error around literature values that are "likely" based on whole fish or muscle tissue, given that liver values also exceed published values.

The IR response is incomplete in the absence of documentation of what fish tissues formed the basis of the published literature values for BCFs. This documentation will address the speculation inherent in the opinion that literature values are *"**likely** based on whole fish or muscle tissue only".*

Request: Please substantiate whether the basis for the published BCFs for cadmium accumulation in fish is muscle or liver tissue. Provide the reference and comparative values for muscle and liver. Please modify the interpretation in the response as required.

2.9 Source: DeBeers Response 1.53 to GLL IR 1.46

Reference: EAR, Section 9.4.2.2.3, 9.4.2.2.4, Appendix IX-I

ToR Line: 376

To: De Beers Canada Mining Inc

Preamble: The original IR was intended to address a contradiction in the conclusions (*" Some discrepancies exist between EAR figures and the Technical Appendices"*) presented on p. 9.232 of the EAR which stated that *"Under these conditions ... total phosphorus concentration could decrease by up to 60% from baseline conditions."* DeBeers have predicted minewater discharges of 25302 m3/day (Table 9.4.16) consisting of groundwater containing, on average, 0.09 mg/L (Table 9.2-1) of total phosphorus and 200 m3/day of sewage (Table 9.4.16) containing 0.2 mg/L of phosphorus (Table 9.4.17) into a lake with baseline total phosphorus of 9 µg/L (Table 9.4.2). and predicted a ***decrease*** on phosphorus concentrations in Snap Lake (p. 9.232). Table 9.4.22 shows that baseline phosphorus is higher than the "maximum during operations" in Snap Lake. p. 9.232 and Table 9.4.22 are internally consistent but contradict the increased loadings predicted from the mine water and sewage discharges in other sections of the EAR. How can this be reconciled ?? Changes in the TP/PO4 ratio in the discharge will not decrease the TP concentrations in the lake, as suggested.

The IR for loadings included estimates of atmospheric deposition to the surface of Snap Lake. These were not provided.

The loadings cannot be correctly calculated in the absence of total phosphorus estimates for the mine water discharge. Table 9.4.18 provides estimates for orthophosphate but not for total phosphorus.

Request: Please reconcile the discrepancy between increased phosphorus loadings to Snap Lake and EA predictions of decreased phosphorus concentrations in the lake.

Please provide an estimate of baseline atmospheric phosphorus loadings to the lake.

Please provide an estimate of total phosphorus in the mine water discharge.

Please use the baseline loadings of total phosphorus to estimate baseline phosphorus concentrations in Snap Lake and compare these to baseline measurements to demonstrate that the predictive model used is generating realistic estimates of changes in phosphorus concentrations in Snap Lake during mine operations.

2.10 Source: DeBeers Response 1.57 to GLL IR 1.50

Reference: EAR, Section 9.2.1.3

ToR Line: 350

To: De Beers Canada Mining Inc

Preamble: DeBeers provided a Table 1.57-1 in their response which showed variation in connate groundwater chemistry with depth for saline-minerals The major source of phosphorus (orthophosphate) to the lake during operations will be mine water discharge of groundwater seepage to the mine workings. Table 1.57-1 does not provide phosphorus or orthophosphate concentrations with depth in the groundwater.

Request: Please provide a column for Table 1.57-1 showing concentrations of phosphorus and orthophosphate at each depth interval and discuss any implications to EA predictions of lake response.

2.11 Source: DeBeers Response 1.59 to GLL IR 1.52

Reference: EAR, Section 3.6.3, 9.3.2.2.3

ToR Line: 358

To: De Beers Canada Mining Inc

Preamble: DeBeers response stated that "mine inflows would be quite low (7000 cubic meters per day (m^3/d)), gradually increase to approximately 24,000 m^3/d in year 6"., Can a more precise response be provided – i.e. can we assume that this is a linear response from Year 1 to Year 6 ?

Request: Please clarify the rate of increase in mine water in the water balance from Year 1 to Year 6.

2.12 Source: DeBeers Response 1.61 to GLL IR 1.54

Reference: EAR, Section 3.10.2

ToR Line: 529

To: De Beers Canada Mining Inc

Preamble: DeBeers response stated that "(*i.e., the change in amount of permafrost should not significantly change the overall load from the pile since the upper surface of the pile will also be the most chemically active and all chemical load from this upper surface is accounted for in the current model).*" This response is correct but does not account for changes in the amount of reactive area if the core of the pile thaws – there will be more reactive surface to react with oxygen should permafrost recede.

Request: Please clarify the implications of reduced permafrost in the core of the waste rock pile on the reactive surface area of waste rock and how this may alter seepage and runoff from the waste rock pile.