March 20, 2015

Mackenzie Valley Environmental Impact Review Board
200 Scotia Centre
P.O. Box 938
Yellowknife, NT
X1A 2N7

Attention: Chuck Hubert, Senior Environmental Assessment Officer

Re: EA1314-01 Jay Project, Dominion Diamond Corporation Developer's Assessment Report – Responses to Information Requests

Dear Mr. Chuck Hubert:

Dominion Diamond is pleased to provide you with a first batch of responses to the Information Requests (IRs) received following the submission of the Jay Project Developer's Assessment Report and the responses to the adequacy review.

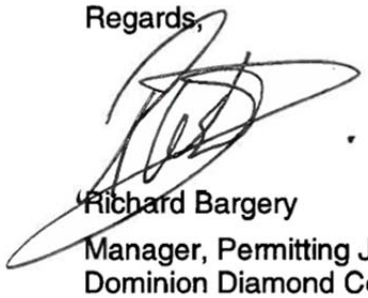
Included in the first submission are 107 selected responses to IRs from the following parties: Fisheries and Oceans Canada, Environment Canada, the Independent Environmental Monitoring Agency, the Government of the Northwest Territories - Lands, the Kitikmeot Inuit Association, the Mackenzie Valley Environmental Impact Review Board, the North Slave Metis Alliance, Transport Canada and the Tłı̨chǫ Lands Protection Department. Dominion Diamond has also received IRs from the Łutselk'e Dene First Nation and the Yellowknives Dene First Nation.

A summary of the responses enclosed in this submission is provided in Table 1. As shown in Table 1, we have included a document identifier in addition to the MVEIRB's Online Review System (ORS) number to differentiate requests from the various parties. This document identifier is provided as the Information Request Number on the individual responses.

The remaining IR responses and an updated ORS Excel spreadsheet will be submitted on April 7, 2015, as outlined in the MVEIRB's Work Plan and Schedule.

Dominion Diamond is committed to work diligently with the MVEIRB and other parties to provide information and responses in a timely manner throughout the remainder of the process.

Regards,



Richard Bargery
Manager, Permitting Jay Project
Dominion Diamond Corporation

DOMINION DIAMOND

Table 1. Summary of Responses to Information Requests Submitted on March 20, 2014

Source Organization	Request	ORS Number	Response Document Identifier
Fisheries and Oceans Canada	Fisheries and Oceans Canada-Fisheries Protection Program recommends that the proponent provide a justification as to why different sampling methods were used for each lake sampled. Fisheries and Oceans Canada recommends the proponent identifies its confidence in the estimates of fish species and abundance for each waterbody sampled, considering that it used different sampling methods. Also, Fisheries and Oceans Canada requests information on how the proponent corrected for the use of different sampling methods when providing information of their sampling (e.g. Catch per unit effort, abundance of species, size of species caught, etc.).	2	DAR-DFO-IR-01
Fisheries and Oceans Canada	Fisheries and Oceans Canada-Fisheries Protection Program recommends that the proponent provide a justification as to how it was determined that the destruction of part of watercourses B0 and Ac35 will not require a Fisheries Act authorization.	4	DAR-DFO-IR-03
Environment Canada	EC requests that the Proponent provide detailed information on how the AQMMP will be expanded to address the air quality issues identified in its air assessment.	18	DAR-EC-IR-03
Environment Canada	EC requests that the Proponent provide the following information: • annual reporting of incineration operational data, • schedule for future incineration stack tests, and • details of the planned food waste composting program.	20	DAR-EC-IR-05
Environment Canada	EC requests the Proponent provide details as to how the samples that show potential to generate acid would be managed.	21	DAR-EC-IR-06

Source Organization	Request	ORS Number	Response Document Identifier
Environment Canada	EC requests the Proponent commit to developing a contingency plan to deal with any exceedance of Uranium and/or thorium in the leachate should that occur	22	DAR-EC-IR-07
Environment Canada	EC seeks clarification on how will the sediments be used once they are removed from Lac du Sauvage? Are the sediments to be disposed of, or stored and reclaimed at a later date?	39	DAR-EC-IR-24
Environment Canada	EC requests that the propoent provide: • a clear summary of waterbird surveys conducted on Lac du Sauvage, including definitive survey dates, confirming and detailing survey methods (i.e. ground or aerial) and results of all years of waterbird surveys of Lac du Sauvage; • the details of the diving bird mitigation strategy during fish-out operations to prevent entanglement.	40	DAR-EC-IR-25
Environment Canada	EC requests information on: • the mitigation measures that will be used to comply with the MBCA to prevent incidental take of migratory birds, their nests and eggs during any land clearing and any dewatering, where there is a risk of change in water levels, within the proposed project.	43	DAR-EC-IR-28
Environment Canada	EC requests: • a revised Map I-2 with comparable data resolution to Table I-2 (i.e. species and number of individuals observed for each location on the map). • a map of 2013 Environment Setting Survey observations, similar to Map I-2, including revisions noted above • clarity on proposed timing of land clearing and dewatering activities where there is habitat loss	44	DAR-EC-IR-29

Source Organization	Request	ORS Number	Response Document Identifier
Environment Canada	EC seeks clarification: • if reporting of wildlife mortalities, including migratory birds and species at risk, on site is voluntary or required by on-site staff.	45	DAR-EC-IR-30
Government of Northwest Territories - Lands	GNWT requests that the Proponent confirm if the IMP plan embedded in the WMP dated April 24, 2014, is the current version of the plan to be used for this project. Additionally, GNWT requests that the Proponent provide a schedule for routine incineration stack testing.	5	DAR-GNWT-IR-03
Government of Northwest Territories - Lands	GNWT requests that DDEC provide the following: a. Describe how freeze-thaw of the pit walls was taken into consideration in the stability assessment of the excavated Jay Pit walls. Provide further discussion regarding freeze-thaw effects as well as the effects of a frozen face on the rock permeability and Pit infiltration rate/volume. b. Provide an estimate of the freeze-thaw depths during operation of the Jay Pit. c. With regards to Section 10.4 of the DAR (mitigation and monitoring), provide a description of the proposed actions, mitigations and monitoring associated with the effects of freeze-thaw on the stability of the of the Jay Pit walls. d. Provide additional information on the slopes and stability of the overburden (lake sediments) located between Jay Pit and the toe of the dike once the area has been dewatered and describe how the lake sediments will be shaped.	19	DAR-GNWT-IR-17

Source Organization	Request	ORS Number	Response Document Identifier
Government of Northwest Territories - Lands	GNWT recommends that annual values used in the impact assessment should be based on the hydrologic year which extends from the onset of freezing temperatures in October through to the following September. For certain types of analysis of annual water yield and runoff coefficients, the runoff of streams which extends past the end of the hydrologic year (September) should be assigned to that runoff year, since such runoff is the result of that year's precipitation. For streams that discharge through the entire winter season, all of the runoff through into May (or whenever the new spring runoff begins) should be assigned to the preceding runoff year. Please provide a rationale for not using the above approach in the baseline hydrology work and any impacts to the assessment in the DAR.	31	DAR-GNWT-IR-29
Government of Northwest Territories - Lands	GNWT requests DDEC provide rationale on the utilization of a 4-hour time step and provide information on how 4 hour values were obtained from the daily data.	33	DAR-GNWT-IR-31
Government of Northwest Territories - Lands	GNWT requests that DDEC clarify whether flow routing time effects are included in the model. If so, how is this done? If not, what are the potential implications of not including this aspect?	35	DAR-GNWT-IR-33
Government of Northwest Territories - Lands	GNWT requests clarification on the methods used for the determination of the zero flow depth "y" in the weir equation for each lake.	37	DAR-GNWT-IR-35
Government of Northwest Territories -	GNWT requests that DDEC provide information on lake stage-storage curves as well as information on how lake storage was taken into account.	38	DAR-GNWT-IR-36

Source Organization	Request	ORS Number	Response Document Identifier
Lands			
Government of Northwest Territories - Lands	GNWT requests the DDEC provide an explanation of the result noted above as well as provide justification for the acceptance of this result.	42	DAR-GNWT-IR-40
Government of Northwest Territories - Lands	GNWT requests additional information of the watershed area or derivation of the design discharge for the discharge channel. GNWT requests clarification from DDEC regarding the inclusion of a stream near the downstream end of the Sub-Basin B Diversion Channel in the computations regarding discharge.	46	DAR-GNWT-IR-44
Government of Northwest Territories - Lands	GNWT requests additional information and assessment of impacts regarding the post-closure scenario at Lynx Pit and any variance in this regard that may result from the incorporation of Lynx Pit into the water management of Jay Pit as opposed to the original closure scenario for Lynx.	52	DAR-GNWT-IR-50
Government of Northwest Territories - Lands	GNWT requests that DDEC provide rationale on the proposed seasonal refilling of Misery and Jay Pits and provide information as whether winter filling has at all been assessed for the project.	58	DAR-GNWT-IR-56
Government of Northwest Territories - Lands	Please elaborate on how DDEC plans to mitigate for this period of acclimatization of new employees to proper waste management.	71	DAR-GNWT-IR-69

Source Organization	Request	ORS Number	Response Document Identifier
Government of Northwest Territories - Lands	Please clarify the history of non-intentional mortalities of carnivores that have occurred at Ekati and other mines.	76	DAR-GNWT-IR-74
Independent Environmental Monitoring Agency	DDEC should include the 2012 AEMP fish monitoring results in the DAR discussion of historic fish tissue contaminants.	7	DAR-IEMA-IR-07
Independent Environmental Monitoring Agency	DDEC should consider the 2006 Rescan report in re-evaluating the DAR assessment of increasing levels of TDS effects on cladocera growth in the Jay-impacted lake watershed.	9	DAR-IEMA-IR-09
Independent Environmental Monitoring Agency	DDEC should incorporate the Diavik 2012 and 2013 AEMP phytoplankton results into its assessment of phytoplankton trends in Lac de Gras.	10	DAR-IEMA-IR-10
Independent Environmental Monitoring Agency	DDEC should explain (1) what the circumstances were that created this higher-than-normal blast, and (2) what measures will DDEC put in place to ensure this magnitude of blast does not occur at Jay.	11	DAR-IEMA-IR-11
Independent Environmental Monitoring Agency	DDEC should assess cumulative effects incorporating the Lupin and Jericho mines within the Base Case.	19	DAR-IEMA-IR-19

Source Organization	Request	ORS Number	Response Document Identifier
Independent Environmental Monitoring Agency	DDEC should document and discuss direct water bird mortalities from previous fish-outs, lessons learned and mitigation measures to prevent reoccurrences. Incidental mortalities during fish-outs should also be included in the cumulative effects assessment on water birds.	20	DAR-IEMA-IR-20
Independent Environmental Monitoring Agency	DDEC should clarify whether aerial surveys to determine caribou abundance and distribution around the Ekati mine complex were carried out in 2012, and demonstrate how these data were considered in the caribou assessment.	24	DAR-IEMA-IR-24
Independent Environmental Monitoring Agency	DDEC should a) justify that the cameras are recording actual deflection rates of caribou approaching the Misery Road at any distance, b) provide details on the mitigation measures in place (and proposed) to enable caribou to freely cross the Misery Road at the traffic volumes suggested.	25	DAR-IEMA-IR-25
Independent Environmental Monitoring Agency	DDEC should re-examine these sources of uncertainty and reconsider how they would affect the conclusions of the DAR with regard to predicted effects on caribou.	30	DAR-IEMA-IR-30
Independent Environmental Monitoring Agency	DDEC should a) redefine the wolf ESA to consider an area that encompasses wolf movements during the denning period, or justify why the ESA selected is adequate to assess potential impacts on wolves, and b) update the literature review and discussions of wolf denning success and pup productivity (all declining in recent years), and provide this context for the evaluation of development impacts on wolves.	32	DAR-IEMA-IR-32
Independent Environmental Monitoring Agency	DDEC should provide the results of the 2013 raptor survey data, justify why these data represent a rigorous assessment of the raptors nesting within the study area, and demonstrate how the 2013 data were incorporated into the Project and cumulative assessment.	33	DAR-IEMA-IR-33

Source Organization	Request	ORS Number	Response Document Identifier
Independent Environmental Monitoring Agency	DDEC should provide the latest data and confirm or amend the conclusions drawn from the dataset.	35	DAR-IEMA-IR-35
Independent Environmental Monitoring Agency	DDEC should describe what fish habitat enhancements it intends to apply to the Sub-Basin B Diversion Channel based on the experience from the Ekati Panda Diversion Channel and Pigeon Stream Diversion.	48	DAR-IEMA-IR-48
Independent Environmental Monitoring Agency	DDEC should provide a reclamation schedule for the Jay Project that shows the same level of detail and integration with the ICRP Reclamation Schedule (Figure 8.5-1).	51	DAR-IEMA-IR-51
Kitikmeot Inuit Association	Please include rationale for the distance chosen for the baseline study area, particularly to the east of the proposed project.	6	DAR-KIA-IR-006

Source Organization	Request	ORS Number	Response Document Identifier
Kitikmeot Inuit Association	Please review the study in full and revise references and verbage regarding interpretations of the effect of vehicles on caribou behaviour at roads. While we feel that traffic was not analysed in a way that can be connected with any of these behaviours in the Rescan study, please comment on the prevalence of behaviours in the Rescan study that imply a startle response (possibly to traffic), such as running along the road, or off the road, in addition to the 2% of caribou that deflected from the road if this reference is retained. Please discuss results from other studies that have explored the impacts of roads, and traffic, on caribou to contextualize these results. Please consider collecting additional information along Misery road on the impacts of vehicles on caribou behaviours at roads (e.g., running, deterrence), along with information about the distance at which caribou respond to vehicles of various sizes. We suspect that caribou have stronger behavioural responses to vehicles than to tundra road verges, and implementing an additional road monitoring program, or sorting the existing data in another way that can answer this question properly would be necessary prior to concluding that, as the proponent does in Section 12.2.2.2, "the key factor affecting crossings appears to be berm height and not traffic volume or maximum road height (ERM Rescan 2014)" .	7	DAR-KIA-IR-007
Kitikmeot Inuit Association	Please comment on whether at least one additional year of baseline data collection be done using the grizzly bear hair snagging grid used in 2013 (Map 2.1-6).	8	DAR-KIA-IR-008
Kitikmeot Inuit Association	On the maps indicated, please provide an inset showing the relative locations of the Snap Lake grizzly hair collection stations and survey efforts relative to the proposed project, or include all projects onto one	9	DAR-KIA-IR-009

Source Organization	Request	ORS Number	Response Document Identifier
	map.		
Kitikmeot Inuit Association	Please clarify whether methodologies, grid sizes, and temporal sampling periods were the same among sites and time periods. Where differences in methodologies occurred, please identify them.	10	DAR-KIA-IR-010
Kitikmeot Inuit Association	Please comment on the rationale for conducting this survey on August 12, 2013 when caribou are expected in the area, as indicated in this same baseline report, from May 1-31 (during northern migration), June 16- Jul 1 (post-calving), from July 2- August 3, and between September 1 to October 31 (fall migration). Will additional surveys be conducted for this area during the aforementioned periods of expected caribou presence, prior to project development?	11	DAR-KIA-IR-011
Kitikmeot Inuit Association	Please provide at least 2 years of systematic baseline data for each of the indicated wildlife VECs within the Zone of Influence of the proposed Jay Pipe project, which can be combined and compared against later monitoring data for that same area.	12	DAR-KIA-IR-012
Kitikmeot Inuit Association	Please provide additional survey maps for noted surveys in this section, namely: 1) 1995-1997 Diavik Surveys, 2) 1998-2001 Ekati Surveys, 3) 2002 surveys for Ekati and SE shore of Lac de Gras, 4) 2006 Ekati Survey, 5) 2006 Diavik Survey, and 6) 2007 Diavik Survey.	15	DAR-KIA-IR-015
Kitikmeot Inuit Association	Please comment on attraction of grizzly bears to power line poles.	26	DAR-KIA-IR-026
Kitikmeot Inuit Association	Please define "minor". This is an important definition as magnitude is the main criterion on which significance is based.	28	DAR-KIA-IR-028

Source Organization	Request	ORS Number	Response Document Identifier
Kitikmeot Inuit Association	Please provide information on whether the proponent will be conducting baseline surveys for this project. We recommend conducting baseline surveys for breeding birds at an appropriate time, and over a two year period, within the proposed project footprint, as well as in comparable habitats paired to survey points outside of the likely ZOI for birds.	33	DAR-KIA-IR-033
Kitikmeot Inuit Association	Please define "minor". This is an important definition as magnitude is the main criterion on which significance is based.	40	DAR-KIA-IR-040
Kitikmeot Inuit Association	Please add and correct the maps in this section.	47	DAR-KIA-IR-047
Kitikmeot Inuit Association	Identify and discuss economic effects anticipated for Nunavut LSA and Inuit communities: Identify specific employment opportunities for Kitikmeot residents; specific economic opportunities for Kitikmeot LSA residents; businesses and contractors and/ or other LSA businesses and contractors that can either service the mine's expansion and/or be affected by its activities.). Need to be explicit about direct and indirect economic effects for Kitikmeot and Inuit residents and businesses, including capital expenditures.	83	DAR-KIA-IR-083
Kitikmeot Inuit Association	Complete a local business use analysis and identify impacts on local businesses in the Kitikmeot. Evaluate the effects of business capacity for Kitikmeot LSA communities and Kitikmeot region; demonstrate how the Proponent will engage with the Kitikmeot LSA communities to enhance potential business capacity and opportunities.	84	DAR-KIA-IR-084
Kitikmeot Inuit Association	Include discussion of trans-boundary employment effects to reflect employment effects (e.g. estimate of percentage of hires out of direct, indirect employment and contractor positions the mine's expansion will create during construction and operations) for Kitikmeot LSA /IBA	85	DAR-KIA-IR-085

Source Organization	Request	ORS Number	Response Document Identifier
	communities and Kitikmeot region.		
Kitikmeot Inuit Association	Describe education and skills building initiatives in non-NWT/IBA-LSA communities in Kitikmeot	87	DAR-KIA-IR-087
Kitikmeot Inuit Association	Describe Northern trans-boundary education /northern workforce development and specifically how educational enhancement plans will be extended to the non-NWT LSA / IBA communities and residents of Kitikmeot	88	DAR-KIA-IR-088
Kitikmeot Inuit Association	Please indicate what TDS concentrations would potentially cause a shift in phytoplankton community composition, using examples from cited scientified literature.	100	DAR-KIA-IR-100
Kitikmeot Inuit Association	Please determine and describe whether or not water quality predictions may induce chronic effects on fish or aquatic biota in the study area.	101	DAR-KIA-IR-101
Kitikmeot Inuit Association	Please indicate whether or not aluminum is below the tissue benchmark if the bioaccumulation factor is removed.	102	DAR-KIA-IR-102
Kitikmeot Inuit Association	Future stages of the Aquatic Effects Monitoring Plan should be reviewed by the KIA in order to determine (1) the proposed metrics for assessing fish survival, reproduction, abundance and distribution and (2) the available baseline data associated with these parameters.	107	DAR-KIA-IR-107
Mackenzie Valley Environmental Impact Review Board	Dominion, please provide evidence for statement that "the dewatered portion of Lac du Sauvage will form a hard pan crust" as rationale for concluding that this pathway has no linkage. Please describe how DDEC will manage caribou and other wildlife that migrate through or enter the exposed lakebed in the diked area of Lac du Sauvage and mitigate any	2	DAR-MVEIRB-IR-002

Source Organization	Request	ORS Number	Response Document Identifier
	adverse impacts.		
Mackenzie Valley Environmental Impact Review Board	Dominion, please provide additional detail on the following: 1. Why are the closure and reclamation costs for all three alternatives considered to be similar? 2. Why would the contingency seepage water management for alternative two be more complex than alternative one?	3	DAR-MVEIRB-IR-003
Mackenzie Valley Environmental Impact Review Board	Dominion, plese re-evaluate the pathway "The dike isolating the Jay pipe may provide spawning habitat for fish where any potential contaminants within interstitial spaces may affect survival of eggs or fry in Lac du Sauvage" with a complete discussion of the supporting evidence.	8	DAR-MVEIRB-IR-008
Mackenzie Valley Environmental Impact Review Board	How was this event chosen? Does the 24hr event represent the peak Intensity-Frequency-Duration event?	16	DAR-MVEIRB-IR-016
Mackenzie Valley Environmental Impact Review Board	What kind of mitigation could be implemented in this case?	20	DAR-MVEIRB-IR-020

Source Organization	Request	ORS Number	Response Document Identifier
Mackenzie Valley Environmental Impact Review Board	Please describe how the boundaries for the BSA for hydrogeology was chosen or provide a reference to another part of the DAR.	22	DAR-MVEIRB-IR-022
Mackenzie Valley Environmental Impact Review Board	Why was additional data collected in 2014, how will this information be incorporated into this environmental assessment, will it effect the effects assessment conclusions and when will the information be submitted?	25	DAR-MVEIRB-IR-025
Mackenzie Valley Environmental Impact Review Board	The conclusion here contradicts Dominion's earlier characterization of Lac du Sauvage as oligotrophic (see Section 8.2.5.2.1). Is the lake considered oligotrophic or not? Is it common practice to assign a trophic status (and therefore a phosphorus objective) based on a maximum measured value or on a median or mean? If the lake is oligotrophic, then the conclusion that "no COPCs were identified for nutrients" as stated on page 8-357 is not correct.	26	DAR-MVEIRB-IR-026
Mackenzie Valley Environmental Impact Review Board	Please confirm what the correct units are for each metal.	28	DAR-MVEIRB-IR-028
Mackenzie Valley Environmental Impact Review	Why was the Cardinal Pipe not assessed as an alternative for development by a stand alone dike?	45	DAR-MVEIRB-IR-045

Source Organization	Request	ORS Number	Response Document Identifier
Board			
Mackenzie Valley Environmental Impact Review Board	Will the processed kimberlite for the Jay Pit differ from other pits on site? And if so, what are the consequences.	49	DAR-MVEIRB-IR-049
Mackenzie Valley Environmental Impact Review Board	Please elaborate on why there was a difference in the timestep used.	50	DAR-MVEIRB-IR-050
Mackenzie Valley Environmental Impact Review Board	Please confirm the values in Figure 8.5-8	52	DAR-MVEIRB-IR-052
Mackenzie Valley Environmental Impact Review Board	For the Narrows, why does the width not consistently increase for the dewatering case relative to the baseline? Why does the width of the narrows decrease for the larger (1 in 100 yr wet) event?	53	DAR-MVEIRB-IR-053

Source Organization	Request	ORS Number	Response Document Identifier
Mackenzie Valley Environmental Impact Review Board	Please explain why environmental conditions before human development, which represent reference conditions, were only considered ..."where possible." when baseline data on water quality and aquatic life are available from the Diavik EA process. The approach proposed does not allow assessment of cumulative effects from Diavik + Ekati+ Jay but only the effects of the Jay project on a baseline of alteration produced by Ekati and Diavik. Please provide true baseline data for Lac de Gras using EIS data for Ekati and DDMI. This should include water quality, sediment quality, zooplankton and phytoplankton	55	DAR-MVEIRB-IR-055
Mackenzie Valley Environmental Impact Review Board	Please provide a commitment to the actually carrying out the listed maintenance activities over the life of mine to ensure safe fish passage to the diversion channel, instead of just considering them in the future.	56	DAR-MVEIRB-IR-056
Mackenzie Valley Environmental Impact Review Board	Please clearly explain the difference between Reference Conditions, Base Case Conditions and Baseline conditions. Describe what time lines are encompassed by each definition and how this influences the assessment of cumulative effects.	59	DAR-MVEIRB-IR-059
Mackenzie Valley Environmental Impact Review Board	Please conduct the nutrient assessment using the CCME guidelines to assess the magnitude of change.	60	DAR-MVEIRB-IR-060

Source Organization	Request	ORS Number	Response Document Identifier
Mackenzie Valley Environmental Impact Review Board	Please provide a reference for this (e.g. Snap Lake?) as was done for benthos on p. 9-190.	62	DAR-MVEIRB-IR-062
Mackenzie Valley Environmental Impact Review Board	Please confirm if year round flow and open water has been confirmed and how this status is addressed in modelling. Were the lakes modelled assuming that there is year-round flow between the lakes?	64	DAR-MVEIRB-IR-064
Mackenzie Valley Environmental Impact Review Board	Please include a forage fish species as a VC or provide a strong rationale for why this is not required.	66	DAR-MVEIRB-IR-066
Mackenzie Valley Environmental Impact Review Board	Please provide explicit consideration of loss of this spawning shoal as the effects assessment does not appear to include loss of lake trout spawning shoals	67	DAR-MVEIRB-IR-067
Mackenzie Valley Environmental Impact Review Board	Will Dominion commit to a monitoring of mercury in small fish (e.g. slimy sculpin) to confirm lack of mercury uptake prior to reconnecting the diked area ?	70	DAR-MVEIRB-IR-070

Source Organization	Request	ORS Number	Response Document Identifier
Mackenzie Valley Environmental Impact Review Board	Are there any parts of the road that caribou are more likely to cross the road than others, considering, for example, currently known caribou movement routes? If so, has this been considered in the selection of the Jay road alternative, and if not, why?	87	DAR-MVEIRB-IR-087
Mackenzie Valley Environmental Impact Review Board	Summarize the experience at the Meadowbank and Diavik dikes with respect to each failure mode and adjust likelihoods of occurrence as appropriate.	88	DAR-MVEIRB-IR-088
Mackenzie Valley Environmental Impact Review Board	Please revise dust on forage from a secondary to a primary pathway or provide reasons why the dust on forage for Gahcho Kué levels (primary effect) is not applicable to Jay and Misery road for the Jay Project.	89	DAR-MVEIRB-IR-089
Mackenzie Valley Environmental Impact Review Board	a) Please integrate recent trail mapping to build a composite map of historic trails, traditional knowledge trails and trails relative to the collar trajectories within the Zone of Influence. b) Please describe the methodology for trail mapping and commit to mapping the trails south-west of the proposed Jay Pit	92	DAR-MVEIRB-IR-092
Mackenzie Valley Environmental Impact Review Board	Please describe low frequency sound transmission potential during blasting and detection distances. Please describe how the modeled decibel ranges compare with the lower limit of caribou hearing with regard to sensory disturbance from the project.	98	DAR-MVEIRB-IR-098

Source Organization	Request	ORS Number	Response Document Identifier
Mackenzie Valley Environmental Impact Review Board	a) Please list the assumptions and relevance to Ekati of basing the energy costs on a simulated disturbance response of boreal caribou. Re-examine the assumption of a single disturbance event/day within the Zone of Influence using the activity patterns measured at Ekati 2001-2009 and re-consider the conservatism of the assumptions. b) Please re-calculate the cost of insect harassment for cows and pregnancy rates based on body mass for Bathurst cows to reduce the over-estimated effect of insect harassment on pregnancy rate	99	DAR-MVEIRB-IR-099
Mackenzie Valley Environmental Impact Review Board	a) Please indicate if Dominion requested that GNWT provide updated vital rates since 2012 given the 2012-2014 decline. b) Please consider whether using an extrapolated adult survival rate (0.68) from the 2012 report would change conclusions from the population model. c) Please provide more detail to clarify how the fecundity and calf survival were calculated from the energetics model projections (revised) for body weight and pregnancy.	100	DAR-MVEIRB-IR-100
Mackenzie Valley Environmental Impact Review Board	Please integrate annual and seasonal incidental sightings, aerial survey sightings and camera sightings to provide tables and maps of caribou distribution in the vicinity of the Sable pit and road. For the next field season, will Dominion commit to undertake a similar finescale track survey as was undertaken in 2014 for Jay to further reduce uncertainty?	102	DAR-MVEIRB-IR-102
North Slave Métis Alliance	Please elaborate this statement. Does this mean: a) Cardinal pipe cannot be mined by definition because of the scope of the assessment; b) DDEC conducted an economic feasibility study of the a phased approach where Cardinal pipe will be developed after Jay pipe, and concluded such approach was not feasibile; or c) something else?	1	DAR-NSMA-IR-01

Source Organization	Request	ORS Number	Response Document Identifier
North Slave Métis Alliance	Please do the same for Jay underground mining option, as the previous item.	3	DAR-NSMA-IR-03
North Slave Métis Alliance	Please provide DDEC's analyses of these approaches. If DDEC has not considered these options, please explain why. Please include in your explanation at least social and economic reasoning.	4	DAR-NSMA-IR-04
North Slave Métis Alliance	Please explain why DDEC consistently organizes community engagement sessions in these times when many working and full-time stutdent members of the affected communities are unable to attend? Please plan and consult ahead of time when these meetings should be held to maximize attendance.	5	DAR-NSMA-IR-05
North Slave Métis Alliance	Please superimpose on this data the Bathurst caribou population data for ease of comparison.	22	DAR-NSMA-IR-22
North Slave Métis Alliance	If there is not adequate data to conduct such analysis, please design community consultations specfifically designed to improve female employment rate at DDEC.	27	DAR-NSMA-IR-27
North Slave Métis Alliance	Please define "traditional" and "non-traditional" roles for women at DDEC.	28	DAR-NSMA-IR-28
North Slave Métis Alliance	Please provide data for northern aboriginal employment statistics; in particular, provide employment statistics of the IBA parties.	30	DAR-NSMA-IR-30
Transport Canada	Transport Canada's Navigation protection Program (NPP) will require the following: A Notice Of Work form that will list out the water body details along with the specific type of work that will impact the water body; TC will need to conduct a navigability assessment on Lac Du Sauvage for the dewatering of the proposed Jay Pit.	47	DAR-TC-IR-01
Transport Canada	Transportation of Dangerous Goods would like to request a copy of the Spill Report for the incident which occurred on March 8th, 2014.	48	DAR-TC-IR-02

Source Organization	Request	ORS Number	Response Document Identifier
Transport Canada	Transportation of Dangerous Goods would like to request a copy of the Emergency Response and Spill Contingency Plans and Hazardous Waste Management Plans for this project for review.	49	DAR-TC-IR-03
Tłı̨chǫ Land Protection Department	1) Please provide a rationale, if it is indeed the era in which large scale diamond mining began or otherwise, for the temporal boundaries chosen for the socio-economic assessment. 2) Please identify the limitations in data that were encountered and how the socio-economic assessment was compromised as a result.	2	DAR-Tłı̨chǫ-IR-02
Tłı̨chǫ Land Protection Department	Please explain how demand for mining-related educational services is an appropriate indicator for educational contributions.	13	DAR-Tłı̨chǫ-IR-13
Tłı̨chǫ Land Protection Department	Please provide more comprehensive statistics on economic inequalities.	15	DAR-Tłı̨chǫ-IR-15
Tłı̨chǫ Land Protection Department	Please clarify whether Aboriginal traditional knowledge will be integrated into the Aquatic Effects Monitoring program.	23	DAR-Tłı̨chǫ-IR-23
Tłı̨chǫ Land Protection Department	DDEC should re-examine these sources of uncertainty and reconsider how they would affect the conclusions of the DAR with regard to predicted effects on caribou.	25	DAR-Tłı̨chǫ-IR-25

DOMINION DIAMOND

Information Request Number:	DAR-DFO-IR-01
Source:	Fisheries and Oceans Canada Information Requests
Subject:	Sampling Methodology for Fish; Fish Species Presence and Abundance.
DAR Section(s):	Annex XIV

Preamble (DAR):

Sampling methods were not consistent among all lakes. For example, in Duchess Lake, only Gill net was used, but in Lake E1, B1, B4 and B15 Gill nets, backpack electrofishing and minnow traps were used. It is important for Fisheries and Oceans Canada to understand why some sampling methods were not used. Some fish species might have been missed because of the methods used for sampling the various lakes. Also, the abundance estimation for each fish species might be underestimated, because of the choice of sampling methods.

Request (DAR):

Fisheries and Oceans Canada-Fisheries Protection Program recommends that the proponent provide a justification as to why different sampling methods were used for each lake sampled. Fisheries and Oceans Canada recommends the proponent identifies its confidence in the estimates of fish species and abundance for each waterbody sampled, considering that it used different sampling methods. Also, Fisheries and Oceans Canada requests information on how the proponent corrected for the use of different sampling methods when providing information of their sampling (e.g. Catch per unit effort, abundance of species, size of species caught, etc.).

Response:

Dominion Diamond Ekati Corporation (Dominion Diamond) is confident that the baseline database for fish and fish habitat provides the required information for a reliable assessment of Project effects on fish valued components (VCs). The baseline database for fish and fish habitat for the Jay Project represents a comprehensive summary of data collected during recent field programs (e.g., 2006 to 2014 studies), combined with other sources of existing and historical information; for example, over 38 documents were reviewed in Annex XIV (Fish and Fish Habitat Baseline Report of the Developer's Assessment Report [DAR]), such as earlier baselines and monitoring programs at the Ekati and Diavik mines. Baseline reports include the Fish and Fish Habitat Baseline Report (Annex XIV) where there is a summary of historical reports and results reported from the 2013 program, and the 2014 Fish and Fish Habitat Supplemental Baseline Report, which provided new information collected from directed studies in 2014 (Golder 2015).

The overall goal of the baseline studies to-date was to collect data in sufficient detail to describe fish population characteristics and habitat in lakes and streams near the proposed Project for a future environmental assessment. Thus, the field studies were designed to collect data to support the design engineers in planning the layout of the mine, to meet regulatory expectations (including the conditions in fishing permits approved by Fisheries and Oceans Canada [DFO]), and to provide baselines against

which to evaluate the potential effects of the Project. To meet the objectives of the baseline programs, study designs (e.g., sampling efforts, locations, gear types) were developed to reliably describe the abundance and distribution of anticipated VCs occurring in lakes and streams near the proposed Project (with consideration that the spatial layout of the mine plan may change), and also to describe the fish community in lakes and streams that may be directly affected by the proposed Project footprint. These priority sites included Lac du Sauvage, Stream B0 (downstream of Stream B1), Stream Ac35, and Stream Ac4. Dominion Diamond is confident that the baseline data (2006 to 2014) for the Jay Project is robust and has satisfied the objectives for the baseline programs.

The study design also considered sampling locations that were downstream and upstream of the Proposed footprint to understand the broader spatial patterns of a fish community across a watershed and potential indirect effects from the Project on a population (e.g., through changes in habitat connectivity, habitat quality). The primary objective of the baseline data collection in habitats not directly affected by the Project is to collect presence/absence information. However, recognizing that in some cases, fisheries technicians working on a baseline program may be the first fisheries technician to sample the stream or lake in question, the final study design for any field program considers the input by technicians in the field where decisions are often made to modify sampling efforts or gear types to best meet the objectives of the program based on the conditions present at the time of sampling. For example, a common scenario for a team sampling a small lake that is close to the Project but may not be affected by the Project (e.g., no residual effects are expected) will include a plan to consider the use of gill nets, minnow traps, and a transect for shoreline electrofishing to confirm fish presence. The field crew may confirm the presence of large-bodied fish (e.g., Lake Trout, Lake Whitefish) with the use of gill nets and not deploy additional sampling at that site as the objectives of the program were satisfied. This approach of surveying until detection is a cost-effective way for sampling many sites across broader geographic areas, providing opportunities for insight on factors influencing species distribution. Using this approach, data from over 36 lakes and streams in the Baseline Study Area (2006 to 2014) were analyzed as part of the Fish and Fish Habitat Baseline Report (Annex XIV) and the Fish and Fish Habitat Supplemental Baseline Report (Golder 2015). In the example referred to in the preamble, supplemental gear types were not deployed for Duchess Lake because it will not be directly affected by the Project and because sufficient information was collected on the composition of small-bodied fish species in nearby lakes, including Lac du Sauvage (where Dominion Diamond is confident that the collected data provides a reliable assessment of VCs).

Standard methods for sampling fish communities were always deployed in the streams and lakes sampled in the Baseline Study Area (Section 3.1.4 in Annex XIV) and because effort was also recorded with catch data, catch-per-unit effort (CPUE) was reported for comparisons among sites and for future comparisons with data collected from monitoring programs. It is generally not recommended to compare CPUE data derived from one method, such as gill netting, to another method, such as angling, and so these comparisons were avoided in the baseline report. Furthermore, any comparisons of species relative abundance, measured as proportion of a species of total catch, between lakes or between years were done with consideration of differences in sampling effort and gear types (e.g., see Section 3.2.3.3 in Annex XIV), and although relative abundance data can be informative for understanding the ecology of local species of fish, the pathways assessed for fish and fish habitat often relied only fish species presence/absence data for the affected lakes and streams under examination (combined with habitat descriptions).

As Lac du Sauvage is the focal waterbody where the Jay Pit will be developed, a suite of standard gear types used for fisheries inventories were deployed (Table 1-1) and were combined with data from hydroacoustic surveys in 2013 to calculate population densities and sizes for fish species for the DAR. In 2014, supplemental gill netting was performed to augment the gill netting CPUE and life history databases for Lake Trout and Lake Whitefish. The hydroacoustic surveys were performed in Lac du Sauvage because a reliable estimate of fish population sizes (or fish densities) was required to predict effects from the diked and dewatered footprint on fish VCs. As described in Section 3.1.5 (Annex XIV), the hydroacoustic surveys targeted numerically abundant pelagic species, such as Cisco, and other numerically abundant species that may be demersal and only occasionally pelagic, such as Lake Trout, Arctic Grayling, Lake Whitefish, and Round Whitefish. The surveys were also designed to detect fish as small as yearlings and older (i.e., fish greater than 90 mm in length). The level of effort performed for the hydroacoustic surveys (over 132 km of transects crossing all locations of Lac du Sauvage) was higher than recommended coverage targets for this survey method. There is no reason to believe that assessment underestimated the number of fish (greater than 90 mm in length) in Lac du Sauvage.

Table 1-1 Summary of Fish Sampling Effort and Catch in Lac du Sauvage, 2006 to 2013 (adapted from Table 3.2-17 in Annex XIV)

Sampling Method	Effort	LKTR	ARGR	NRPK	CISC	RNWH	LKWH	BURB	NNST	SLSC	Total	Total CPUE
GN	131.28 net-units	87			7	27	50				171	1.30 fish/ net-unit
EF	3,231 s		1			1			1	9	12	0.37 fish/ 100 s
AN	108.77 rod-h	83		1							84	0.77 fish/ rod-h
MT	182.95 trap-d					1		3		1	5	0.03 fish/ trap-d
Total		170	1	1	7	29	50	3	1	10	272	

CPUE = catch-per-unit-effort; GN = gill net, EF = backpack electrofishing, AN = angling, MT = minnow trapping;1 net-unit = 100 m^2 of net set for 1 hour; s = seconds; rod-h = rod hour; 1 trap-unit = one minnow trap set for 24 hours; LKTR = Lake Trout; ARGR = Arctic Grayling; NRPK = Northern Pike; CISC = Cisco; RNWH = Round Whitefish; LKWH = Lake Whitefish; BURB = Burbot; NNST = Ninespine Stickleback; SLSC = Slimy Sculpin.

In 2014, the main goal of the supplemental baseline program was to address data gaps on fish population characteristics and habitat in lakes and streams near the proposed Project, with a focus on populations and their habitat directly or indirectly affected by the proposed Sub-Basin B Diversion Channel (Table 1-2). Field studies focused on Stream B1, B0, Ac35, and Ac4, small streams potentially affected by the proposed Sub-Basin B Diversion Channel for the Project (DAR Section 3; also see Section 9). Relative abundance estimates from electrofishing surveys were calculated for all sites, and for Streams B0 and B1, fish abundance was also quantified using two, two-way net traps (i.e., fyke and hoop styles) installed to capture fish moving in upstream and downstream directions during spring and summer periods (for 756 traps hours in total). Stream flows at Streams Ac4 and Ac35 were too low for trap nets; both streams had minimal flows during the spring period and Stream Ac4 was almost completely dry by the summer period. Note that for this example, the level of effort and type of gear deployed at the stream reflected the type or conditions of habitat under examination (not just whether the site would be directly affected by the Project footprint).

Table 1-2 Summary of Fish Sampling Effort and Catch In Stream Ac4, Ac35, B0, and B1 in 2014 (adapted from Table 2.2-4 in Golder [2015])

Season	Location	Method	Effort	ARGR	BURB	NRPK	LKCH	LKTR	RNWH	SLSC	Total	Total CPUE	Unit
Spring	Stream Ac4	EF	229	-	-	-	-	-	-	-	0	0.00	fish/100 s
	Stream Ac35	EF	1,468	9	-	-	-	-	-	-	9	0.61	fish/100 s
	Stream B0	EF	802	4	-	-	-	-	-	-	4	0.50	fish/100 s
	Stream B0	FN	240.1	430	-	1	-	1	-	-	432	1.80	fish/trap-h
	Stream B1	EF	439	10	-	-	-	-	-	-	10	2.28	fish/100 s
	Stream B1	HN	208.8	7	-	-	1	-	1	4	13	0.06	fish/trap-h
	Stream B1	MT	4.2	-	-	-	-	-	-	-	0	0.00	fish/trap-d
Summer	Stream B0	FN	166.5	282	38	-	-	1	-	-	321	1.93	fish/trap-h
	Stream B0	MT	5.3	-	-	-	-	-	-	-	0	0.00	fish/trap-d
	Stream B1	HN	140.6	2	9	-	70	-	1	3	85	0.60	fish/trap-h

- = none caught; CPUE = catch-per-unit-effort; AN = angling; EF = backpack electrofishing; FN = fyke style trap net; GN = gill net; HN = hoop style trap net; MT = minnow trapping; 1 net-unit = 100 square metres (m^2) of net set for 1 hour; s = seconds; 1 trap-d = 1 minnow trap set for 24 hours; rod-h = angling-h x # rods being used; fish/100 s = #fish/(EF seconds/100); ARGR = Arctic Grayling; BURB = Burbot; NRPK = Northern Pike; NNST = Ninespine Stickleback; LKCH = Lake Chub; LKTR = Lake Trout; LKWH = Lake Whitefish; RNWH = Round Whitefish; SLSC = Slimy Sculpin.

In summary, Dominion Diamond is confident that the baseline database for fish and fish habitat provides the required information for an environmental assessment of fish VCs for the Jay Project. The fisheries database provides a reliable description of the species composition and abundance for lakes and streams to be directly affected by the Project, as well as species inventory data across a broad geographic area. The level of effort and gear type that were deployed reflected baseline objectives, site conditions (e.g., flows, water levels), and fishing permits approved by DFO.

References:

Golder (Golder Associates Ltd). 2015. 2014 Fish and Fish Habitat Supplemental Baseline Report for the Jay Project. Prepared by Golder Associates Ltd for Dominion Diamond Ekati Corporation, Yellowknife NT. 66 pp + Appendices (In-preparation).

DOMINION DIAMOND

Information Request Number: DAR-DFO-IR-03

Source: Fisheries and Oceans Canada Information Requests

Subject: Impacts on Watercourses B0 and Ac35.

DAR Section(s): 1.4

Preamble (DAR):

It is mentioned in table 1.4-2 that "a fisheries authorization will be required for the dike construction, fish-out and dewatering of a diked area of Lac du Sauvage, and construction and operation of the Jay Pit"..

Request (DAR):

Fisheries and Oceans Canada-Fisheries Protection Program recommends that the proponent provide a justification as to how it was determined that the destruction of part of watercourses B0 and Ac35 will not require a *Fisheries Act* authorization.

Response:

Dominion Diamond Ekati Corporation (Dominion Diamond) would like to clarify the bullet referred to in Table 1.4-2 in Section 1 (Introduction) of the Developer's Assessment Report (DAR). A *Fisheries Act* Authorization will be required for the temporary operation of the Sub-Basin B Diversion Channel, as well as dike construction, the fish-out, the dewatering of the diked area of Lac du Sauvage, and construction and operation of the Jay Pit. As stated in Section 9A1.1 of the Conceptual Offsetting Plan (Appendix 9A of the DAR), the construction and operation of the mine will cause serious harm to fish (as defined in the *Fisheries Act*) in the Lac du Sauvage watershed. The affected areas include a portion of Lac du Sauvage and adjacent watercourses within the watershed (including Stream B0 and Stream Ac35). The stream lengths affected by the temporary diversion of Stream B0 and Ac35 around the dewatered area in Lac du Sauvage during operations are included in Table 9A3.3-1 and the residual effects are reported in Section 9A4 of the Conceptual Offsetting Plan (Appendix 9A).

The Final Offsetting Plan will be produced during the permitting phase of the Project and will be submitted to Fisheries and Oceans Canada (DFO) as part of the Application for Authorization under the *Fisheries Act*. Dominion Diamond will continue to engage with DFO and local communities on the offsetting plan for the Project.

DOMINION DIAMOND

Information Request Number:	DAR-EC-IR-03
Source:	Environment Canada: Susanne Forbrich
Subject:	Air Quality monitoring
DAR Section(s):	7

Preamble (EC):

The Proponent has presented air quality modelling predictions indicating exceedances of GNWT ambient air quality standards for NO2, TSP, PM10, and PM2.5 resulting from emissions from the Jay project. The Proponent states that the Air Quality Management and Monitoring Plan (AQMMP) can be expanded to encompass the project. However no details have been provided on how the AQMMP will be revised to cover the air quality concerns.

Request (EC):

EC requests that the Proponent provide detailed information on how the AQMMP will be expanded to address the air quality issues identified in its air assessment.

Response:

The DAR provides Dominion Diamond's intention to amend the Air Quality Monitoring and Management Program (AQMMP) to address monitoring and mitigation of air quality for the Jay Project. This will build on the current Ekati Mine AQMMP. Detailed changes to the AQMMP will be developed as part of the regulatory permitting based on the outcome of the Environmental Assessment. The Government of the Northwest Territories, Environment Canada, aboriginal communities, and other organizations will be engaged during the amendment of the AQMMP.

DOMINION DIAMOND

Information Request Number:	DAR-EC-IR-05
Source:	Environment Canada: Susanne Forbrich
Subject:	Camp Waste
DAR Section(s):	3

Preamble (EC):

The EKA PLA.2120 Incineration Management Plan (2014/05/05) should be updated to include annual reporting of operational data and a schedule for stack testing the incinerators. EC understands that the Proponent is planning to start composting food waste on site. EC requests details on the composting program and how it will affect the incineration of waste.

Request (EC):

EC requests that the Proponent provide the following information:

- annual reporting of incineration operational data,
- schedule for future incineration stack tests, and
- details of the planned food waste composting program.

Response:

Operation of the Ekati Mine Incinerator, including operational monitoring and maintenance of the Incinerator Management Plan, is an operational matter regulated directly by the Wek'èezhìı Land and Water Board (WLWB). The WLWB approvals of the Incinerator Management Plan include a public/regulatory review process. The incinerator would be operated the same way for the Jay Project as it was during Ekati Mine operations, and therefore, this Information Request is more properly a matter for the WLWB regulatory review process of updates to the Incinerator Management Plan. Further information is provided below for the Review Board's information.

As per Part B, Item 4 of Water Licence W2012L2-0001, the Waste Management Plan and Incinerator Management Plan is reviewed annually and updated if required. Version 2.0 of the Incinerator Management Plan will be updated in July 2015. As per the Incinerator Managemen Plan approval, updates to the Plan will be included in the Environmental Agreement and Water Licence Annual Report.

Maintenance data, pre-operational checks, operational checks, and monthly checklists are completed and records are maintained at the Ekati Mine for auditing purposes. Incinerator ash is collected daily and a composite samples are submitted for laboratory analysis quarterly. Scrubber water is also sampled and analyzed quarterly.

As the waste streaming process is changing, stack testing will occur after the composting system is in place and the new waste streaming has been rolled out. Current operations of the incinerator have not changed from when the stack testing was completed in June 2013.

The composter is expected to arrive on this season's Winter Road and will be commissioned for use during summer/fall 2015. During this time, a new waste management education program will be rolled out at Ekati to introduce the new waste streaming for composting, and as a reminder of the proper waste management. The new waste streaming program will include an additional bin for compostable material which will be located at all the waste stations around the Ekati Mine.

Dominion Diamond has decided to install a composter as it is safe, easy to maintain, environmentally friendly, and a cost-effective method for the disposal of organic waste (food waste, paper, cardboard). Installing a composter at the Ekati Mine may eliminate the need to run two incinerators and save the use of diesel that powers the incinerators, and result in a reduction of emissions. The composter unit is 32 inches long and 6 inches (81 x 15 centimetres) in diameter and able to process more than 2,000 pounds (746 kilograms) of waste per day and will be located inside the Incinerator Building. The food waste, cardboard, and paper collected from the composting bins are broken down and mixed using an agricultural mixer. The material is then fed in to the composter by conveyor where it does one full revolution per hour to feed air in to the unit. Bacteria live off the oxygen, the nitrogen-rich food waste, and the carbon-rich cardboard/paper, thereby breaking down the material into compost. The end material is odour-free, nutrient rich, safe to handle, and not a wildlife attractant.

In 2012, Ekati removed all plastics from site and replaced them with compostable material (take-away containers, garbage bags), and therefore, this does not need to be adjusted for the new waste streaming.

DOMINION DIAMOND

Information Request Number:	DAR-EC-IR-06
Source:	Environment Canada: Susanne Forbrich
Subject:	Neutralization Potential
DAR Section(s):	4, Annex VIII

Preamble (EC):

The Proponent states that the Neutralization Potential to Acid Potential (NP/AP) ratio of diabase samples is presented in Figure 4.2-3. A total of 75 diabase samples were analyzed for NP and AP, of which 72 diabase samples (96%) had NP/AP ratios greater than 2 and are classified as non-PAG (Table 4.2-2). Four diabase samples had NP/AP ratios between 1 and 2. Therefore, diabase is non-potentially acid generation (non-PAG). Given that the proponent has classified all the diabase samples as non-PAG, it is not clear how the samples that fall within the uncertain range would be managed.

Request (EC):

EC requests the Proponent provide details as to how the samples that show potential to generate acid would be managed.

Response:

The neutralization potential (NP) / acid potential (AP) ratio is commonly used as a screening criterion to identify materials that may have a potential for acid generation. Samples of materials with an NP/AP ratio less than 1 are assumed to have a long-term acid generation potential, as AP exceeds the NP available in a sample. Materials with an NP/AP ratio between 1 and 2 are assigned an uncertain acid generation potential to account for an inherent “factor of safety” in the classification of samples. Uncertainty, in this case, considers factors such as the occurrence and availability of minerals that contain NP (i.e., carbonate minerals) in a sample, and the rate of reaction of minerals that contribute AP (i.e., sulphide minerals) versus the rate of reaction of NP-bearing minerals.

Based on the information presented in Appendix B of the Geochemistry Baseline Report for the Jay Project (Annex VIII of the Developer’s Assessment Report), 75 samples of diabase were collected from the Ekati Mine, including 4 samples from the Jay Pipe. Of the 75 diabase samples, 3 samples had NP/AP ratios between 1 and 2 (4% of all samples). Owing to the low proportion of samples with an NP/AP between 1 and 2, diabase was considered non-potentially acid generating (non-PAG) overall. Furthermore, all samples collected from the Jay pipe had NP/AP ratios greater than 2; as such, diabase from the Jay pipe is considered non-PAG.

In general, diabase accounts for a minor proportion of the waste rock that will be generated from the Jay Project. Diabase occurs as mafic dykes, which intrude the country rock. Operational segregation of diabase during mining is unlikely, owing to the nature of the diabase occurrence within the Jay pipe. Diabase will be mixed with host rock (either granite or metasediment) as rock is blasted during mining, and end-dumped within the Jay Waste Rock Storage Area.

The Ekati Diamond Mine Waste Rock and Ore Storage Management Plan (WROMP) (Dominion Diamond 2014) is expected to be expanded to include the Jay Project area. The verification and monitoring component of the WROMP includes collection of supplemental samples of waste rock from the active mining areas. If samples of diabase from the Jay open pit are found to have geochemical characteristics outside the range reported in the Geochemistry Baseline Report for the Jay Project (Annex VIII), supplemental geochemical characterization will be recommended as part of the annual reporting. The results of supplemental geochemical characterization will be used to identify requirements for adaptive management, according to the process described in the WROMP for the Ekati Mine.

References:

Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Ekati Diamond Mine Waste Rock and Ore Storage Management Plan. Version 4.1, May 2014.

DOMINION DIAMOND

Information Request Number:	DAR-EC-IR-07
Source:	Environment Canada: Susanne Forbrich
Subject:	Metal Analysis, Uranium and Thorium
DAR Section(s):	4, Annex VIII

Preamble (EC):

Tables 4-2-3 to 4-2-6 show the Summary of Metal Analysis Results of Overburden, Waste Rock, Diabase, Granite, and Metasediment Samples from the Ekati Mine Parts A & B, (in comparison to crustal abundances); Summary of Metal Analysis Results of Kimberlite Samples From the Ekati Mine parts A & B; as well a Summaries of Results of Shake Flask Extraction Leach Testing of Samples From the Jay Pipe Parts A & B for in comparison to CCME guidelines. In places, Uranium and/or thorium are marginally higher or in some cases the maximum value are higher than the crustal abundance in diabase, granite, metasediments, Kimberlite and coarse processed Kimberlite. However, the concentrations of uranium (thorium not reported in table) are lower than CCME guidelines in the leachates as reported in the table. If with time, or should the concentration of uranium in the leachate become higher than the CCME guideline, is there a contingency plan to deal with that exceedance given the radioactive nature of uranium and/or thorium.

Request (EC):

EC requests the Proponent commit to developing a contingency plan to deal with any exceedance of Uranium and/or thorium in the leachate should that occur.

Response:

The results of solid phase analysis of waste rock and kimberlite were compared to the average crustal abundance of metals in crustal rock to identify parameters that may require further consideration with regard to metal leaching potential in the Geochemistry Baseline Report for the Jay Project (Annex VIII of the Developer's Assessment Report [DAR]). The results of short-term leach tests (such as shake-flask extraction tests), conducted on select samples, were then evaluated to identify readily soluble components of a sample. While the results of shake flask extraction are useful for indicating the short-term metal leaching characteristics of a material, these results cannot be used to evaluate long-term weathering if transient processes, such as sulfide oxidation, are expected to occur. Ultimately, the results of field-scale monitoring are the most useful reference for identifying the long-term metal leaching potential of a material.

Select results of field-scale monitoring of seepage from the Misery waste rock storage area (WRSA) were used to develop the waste rock contact water input to the water quality predictions for the Jay Project DAR. Thorium was not measured in WRSA seepage, and therefore, was not included in the water quality predictions.

Uranium concentrations in the waste rock contact water input ranged from 0.018 mg/L (mean) to 0.43 mg/L (maximum). Waste rock discharge water qualities used for input to the water quality model are presented in Table 8E4.2-2 (Appendix 8E of the DAR; Site Discharge Water Quality Monitoring Report). The maximum predicted concentration in discharge for 99th percentile modelled scenario was 0.1 mg/L in the site discharge water quality predictions. Discharge concentrations are presented in Table 8E4.1-1 (Appendix 8E Site Discharge Water Quality Monitoring Report).

The Ekati Diamond Mine Waste Rock and Ore Storage Management Plan (WROMP; Dominion Diamond 2014) is expected to be expanded to include the Jay Project area. The verification and monitoring component of the WROMP includes seepage monitoring during the freshet and the fall. Monitoring of seeps identified as “potentially problematic” will continue where necessary on a bi-weekly basis during the open water season. The objectives of seepage monitoring include detection of undesirable changes in chemistry and unacceptable high concentrations of specific elements. Adaptive seepage management strategies will be implemented as necessary to remedy undesirable water quality trends. Uranium and thorium will be included in the seepage monitoring program to identify short-term and long-term water quality trends for the purpose of identifying any needs for further testing, monitoring, or adaptive management.

References:

Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Ekati Diamond Mine Waste Rock and Ore Storage Management Plan. Version 4.1, May 2014.

DOMINION DIAMOND

Information Request Number: DAR-EC-IR-24

Source: Environment Canada: Susanne Forbrich

Subject: Reclamation of Sediments

DAR Section(s): 8

Preamble (EC):

During the dewatering process of the diked area, sediments will become exposed and will need to be removed in order to access the Jay pipe. Sediments can be used on site for a variety of purposes including reclamation cover. There is no mention by the Proponent as to how the sediments will be dealt with.

Request (EC):

EC seeks clarification on how will the sediments be used once they are removed from Lac du Sauvage? Are the sediments to be disposed of, or stored and reclaimed at a later date?

Response:

Lakebed sediments are fine-grained materials, such as, silt, clay, and sand, that accumulate on lake bottoms, often with thicker accumulations in deeper areas of a lake. During the development of open pits at the Ekati Mine in the past, lakebed sediments were put aside for possible future use in reclamation. Lakebed sediments will be encountered during pit stripping and during dike construction associated with the Jay Project. The material will be placed in the Jay waste rock storage area. For the Project, segration and separate storage of this material is not planned as site-specific reclamation research at the Ekati Mine has shown that lakebed sediment is not a suitable reclamation material. If stockpiled separately, this material would create a reclamation liability, requiring reclamation of itself. The specific research findings as published in various technical reports are as follows:

- As part of the rock pad research program established in 2008, lake sediment materials were evaluated for their suitability as a top dressing material. Monitoring results to date indicate that lake sediment did not provide favorable conditions for plant growth. Specifically mixing of lake sediment with topsoil, has reduced performance of planted stock and seeded grasses and legumes (Martens 2014; EcoSense 2014).
- Lake sediments were tested for their ability to support plant growth in a field experiment at the Fox Portal starting in 1996, then later tested in greenhouse experiments in 1998. Field and greenhouse studies on lake sediments in 1996 and 1999 found that lake sediments have low organic content, low moisture holding capacity and low cation exchange capacity, and appeared to be the main factors responsible for poor growth at the Fox Portal Pilot Study (Kidd and Max 2000; Martens 2013).
- Vegetation monitoring on a seeded test area within the lake sediment stock pile area sediment was established in 2002. Initial growth monitoring results were poor and the test area was rototilled and a light application of native grass cultivars and fertilizer was re-applied. Overall rate of native

colonization of the lake sediments was deduced to be slow due to persistent crusted surface that persists on the lake sediments (Martens 2009).

References:

EcoSense (EcoSense Environmental Inc.). 2014. Ekati Diamond Mine: 2014 Vegetation Annual Report. Prepared for Dominion Diamond Ekati Corporation by EcoSense Environmental Inc. Lethbridge, AB, Canada.

Kidd JG, Max KN. 2000. Ekati Diamond Mine Reclamation Research Program, 1999, NT, Canada. Final report prepared for BHP Diamonds, Inc., Yellowknife, NWT, Canada, by ABR, Inc., Fairbanks, AK, USA.

Martens HE. 2009. Ekati Diamond Mine Revegetation Research Projects, 2008. Final report prepared for BHP Billiton Diamonds Inc., Yellowknife, NT, Canada by Harvey Martens and Associates, Calgary, AB, Canada.

Martens HE. 2013. Ekati Diamond Mine Revegetation Research Projects – 2012. Prepared for BHP Billiton Diamonds, Inc., Yellowknife, NT, Canada by Harvey Martens & Associates Inc. Calgary AB Canada.

Martens HE. 2014. Ekati Diamond Mine Revegetation Research Projects – 2013. Prepared for Dominion Diamond Ekati Corporation, Yellowknife, NT, Canada by Harvey Martens & Associates Inc. Calgary AB, Canada.

DOMINION DIAMOND

Information Request Number:	DAR-EC-IR-25
Source:	Environment Canada: Susanne Forbrich
Subject:	Fish-Out Plan - Waterbirds
DAR Section(s):	3 (Appendix 9B), Annex VII, Sable Addendum (Appendix I)

Preamble (EC):

The inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs is known as incidental take. Incidental take, in addition to harming individual birds, nests or eggs, can have long-term consequences for migratory bird populations in Canada, especially through the cumulative effects of many different incidents. EC is concerned by the frequency of waterbird entanglement during fish-out operations at northern mines, including a previous incident at Ekati mine. In Section 3.5 of the Conceptual Fish-Out Plan (Appendix 9B), the Proponent notes the potential for incidental mortalities of diving waterbirds and proposes to include a mitigation strategy in the detailed fish-out plan. Section 2.3.3 of the Wildlife Baseline (Annex VII) describes the survey methods for a waterbird aerial surveys completed August 8 and 12, 2013 on Lac du Sauvage but that results were not yet available (Section 3.9). Section I2.2 of Appendix I (Sable Addendum) describes survey methods for a waterbird aerial survey conducted on July 11, 2014. Table I-3 of Appendix I (Sable Addendum) presents results of aerial and ground surveys of Lac du Sauvage and Islands for 2013 (June) and 2014.

Request (EC):

EC requests that the propoent provide:

- a clear summary of waterbird surveys conducted on Lac du Sauvage, including definitive survey dates, confirming and detailing survey methods (i.e. ground or aerial) and results of all years of waterbird surveys of Lac du Sauvage;
- the details of the diving bird mitigation strategy during fish-out operations to prevent entanglement.

Response:

Waterbird aerial surveys were completed on Lac du Sauvage in both 2013 and 2014. In 2013, a survey was completed on August 8 and another on August 12 (Section 2.3.3 of Annex VII, Wildlife Baseline Report of the Developer's Assessment Report). In 2014, one survey was completed on July 11 (Dominion Diamond 2014). Both the 2013 and 2014 surveys involved flying in a north-south direction along nine transects spaced 2 kilometres (km) apart. An aerial survey was also conducted around the complete shoreline contour. All surveys were flown by helicopter at 80 metres (m) above ground level at a speed of 80 to 100 km per hour. Observers recorded waterbirds present within 200 m of either side of the helicopter. The distribution of aerial transects and the results of waterbird aerial surveys (i.e., waterbird species, counts, and locations) are shown on Map 25-1. Results are presented in Table I-3 (Appendix I) of the Sable Addendum (Dominion Diamond 2014).

537500 540000 542500 545000 547500 550000 552500 555000 557500

7175000 7172500 7170000 7167500 7165000 7162500 7160000 7157500

Lake Af1

Duchess Lake

Lac du Sauvage

Lake B1 (Christine Lake)

Misery Operation

Hammer Lake

Lac de Gras

N

LEGEND

- EKATI MINE FOOTPRINT (MISERY OPERATION)
- PROPOSED JAY FOOTPRINT
- ELEVATION CONTOUR (10 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

2013 WATERBIRD OBSERVATIONS

- BALD EAGLE, 1
- COMMON LOON, 1
- COMMON LOON, 2-5
- COMMON MERGANSER, 2-5
- COMMON MERGANSER, >25
- GOLDEN EAGLE, 1
- GULL SPP., 1
- GULL SPP., 2-5
- LONG-TAILED DUCK, 2-5
- PARASITIC JAEGER, 1
- PARASITIC JAEGER, 2-5
- TERN SPP., 1
- UNKNOWN DIVER, 1
- UNKNOWN LOON, 1
- YELLOW-BILLED LOON, 1
- YELLOW-BILLED LOON, 6-10

2014 WATERBIRD OBSERVATIONS

- COMMON MERGANSER, 1
- COMMMON MERGANSER, 2-5
- COMMON MERGANSER, 11-25
- GULL SPP., 1
- GULL SPP., 2-5
- GULL SPP., 6-10
- LONG-TAILED DUCK, 2-5
- NORTHERN HARRIER, 1
- TERN SPP., 1
- TERN SPP., 2-5
- TERN SPP., 6-10
- YELLOW-BILLED LOON, 1
- AERIAL TRANSECT
- AERIAL SHORELINE SURVEY

REFERENCE

CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

DAR-EC-IR-25

1.5 0 1.5
SCALE 1:75,000 KILOMETRES

PROJECT
DOMINION DIAMOND
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
WATERBIRD AERIAL SURVEY RESULTS, 2013 AND 2014

Golder Associates

PROJECT		13-1328-0041	FILE No. POSTDAR_IR_Wild_020_GIS	
DESIGN	DC	01/03/15	SCALE AS SHOWN	REV 0
GIS	EN	13/03/15	MAP 25-1	
CHECK	DC	13/03/15		
REVIEW	BS	13/03/15		

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The fish-out within the diked area of Lac du Sauvage will require a *Fisheries Act* Authorization from Fisheries and Oceans Canada, which will be part of permit applications following the environmental assessment review. To avoid the incidental take of birds protected by the *Migratory Birds Convention Act* during the fish-out, Dominion Diamond Ekati Corporation will develop a diving bird mitigation strategy with Environment Canada, which will be included in the final fish-out plan. Lessons learned from fish-outs at Ekati, Diavik, and Gahcho Kué will be considered and incorporated into the development of the diving bird mitigation strategy.

References:

Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Jay Project Developer's Assessment Report Sable Addendum. Prepared by Golder Associates Ltd., December 2014. Yellowknife, NWT, Canada.

DOMINION DIAMOND

Information Request Number:	DAR-EC-IR-28
Source:	Environment Canada: Susanne Forbrich
Subject:	Migratory Birds – Incidental Take
DAR Section(s):	13

Preamble (EC):

The inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs is known as incidental take. Incidental take, in addition to harming individual birds, nests or eggs, can have long-term consequences for migratory bird populations in Canada, especially through the cumulative effects of many different incidents. In Table 13.3-1, the Proponent states that if vegetation clearing is required, activities will be managed to comply with SARA and the MBCA and that siting and construction of the project will be planned to avoid environmentally sensitive areas to the extent practical. In section 13.3.2.2.2, the Proponent also states that bird nests, eggs, and/or birds could be destroyed during dewatering the diked area of Lac du Sauvage (i.e., flooding of downstream areas) but expects that mitigation policies and practices for dewatering activities will limit incidental take of migratory birds and nests. EC reminds the Proponent that any incidental take is non-compliant with the MBCA.

Request (EC):

EC requests information on:

- the mitigation measures that will be used to comply with the MBCA to prevent incidental take of migratory birds, their nests and eggs during any land clearing and any dewatering, where there is a risk of change in water levels, within the proposed project.

Response:

Details of the mitigation procedures to avoid incidental take of migratory birds, their nests and eggs to comply with the *Migratory Birds Convention Act* and specific details for the avoidance of incidental take will be identified in the wildlife and wildlife habitat protection plan and wildlife effects monitoring program that will be developed with Environment Canada during the Jay Project permitting phase.

Mitigation measures to reduce incidental take may include the following:

- to the extent practicable, land and vegetation clearing will occur outside of the general nesting season, which is defined as occurring from May 20 to August 13 in the Project area (zone N9; EC 2015);
- continuing with surveys for active nests on mine infrasturucture and open pits each spring;
- avoiding disturbance to active nest sites;
- preventing birds from nesting on mine infrastructure or in active open pits;
- continuing site worker environmental sensitivity training; and,

- identifying specific times and places where incidental take may occur, and proposing specific mitigation (such as nest sweeps, grubbing and use of bird deterrents).

References:

EC (Environment Canada) 2015. General Nesting Periods of Migratory Birds in Canada. Website: http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#_01_1. Accessed March 13, 2015.

DOMINION DIAMOND

Information Request Number:	DAR-EC-IR-29
Source:	Environment Canada: Susanne Forbrich
Subject:	Migratory Birds – Incidental Take
DAR Section(s):	Sable Addendum Appendix I

Preamble (EC):

Table I-2 presents a summary of 2013-2014 Environmental Setting Surveys observations. Map I-2 depicts the location of the 2014 Environmental Setting Surveys observations in broad categories (e.g. bird, bird sign, mammal and mammal sign) overlapping areas where most habitat loss would occur (i.e. proposed dewatered area, road alignment and WRSA). There is no map of the 2013 Environmental Setting Surveys observations.

Request (EC):

EC requests:

- a revised Map I-2 with comparable data resolution to Table I-2 (i.e. species and number of individuals observed for each location on the map).
- a map of 2013 Environment Setting Survey observations, similar to Map I-2, including revisions noted above
- clarity on proposed timing of land clearing and dewatering activities where there is habitat loss

Response:

The 2013 and 2014 wildlife observations collected during environmental setting surveys are shown by species and number of individuals on Map 29-1.

A detailed construction schedule for the Jay Project is not yet available. To the extent practicable, Dominion Diamond will plan to avoid vegetation clearing or causing other habitat loss during the migratory bird nesting season. The general nesting season is defined as occurring from May 20 to August 13 in the Project area (zone N9; EC 2015). Specific times and areas where migratory birds may be at risk, along with specific mitigation will be identified in the wildlife and wildlife habitat protection plan and wildlife effects monitoring program that will be developed with Environment Canada during the Jay Project permitting phase.

References:

EC (Environment Canada) 2015. General Nesting Periods of Migratory Birds in Canada. Website http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#_01_1. Accessed March 13, 2015.

537000 538000 539000 540000 541000 542000 543000

7167000 7166000 7165000 7164000 7163000 7162000 7161000

Lake B1 (Christine Lake)

Existing Misery Road

Misery Waste Rock Storage Area

N

LEGEND

- EKATI MINE FOOTPRINT (MISERY OPERATION)
- PROPOSED JAY FOOTPRINT
- ELEVATION CONTOUR (10 m INTERVAL)
- WATERCOURSE
- WATERBODY
- ESKER

2013 WILDLIFE OBSERVATIONS

- ARCTIC GROUND SQUIRREL, 1
- ARCTIC HARE, 1
- GRIZZLY BEAR, 1
- NORTHERN HARRIER, 1
- ROUGH-LEGGED HAWK, 1
- SHORT-EARED OWL, 1

2014 WILDLIFE OBSERVATIONS

- AMERICAN PIPIT, 1
- AMERICAN PIPIT, 2-5
- AMERICAN TREE SPARROW, 1
- AMERICAN TREE SPARROW, 2-5
- ARCTIC GROUND SQUIRREL, 1
- BAIRD'S SANDPIPER, 1
- COMMON LOON, 1
- COMMON/HOARY REDPOLL, 1
- GRAY-CHEEKED/BICKNELL'S THRUSH, 1
- GULL SPP., 1
- HARRIS'S SPARROW, 1
- HARRIS'S SPARROW, 2-5
- HORNED LARK, 1
- LAPLAND LONGSPUR, 1
- LAPLAND LONGSPUR, 2-5
- LEAST SANDPIPER, 1
- LEAST SANDPIPER, 2-5
- LEMMING, 1
- LONG-TAILED DUCK, 1
- LONG-TAILED JAEGER, 1
- PTARMIGAN SPP., 2
- RED-THROATED LOON, 1
- SAVANNAH SPARROW, 1
- SAVANNAH SPARROW, 2-5
- UNIDENTIFIED DUCK, 1
- WHITE-CROWNED SPARROW, 1
- WHITE-CROWNED SPARROW, 2-5
- YELLOW WARBLER, 1

NOTES

ROAD, PIPELINES, AND POWER LINE ARRANGEMENT TO BE DETAILED AS PART OF FURTHER PRE-FEASIBILITY DESIGN. APPROXIMATE CORRIDOR WIDTHS ARE SHOWN.

REFERENCE

JAY PROJECT CONCEPTUAL ENGINEERING REPORT, EKATI MINE, DOC#: 1313280041-E14037-R-REV0-4060, DATED: MAY 13, 2014
JAY PROJECT DESIGN BASIS MEMORANDUM FOR PRE-FEASIBILITY DESIGN OF PROJECT ROADS AND PIPELINE BENCHES, DOC#: 1313280041-E14031-TM-REVD-2020, DATED: AUGUST 1, 2014
LIDAR AND BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
WATER OBTAINED FROM CANVEC © NATURAL RESOURCES CANADA, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

DAR-EC-IR-29

500 0 500
SCALE 1:25,000 METRES

PROJECT
DOMINION DIAMOND™
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
WILDLIFE OBSERVED DURING ENVIRONMENTAL SETTING SURVEYS, 2013 AND 2014

Golder Associates

PROJECT		13-1328-0041	FILE No. POSTDAR_IR_Wild_021_GIS	
DESIGN	DC	01/03/15	SCALE AS SHOWN	REV 0
GIS	EN	01/03/15		
CHECK	DC	01/03/15	MAP 29-1	
REVIEW	BS	16/03/15		

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DOMINION DIAMOND

Information Request Number:	DAR-EC-IR-30
Source:	Environment Canada: Susanne Forbrich
Subject:	Migratory Birds and SARA - reporting of mortalities
DAR Section(s):	13

Preamble (EC):

In Section 13.2.1.1.7, the Proponent states that project-related wildlife mortalities on mine sites in the NWT are monitored by voluntary reporting by site personnel. The WEMP does not specify if reporting is voluntary or required by staff, but rather reports on efforts to improve level and detail of mortality incidents. Voluntary reporting of project-related wildlife mortalities, including migratory birds and species at risk, may underestimate the impacts of the project on wildlife. Voluntary reporting may also delay the implementation of mitigation measures to prevent further impacts on migratory bird and species at risk.

Request (EC):

EC seeks clarification:

- if reporting of wildlife mortalities, including migratory birds and species at risk, on site is voluntary or required by on-site staff

Response:

Reporting of all wildlife mortalities, including those of migratory birds and species at risk, is required by site personnel. Staff are educated on the importance to report all wildlife incidents, which includes mortality, during new employee orientations, and are reminded through on-going environmental awareness training on site. This commitment for mandatory wildlife mortality reporting will be reaffirmed in the wildlife and wildlife habitat protection plan and wildlife effects monitoring program that will be developed with Environment Canada during the Jay Project permitting phase.

DOMINION DIAMOND

Information Request Number: DAR-GNWT-IR-3

Source: Government of Northwest Territories – Lands: Paul Mercredi

Subject: Incineration Facilities - Waste Incineration

DAR Section(s): 3.4.1.8.7

Preamble (GNWT):

It is GNWT's understanding that for this proposed project, the Proponent plans to use the Incineration Management Plan (IMP), embedded in the Ekati Waste Management Plan (WMP) dated April 24, 2014, to help manage the incineration of on-site waste and to reduce associated emissions. The IMP referenced above does not include a schedule for regular incinerator stack testing to ensure compliance with Canada-Wide Standards (CWS) for Dioxins, Furans and Mercury. Stack testing remains the most effective quantitative form of compliance testing available.

Request (GNWT):

GNWT requests that the Proponent confirm if the IMP plan embedded in the WMP dated April 24, 2014, is the current version of the plan to be used for this project. Additionally, GNWT requests that the Proponent provide a schedule for routine incineration stack testing.

Response:

The current version of the Waste Management Plan is dated April 24, 2014 and was submitted to the Wek'èezhìi Land and Water Board (WLWB) on May 7, 2014, along with the Incinerator Management Plan, the Hazardous Waste Management Plan, the Solid Landfill Waste Management Plan, and the Hydrocarbon Contaminated Materials Management Plan. The submitted plans were reviewed by the WLWB and approved on August 11, 2014.

As per Part B, Item 4 of Water Licence W2012L2-0001, the Waste Management Plan and associated Plans will be reviewed annually and updated if required. Version 2.0 of the Waste Management Plan and Incinerator Management Plan will be updated in July 2015 to account for the commissioning of the new composter during the summer of 2015.

As the waste streaming process is changing, stack testing will occur after the composting system is in place and the new waste streaming has been rolled out. Current operations of the incinerator have not changed from when the stack testing was completed in June 2013, and therefore, the emissions are expected to be the same as when the sampling was completed.

DOMINION DIAMOND

Information Request Number:	DAR-GNWT-IR-17
Source:	Government of Northwest Territories – Lands: Paul Mercredi
Subject:	Jay-Pipe Pit Geometry
DAR Section(s):	3, 3.5, 3.5.4.1 (Map 3.5-4 and 3.5-2)

Preamble (GNWT):

Section 3 of the DAR outlined the conceptual design of the various components specific to the Jay Project. In Section 3.5, discussion was presented that details the conceptual design of the various components specific to the Jay Project during the construction phase (Map 3.5-1) and operations phase (Map 3.5-2). The Pit geometry and preliminary stable slope configurations are outlined in Section 3.5.4.1. The information presented provides limited discussion pertaining to the following: - Whether freeze-thaw effects were taken into consideration in the stability assessment of the Pit walls. Based on a preliminary review of the data, it appears the freezing and thawing index may be on the order of 5,000 deg-days and 2,000 deg-days, respectively; however these indices are not presented in the DAR. - The stability and shape of the overburden (lake sediments) located between the excavated Jay Pit and the toe of the dike.

Request (GNWT):

GNWT requests that DDEC provide the following:

a) Describe how freeze-thaw of the pit walls was taken into consideration in the stability assessment of the excavated Jay Pit walls. Provide further discussion regarding freeze-thaw effects as well as the effects of a frozen face on the rock permeability and Pit infiltration rate/volume.

b) Provide an estimate of the freeze-thaw depths during operation of the Jay Pit.

c) With regards to Section 10.4 of the DAR (mitigation and monitoring), provide a description of the proposed actions, mitigations and monitoring associated with the effects of freeze-thaw on the stability of the of the Jay Pit walls.

d) Provide additional information on the slopes and stability of the overburden (lake sediments) located between Jay Pit and the toe of the dike once the area has been dewatered and describe how the lake sediments will be shaped.

Response:

a) Describe how freeze-thaw of the pit walls was taken into consideration in the stability assessment of the excavated Jay Pit walls. Provide further discussion regarding freeze-thaw effects as well as the effects of a frozen face on the rock permeability and Pit infiltration rate/volume.

During mine operation, freeze-thaw cycles are expected to have a minimal impact on the pit wall stability and will be limited to the surficial portion of the rock walls. At a later stage in the design process, a ground control management plan will be developed and implemented to monitor and maintain pit wall stability to an acceptable risk level associated with various forms of ground instability that may develop during operations. In addition, thermistors will be installed to supplement the monitoring program, if deemed necessary.

Ice walls do develop in some pits during mining; however, the development of such structures, their extent, their stability and any potential impact to safety, are site specific. Infiltration rate into pits is one factor that determines if an ice wall may form. If infiltration rates are relatively low, seasonal freezing is more likely to occur, in comparison to if infiltration rates are high. It is standard practice that mining operations continually evaluate pit wall conditions and mitigations or modifications are implemented, as necessary, as part of the ground control management plan.

b) Provide an estimate of the freeze-thaw depths during operation of the Jay Pit.

The Permafrost Baseline Report (Annex XIV of the Developer's Assessment Report [DAR]) for the Jay Project presents historical data for the area; the locations of thermistor installations are summarized on Table 4.2-1 and are presented on Map 4.2-1, and Appendix A contains graphical presentations of the thermistor data. In the Misery Pit area, the active layer varies between 1 metre (m) and 2.7 m (Section 3 of Annex XIV). Active layer refers to the upper soil and/or bedrock that annually thaws and refreezes. It is anticipated that the active layer on the islands and shore of Lac du Sauvage will be similar to that measured near the Misery Pit. Several thermistors were installed as part of the 2014 geotechnical investigation program. Initial data obtained from these thermistor locations are presented in the Jay Project Geotechnical and Hydrogeologic Field Investigation Factual Report (Volume 1: Proposed Dikes; Golder [2014]). In Volume 1, Figure 3 presents the location of the thermistor installations and Appendix D contains the initial data. Additional thermistors are planned to be installed as part of the ongoing investigations. The depths of the freeze-thaw layer in the proposed Jay Pit are expected to be of the same order of magnitude as those measured on the shore and on islands in Lac du Sauvage. However, these depths will locally vary depending on the pit wall exposure, structural geology, and hydrogeologic conditions.

c) With regards to Section 10.4 of the DAR (mitigation and monitoring), provide a description of the proposed actions, mitigations and monitoring associated with the effects of freeze-thaw on the stability of the of the Jay Pit walls.

A ground control management plan will be developed and implemented to monitor and maintain pit wall stability to an acceptable risk level associated with various forms of ground instability that may develop during operation of the Jay Pit, including potential rock falls induced by free-thaw cycles. In addition, thermistors will be installed to supplement the monitoring program, if deemed necessary.

d) Provide additional information on the slopes and stability of the overburden (lake sediments) located between Jay Pit and the toe of the dike once the area has been dewatered and describe how the lake sediments will be shaped.

The overburden thicknesses encountered in the Jay Pit diamond and sonic boreholes during the 2014 field investigation are summarized in Table 17-1.

Table 17-1 Summary of Jay Pit Overburden Thickness

Borehole ID	Overburden Thickness[a] (mah)	Borehole Inclination[b] (°)	Overburden Thickness[a] (vmbgs)
JGT-01[c]	4.7	80	4.6
JGT-02[c]	3.2	70	3.0
JGT-03[c]	4.5	70	4.2
JGT-04[c]	19.6	70	18.4
JGT-05[c]	3.9	70	3.6
JGT-06[d]	5.9	80	5.8
JGT-07[c]	6.4	90	6.4
JSD-01[d]	16.0	90	16.0
JSD-02[d]	8.9	90	8.9

a) Overburden thickness is the difference between the top of sediments and the top of bedrock.

b) Inclination is the angle below the horizontal; i.e., 90° = a vertical hole.

c) Overburden thickness calculated from data collected by Golder personnel.

d) Overburden thickness calculated from data provided by Dominion Diamond.

ID = identification; mah = metres along hole, relative to ground (or ice) surface; ° = degree; vmbgs = vertical metres below ground surface.

An additional geotechnical investigation is being carried out in 2015; these data will be used to supplement the information presented above and used in preparing the detailed design. Overburden materials consist of varying thicknesses and distributions of: lakebed sediment, glacial lacustrine, glacial fluvial and glacial till.

The overburden materials excavated above the Jay Pit, near the crest are planned to be sloped at an angle of 33°. In areas where the overburden thickness exceeds 10 m, the following bench configuration will be implemented, based on the pre-feasibility pit design:

- bench height: 10 m;
- catch berm width: 9.5 m;
- bench face angle: 60°; and,
- inter-ramp angle: 33°.

Additional information regarding overburden materials will be collected as part of the 2015 investigation program. This information will be incorporated into the detailed design for the pit. A ground control management plan will be developed and implemented to monitor and maintain pit wall stability. This will include stability of the overburden materials. Modifications to the proposed overburden slopes will be implemented, if required to maintain stability, based on conditions encountered during mining operations.

References:

Golder (Golder Associates Ltd.) 2014. Jay Project Geotechnical and Hydrogeological Field Investigation Factual Report Vol 1: Proposed Dikes, Part A. Submitted to Dominion Diamond Ekati Corporation. July 23, 2014. http://www.reviewboard.ca/upload/project_document/EA1314-01_Jay_Dike_Factual_Report_Volume_1_Part_A.PDF

DOMINION DIAMOND

Information Request Number: DAR-GNWT-IR-29

Source: Government of Northwest Territories – Lands: Paul Mercredi

Subject: Hydrology Baseline

DAR Section(s): 8

Preamble (GNWT):

All of the baseline characterization and the presentation of project effects involve use of an annual calendar year period. Use of the calendar year period would underestimate the extremes of true annual variability of wet and dry years.

Request (GNWT):

GNWT recommends that annual values used in the impact assessment should be based on the hydrologic year which extends from the onset of freezing temperatures in October through to the following September. For certain types of analysis of annual water yield and runoff coefficients, the runoff of streams which extends past the end of the hydrologic year (September) should be assigned to that runoff year, since such runoff is the result of that year's precipitation. For streams that discharge through the entire winter season, all of the runoff through into May (or whenever the new spring runoff begins) should be assigned to the preceding runoff year. Please provide a rationale for not using the above approach in the baseline hydrology work and any impacts to the assessment in the DAR.

Response:

We understand that in northern watersheds, the hydrologic year commencing at the onset of snow accumulation is often used to characterize flow and water level regimes, rather than the calendar year commencing January 1. However, use of the calendar year in this assessment was selected to provide results for the following reasons:

- Working with and presenting the results as a calendar year was the most efficient and consistent method to provide data and assessments to other disciplines (i.e., Water Quality, Engineering, etc.) for their modelling and assessments.
- Some of the inputs required for the water balance model (e.g., back-flooding and operational water transfers) were available on a calendar year basis.
- Ultimately, the parameters used as a proxy to compare the effects metrics are not influenced by either the calendar year or hydrologic year, as discussed below.

The baseline characterization and presentation of Jay Project (Project) effects on flows and water levels were compared primarily through monthly average values or by frequency analyses conducted on the annual maximum peaks or minimum lows for specified events (e.g., the 7-day peak or the 30-day low flow). For all of these baseline and assessment results, calendar year periods or water year periods provide the same results because these events do not span over two hydrologic years. Peak events

consistently occur during open-water season, and low-flow events occur either in October (prior to freeze-up) or during late winter months at streams that discharge year-round.

The 100-year and 2-year peak flows and water levels were assessed as one annual maximum flow or water level per calendar year for 50 years of analysis (1964-2013). Similarly, the 7-day and 14-day peak, and the 30-day, 60-day, and 90-day averaged low flows were assessed as one annual minimum flow or water level per calendar year over the 1964-2013 time period. Determining the annual maximum (or minimum) flow or water level based on the calendar year will yield the same 50 year dataset as the annual maximum based on the hydrologic year, and therefore, would make no change in the results presented in the Developer's Assessment Report (DAR). It should also be noted that the maximum flows and water levels typically occurred during the summer months (June to September) and the minimum flows and water levels typically occurred during the spring months prior to the freshet (March to May) for the streams that discharge year-round.

The monthly estimates are based on frequency analyses of the daily flows averaged over each month every year from 1964 to 2013 to produce one estimate for each month per year. Use of the hydrologic year would have no influence on the monthly estimates as the flows do not carry over from December to January and would make no change to the results presented in the DAR.

Use of a hydrologic year may have an effect on the calculated annual water yield time series, as the water yields are a function of the total volume averaged over the total watershed area per key area (e.g., Lac du Sauvage, Lac de Gras, and Desteffany Lake). Using a hydrologic year from October to September may produce a different total runoff volume than the annual calendar year (January to December). For baseline modelling, water yields were used primarily for calibration, and therefore, the same period was used to calibrate modelled annual water yields to observed annual water yields. An example of a comparison of the effects to water yields, using both the calendar year and the hydrologic year during Closure Year 3 (the period with the greatest effects to Lac du Sauvage and downstream waterbodies), is provided below in Table 29-1 and the following discussion. The results using a calendar year are presented in Table 8D5-300 of Appendix 8D of the DAR, with the percent change from baseline provided below in Table 29-1. These results are compared in Table 29-1 (below) to the percent change from baseline during Closure Year 3, using an annual period of the hydrologic year. The hydrologic year is estimated to start October 15th (ERM Rescan 2014).

Table 29-1 Derived Percent Change in Water Yield for Calendar Versus Hydrologic Year at Lac du Sauvage, Lac de Gras, and Desteffany Lake Outlets – Closure Year 3

Condition	Return Period (years)	Percent Change in Annual Water Yield from Baseline During Closure Year 3					
		Percent Change in Annual Water Yield Using a Calendar Year Period			Percent Change in Annual Water Yield Using a Hydrologic Year Period		
		Lac du Sauvage	Lac de Gras	Desteffany Lake	Lac du Sauvage	Lac de Gras	Desteffany Lake
Wet	100	-8.1%	-3.4%	-2.0%	-8.8%	-3.4%	-2.1%
	50	-8.7%	-3.6%	-2.1%	-9.1%	-3.2%	-2.2%
	20	-10.0%	-3.9%	-2.3%	-10.0%	-3.9%	-2.4%
	10	-11.0%	-3.7%	-3.0%	-11.0%	-3.7%	-2.5%
	5	-12.2%	-4.6%	-2.7%	-12.2%	-4.6%	-3.3%

Table 29-1 Derived Percent Change in Water Yield for Calendar Versus Hydrologic Year at Lac du Sauvage, Lac de Gras, and Desteffany Lake Outlets – Closure Year 3

Condition	Return Period (years)	Percent Change in Annual Water Yield from Baseline During Closure Year 3					
		Percent Change in Annual Water Yield Using a Calendar Year Period			Percent Change in Annual Water Yield Using a Hydrologic Year Period		
		Lac du Sauvage	Lac de Gras	Desteffany Lake	Lac du Sauvage	Lac de Gras	Desteffany Lake
Median	2	-14.2%	-5.4%	-3.2%	-14.2%	-5.4%	-3.2%
Dry	5	-17.2%	-6.3%	-3.7%	-17.1%	-5.5%	-3.7%
	10	-18.1%	-5.9%	-4.0%	-17.8%	-5.9%	-4.0%
	20	-20.4%	-7.1%	-3.4%	-19.1%	-7.1%	-4.2%
	50	-21.2%	-6.6%	-4.5%	-20.6%	-7.6%	-4.5%
	100	-21.5%	-6.9%	-3.8%	-21.6%	-7.0%	-4.7%

Note: Annual water yield using a Calendar Year period is based on a 50 year period of record. The Hydrologic year period is based on 49 years, because 2013 has an incomplete hydrologic year. This may have an influence on the differences between calendar year and hydrologic year when considering the frequency analysis of both datasets.

% = percent.

The assessment of the results in the Hydrology Baseline (Annex X) and Section 8.5.3 of the DAR using the calendar year is valid as the primary parameters used as a proxy for comparison (e.g., 100-year peak, 2-year peak, 7-day peak, 14-day peak, 30-day low, 60-day low, 90-day low, and mean monthly) are not influenced by the hydrologic year, as discussed earlier.

The annual water yield is the parameter potentially most affected by the use of calendar year versus hydrologic year, as it is a function of the total runoff volume. Changing the start date may yield more/less total runoff volume than using the calendar year. However, based on the sample results presented in Table 29-1, comparing the percent differences between the baseline annual water yields and the year 3 closure annual water yields, calculated for both the calendar year and the hydrologic year, shows very little difference between the two. On average, the difference between calendar year and hydrologic year is near zero, with the largest difference occurring for the dry 20 year Desteffany Lake water yield (calendar year is -3.8 percent (%), hydrologic year is -4.7% for a difference of 0.9%). The effects to annual parameters, such as water yields, from baseline values due to Project activities, are therefore, valid with negligible changes due to the use of a calendar year or hydrologic year. Therefore, the conclusions in the DAR remain valid.

References:

ERM Rescan (ERM Rescan Environmental Ltd.). 2014. Ekati Diamond Mine 2013 Aquatic Effects Monitoring Program Annual Report. Prepared for Dominion Diamond Ekati Corporation. Yellowknife, NWT, Canada.

DOMINION DIAMOND

Information Request Number: DAR-GNWT-IR-31

Source: Government of Northwest Territories – Lands: Paul Mercredi

Subject: Baseline Water Balance Model

DAR Section(s): Annex X

Preamble (GNWT):

A 4-hour time step was used to develop the model, apparently using daily data, however it is unclear why a 4-hour time step was used and how 4-hour values were obtained from the daily data.

Request (GNWT):

GNWT requests DDEC provide rationale on the utilization of a 4-hour time step and provide information on how 4 hour values were obtained from the daily data.

Response:

The regional water balance model, including the Desteffany Lake, Lac de Gras, and Lac du Sauvage watersheds, use a 4-hour time step to allow a higher frequency of lake outlet discharge calculations.

The regional water balance model has approximately 500 lake outlets modelled in parallel and in series. At each lake outlet, the volume of water and corresponding water depth (stage) of the lake reservoir during the computation time step, is applied to the lake outlet stage-discharge rating curve and discharged accordingly.

Based on manual optimization runs of the model, using a 1-day (24 hour) time step artificially attenuated water within the system of lake reservoirs, especially at smaller modelled lake outlets. A 4-hour time step was observed to improve the lake outlet discharge hydrographs, in particular the peak freshet flows at inlets to Lac du Sauvage. A further reduction to a 1-hour time step did not noticeably improve the results and greatly increased the model run time.

GoldSim is a dynamic simulator, which means it models time-varying behavior of a system. In GoldSim, time is a built-in variable which is explicitly associated with all model variables, including input time series data.

GoldSim can use daily input data for model runs with a shorter time step. Examples of how the hydrological model uses daily data at a 4-hour time step length are as follows:

1. Constant daily data, such as mean daily temperature, are the same for each 4 hour time step in the calendar day.
2. Daily data with a rate (i.e., rainfall, snowfall, evaporation, etc.) are distributed over the shorter time steps. In Equation 1, 6 millimetres (mm) of rainfall in a day (24-hour time step) would result in 1 mm per 4-hour time step. The total amount of rainfall over the day is unchanged.

Equation 1:
$$6\ \frac{mm}{day} \div 6\ \frac{timesteps}{day} = 1\ \frac{mm}{timestep}$$

DOMINION DIAMOND

Information Request Number:	DAR-GNWT-IR-33
Source:	Government of Northwest Territories – Lands: Paul Mercredi
Subject:	Baseline Water Balance Model
DAR Section(s):	Annex X

Preamble (GNWT):

On Page F-2 of Annex X, the model does not appear to allow for the routing time effects of flows as they move through the complex of lakes and channels to the points of interest.

Request (GNWT):

GNWT requests that DDEC clarify whether flow routing time effects are included in the model. If so, how is this done? If not, what are the potential implications of not including this aspect?

Response:

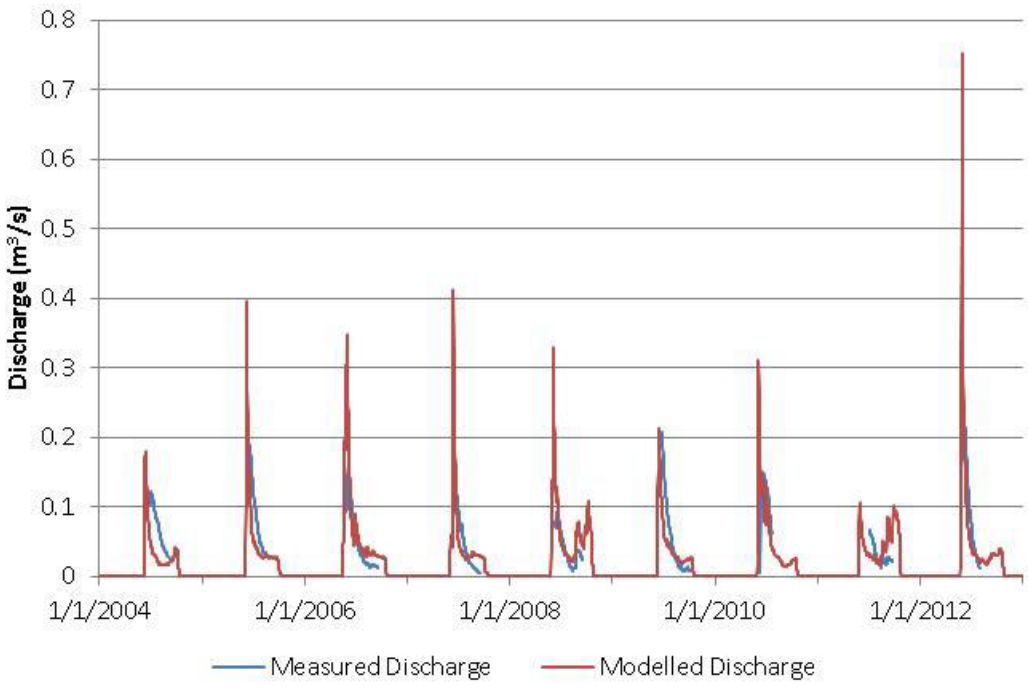
Channel routing was not included in the water balance model. This is generally consistent with the physical characteristics of the Lac du Sauvage watershed, where lakes are connected by relatively short channels and conveyance of flow depends on lake storage and timing of release through lake outlets.

Storage effects through the complex of lakes were included in the Lac du Sauvage watershed and Paul Lake basin. A network of approximately 500 lakes were modelled in series and in parallel. This attenuation of flows is controlled through storage in all modelled lakes and lake outlets throughout the watershed.

The potential implications of not including the time effects in channels would be to underestimate the time required for flows to be routed downstream in each basin. This has not been observed in the comparison of observed hydrographs to modelled hydrographs.

The timing of flows from the contributing watersheds match measured data as presented in the Developer's Assessment Report, Annex X, Section F3.1.2.3 and Section 8D3.1.5. An example of this is shown in Figure 33-1.

Figure 33-1 Counts Lake (D3) Measured vs Modelled Discharge



Based on the comparisons of Lac de Gras and Desteffany Lake hydrographs, there is no consistent lag as shown in Figure 33-2 and Figure 33-3 below. This indicates that modelling without consideration of channel routing provides an accurate estimate of flows and discharges in Lac de Gras and the Coppermine River downstream to Desteffany Lake.

Figure 33-2 Desteffany Lake Outlet Modelled and Measured Discharges

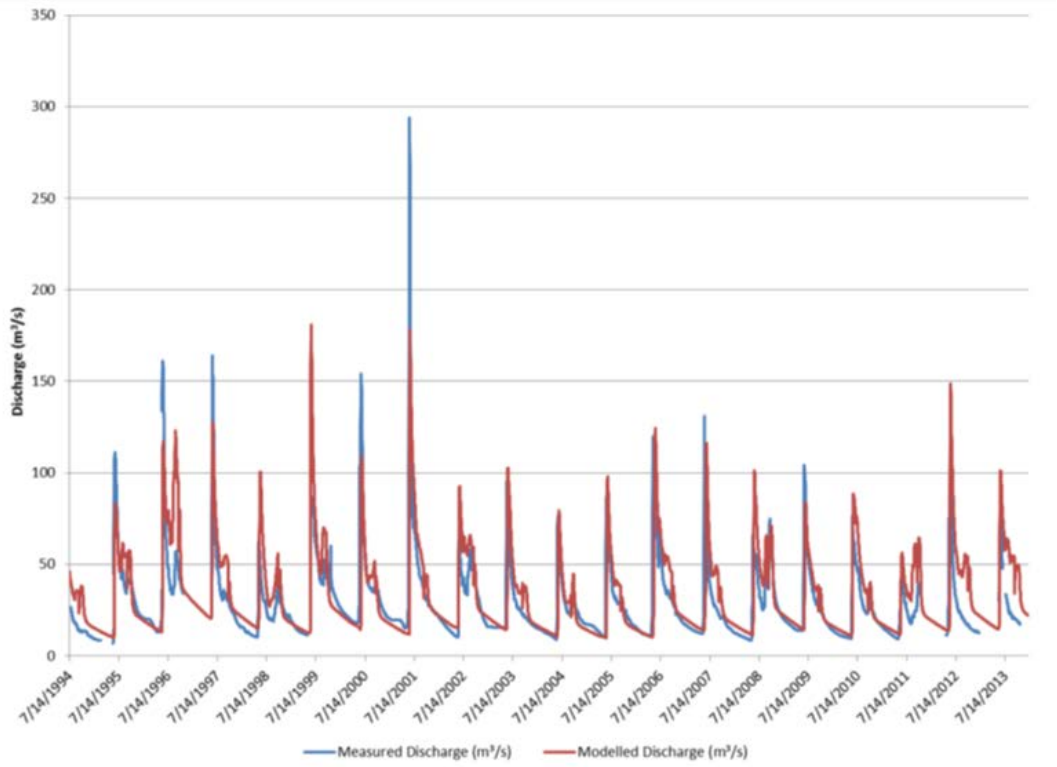
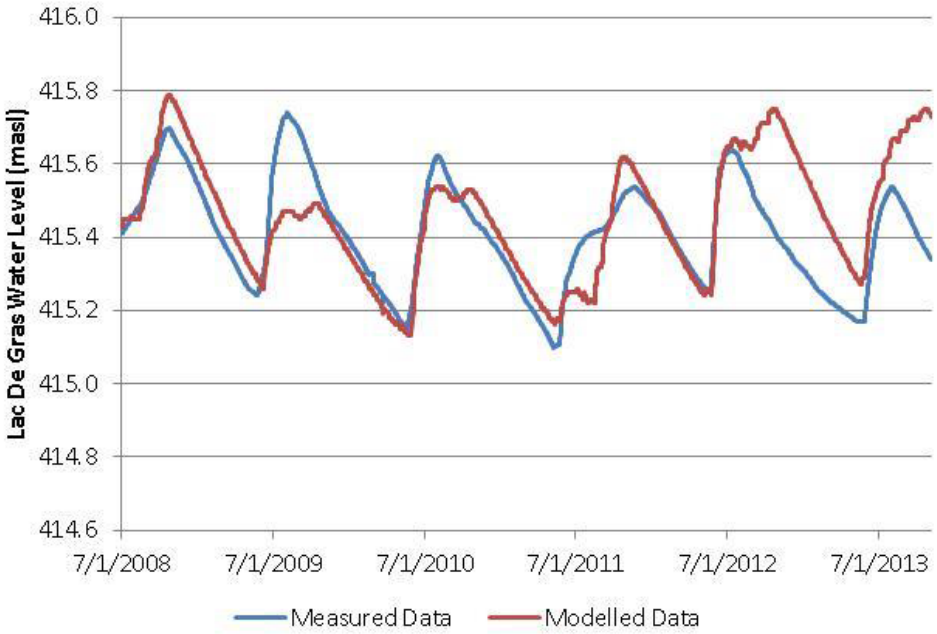


Figure 33-3 Lac de Gras Modelled vs Measured Water Level



DOMINION DIAMOND

Information Request Number: DAR-GNWT-IR-35

Source: Government of Northwest Territories – Lands: Paul Mercredi

Subject: Baseline Water Balance Model

DAR Section(s): Annex X

Preamble (GNWT):

Pages F-4 to F-6 of Annex X, the description of the methodology for application of lake outlet discharge rating curves based on a "regional" approach appears incomplete.

Request (GNWT):

GNWT requests clarification on the methods used for the determination of the zero flow depth "y" in the weir equation for each lake.

Response:

The regional hydrology water balance model included all lakes within the Lac du Sauvage watershed with a surface area greater than 4 hectares. As part of the 2013 baseline data collection program within the Lac du Sauvage and Lac de Gras watersheds, detailed aerial reconnaissance was completed at 72 lake outlets, detailed aerial reconnaissance and hydrometric ground surveys (collection of water levels, discharge and cross-sections) were completed at 39 lake outlets, and additional continuous hydrometric modelling was completed at 6 of the above 39 lake outlets (including Lac du Sauvage). Collected baseline data is summarized in Appendix E of the Hydrology Baseline Report (Annex X) of the Developer's Assessment Report (DAR). In addition, historical hydrometric data was used to derive lake outlet stage-discharge rating curves at additional lake outlets including Lac de Gras, Christine Lake (Lake B1), Ursula Lake (Lake E10), and others as summarized in Appendix C of the Hydrology Baseline Report (Annex X) of the DAR. Detailed hydrometric surveys were prioritized for larger lakes with greater storage potential, terminal sub-basin lakes, lakes within potentially altered watersheds or representative lakes.

Three methods were used to derive stage-discharge rating curves at modelled lake outlets, and the selection of the method was a function of available site specific information. The three methods, including the broad-crested weir equation, are described in Section F3.1.2.1.2 in Appendix F of the Hydrology Baseline Report (Annex X) of the DAR. The broad-crested weir equation is provided as Equation F3.1-1 in Appendix F of the Hydrology Baseline Report (Annex X) of the DAR, and was used for lake outlets where detailed ground surveys were not completed (typically smaller, non-terminal sub-basin lakes).

The following describes the methodology used to determine the variable "y" which is defined as the depth above zero-flow elevation (m) in the regional broad-crested weir rating curve equation.

For all water surface elevations less than or equal to the zero-flow elevation, no water will be discharged at the lake outlet, and conversely, for all water surface elevations greater than the zero-flow elevation (when the outlet is not frozen), water will be discharged at the lake outlet. Also referred to as the lake sill

elevation, it is a physical component of all lake outlets, which controls the lake outlet discharge. The lake outlet discharge rate for lake water surface elevations above the zero-flow elevation can be calculated using a lake outlet stage discharge rating curve.

Each modelled lake using the regional rating curve approach was assigned:

- An initial volume sufficient to maintain a lake volume (i.e., not go dry) throughout the baseline period. The assumption that the modelled larger lakes have sufficient volume to not go dry was supported by field observations in 2013 and 2014. The initial volume is associated with the zero-flow condition, where no water is discharging from the reservoir.
- An initial depth above the zero-flow elevation (either of zero or the long-term modelled average to reduce model spin-up time). No geodetic elevations were applied to water levels in these modelled reservoirs.
- A constant lake area (i.e., a vertical wall) boundary, which was assumed, as detailed bathymetry and storage-elevation curves were not available for the over 400 modelled lakes. In addition, it is expected that the change in lake water surface area due to natural water level fluctuations for the larger modelled lakes is a small fraction of the mean water surface area.

The lake inflows and outflows, as depicted in Figure F3-1 of Appendix F, Annex X, were calculated at each reservoir element according to the Water Balance Model Flowchart (Figure F3-2, Annex X, Appendix F) and methods described in Appendix F of Annex X. For each time-step, the volume greater than the initial lake volume divided by the lake water surface area, or depth of water “y”, is applied to the lake outlet rating curve as described in Section F3.1.2.1.2 (Annex X, Appendix F) to derive a discharge. Outflows from a reservoir are transferred into the downstream reservoir as inputs.

DOMINION DIAMOND

Information Request Number:	DAR-GNWT-IR-36
Source:	Government of Northwest Territories – Lands: Paul Mercredi
Subject:	Baseline Water Balance Model
DAR Section(s):	Annex X

Preamble (GNWT):

GNWT notes that there is no information on lake stage-storage curves, or how lake storage was taken into account.

Request (GNWT):

GNWT requests that DDEC provide information on lake stage-storage curves as well as information on how lake storage was taken into account.

Response:

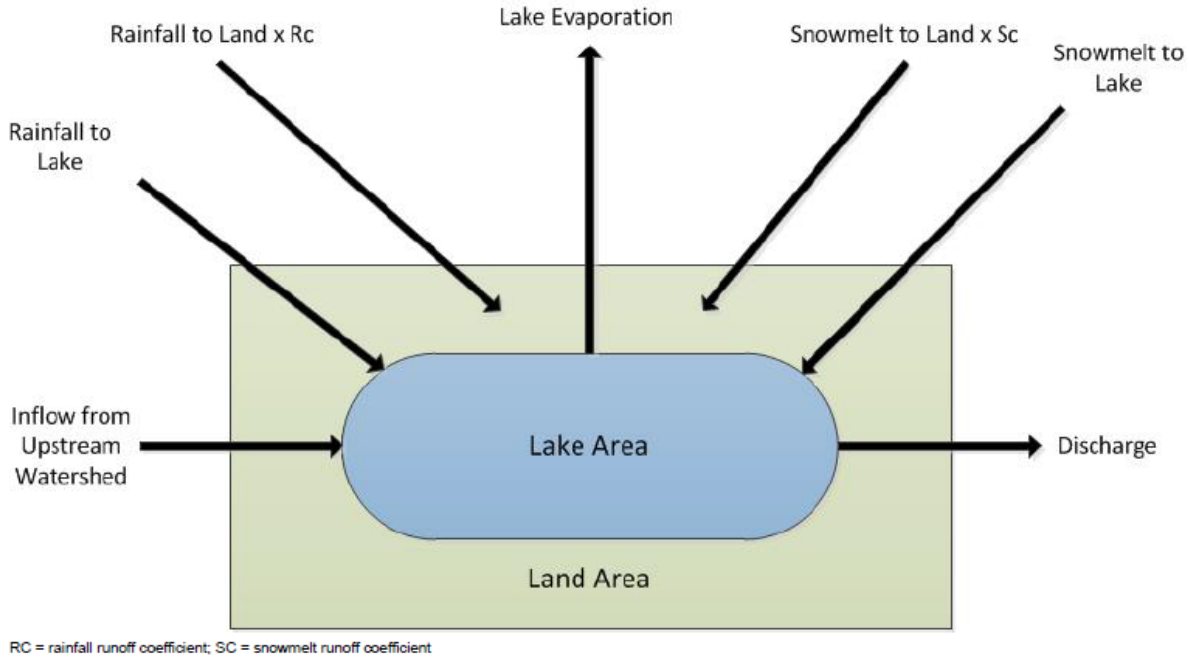
In the water blance model, each modelled lake uses a “vertical wall” assumption that the lake surface area is constant and does not change with variations in lake water level. This assumption was used as there was no available bathymetry for almost all modelled lakes. Lakes with available bathymetry (including Lac du Sauvage, Lac de Gras, Lake B1, Lake C1, Lake D3) do not have resolution to support varying lake surface area for relatively small changes in depth. For the purposes of this water balance model, the change in overall evaporation and runoff rates due to changing lake surface areas is assumed to be minimal.

These assumptions are supported by the fact that lakes in the study area typically have very small (e.g., often on the order of 0.5 metres) variations in water surface elevation between normal high and low water stages. Stage-storage characteristics below the lake low water level (i.e., dead storage) are not required inputs to the model.

Lake storage curves, at 1 metre depth resolution, are provided in the Developer’s Assessment Report (Annex X, Hydrology Baseline Report) for each Lac du Sauvage sub-basin (Section 5.2.1) and for Lac de Gras (Section 5.3).

Lake storage is tracked in each modelled reservoir as an accumulation (or loss) of water based on the inflow and outflow rates, as depicted in Figure 36-1 below. The lake storage is proportional to the lake water level, which in turn, affects the lake outlet discharge rate. If the lake water level is below the zero-discharge elevation, evaporative losses are still accounted for.

Figure 36-1 Schematic of Lake Reservoir Model



RC = rainfall runoff coefficient; SC = snowmelt runoff coefficient

DOMINION DIAMOND

Information Request Number: DAR-GNWT-IR-40

Source: Government of Northwest Territories – Lands: Paul Mercredi

Subject: Baseline Water Balance Model

DAR Section(s): Annex X

Preamble (GNWT):

On Page F-22 of Annex X, the calibration results show that unrealistic values of runoff coefficients were required for calibration - i.e. RC for rainfall land runoff = 0.57 and SC for snowpack runoff from land = 1.00. No explanation for this result is provided, and no justification for accepting this result is made.

Request (GNWT):

GNWT requests the DDEC provide an explanation of the result noted above as well as provide justification for the acceptance of this result.

Response:

The runoff coefficients derived in the water balance model and presented in Table F3-9 of Annex X, Appendix F of the Developer's Assessment Report (DAR) were calibrated to the mean annual water yield of the Lac de Gras basin. The runoff coefficients for rainfall and snowfall runoff on land are 0.2 to 0.3 units higher than those found in the literature review in the Annotated Bibliography (DAR Annex X, Appendix A).

It is expected that runoff coefficients vary in hydrological studies, as they are calibrated to measured data and may include inconsistent treatments of factors including sublimation, evapotranspiration, and infiltration losses. In particular, the 30 percent reduction in snow water equivalent that was applied in the model to account for sublimation is likely to account for much of this apparent discrepancy.

The runoff coefficients are consistent with previous calculations of land water losses in the Lac de Gras basin (Golder 2008), current runoff coefficients used at the Ekati Mine (ERM Rescan 2014), and with hydrological experience at other mine sites in the Northwest Territories.

The runoff coefficients are considered realistic and appropriate based on the historic water yields, study methodology, and comparison to recent regional studies.

References:

ERM Rescan (ERM Rescan Environmental Ltd.). 2014. Water Balance and Water Quality Modelling related to the Jay Project. Yellowknife, NT, Canada: ERM Rescan.

Golder (Golder Associates Ltd.). 2008. 2007 Review of Baseline Climate and Surface Hydrology for the Diavik Diamond Mine. Burnaby, BC, Canada: Golder Associates Ltd.

DOMINION DIAMOND

Information Request Number: DAR-GNWT-IR-44

Source: Government of Northwest Territories – Lands: Paul Mercredi

Subject: Mine Water Management

DAR Section(s): 3, Appendix 3A

Preamble (GNWT):

On page 18 of the Mine Water Management Plan regarding the diversion channel, no information is provided on the watershed area or derivation of the design discharge. The figures also show a stream entering the diversion channel near its downstream end. It is unclear if this stream is included in the computations.

Request (GNWT):

GNWT requests additional information of the watershed area or derivation of the design discharge for the discharge channel. GNWT requests clarification from DDEC regarding the inclusion of a stream near the downstream end of the Sub-Basin B Diversion Channel in the computations regarding discharge.

Response:

The Sub-Basin B Diversion Channel is described in Section 3.5.3.2 of the Developer's Assessment Report (DAR). The diversion channel will divert flow from the drainage area to the west of the Lac du Sauvage comprising the Lake B1 (Christine Lake) and Lake B0 watershed (stream B0 watershed), and the Stream Ac35 wastershed (small stream that flows from Lake Ac35). Stream Ac35 will enter the diversion channel near the downstream end. The watershed area reporting to the diversion channel is shown in green in Map 44-1.

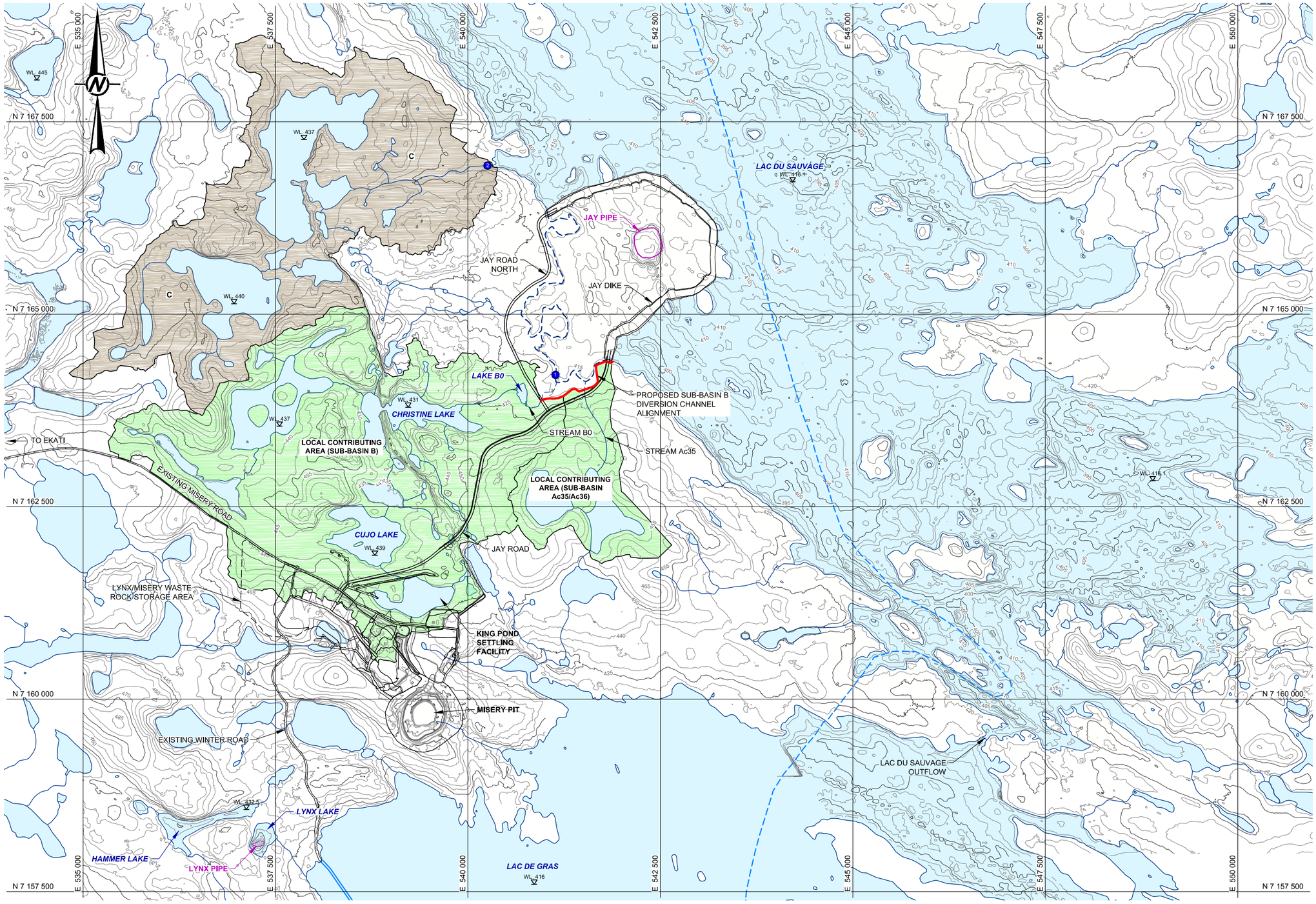
The diversion channel is designed to convey the peak flow generated from the reporting watershed areas during the 1-in-100 year return period storm.

Estimated extreme daily rainfall plus snowfall depths at the Project (Hydrology Baseline; Annex X of the DAR) were applied to the regional water balance developed for the Project and were used to derive design hydrographs and peak flows for the diversion channel.

The watershed areas reporting to the diversion channel as well as the estimated 1-in-100 year design flows are provided in Table 44-1.

Table 44-1 Drainage Areas and Design Flows for Sub-basin B and Sub-basin Ac35/Ac36

Catchment	Drainage Area (km^2)	Design Flows (m^3/s)
Sub-basin B	15.5	2.53
Ac35/Ac36	2.5	0.65
Total (channel design flow)	18.0	3.18



LEGEND

- SUB-BASIN OUTFLOW
- WATER BODY
- WATER COURSE
- ROAD
- SUB-BASIN B DIVERSION CHANNEL
- EXISTING SHORELINE IN DRAWDOWN AREA
- WINTER ROAD - YEARLY CONSTRUCTION
- WINTER ROAD - ON DEMAND CONSTRUCTION
- PIPE LOCATION
- WATER LEVEL ELEVATION
- DISCONTINUED STREAM PORTION

SUB-BASIN LEGEND

- SUB-BASIN C
- DIVERSION CHANNEL CONTRIBUTING AREA

NOTES

1. ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED.
2. GROUND SURFACE AND BATHYMETRY CONTOURS ARE SHOWN AT 5 m INTERVALS.
3. COORDINATES ARE SHOWN IN DATUM: NAD 83, PROJECTION: UTM ZONE 12.
4. DRAWING TO BE READ IN CONJUNCTION WITH TECHNICAL MEMORANDUM E14034-TM-REV.0.

REFERENCES

1. CONTOUR AND BATHYMETRY DATA PROVIDED BY AURORA GEOSCIENCES LTD., FILE: Final 1m Contours - Priority Area.dxf, DATE RECEIVED: OCTOBER 29, 2013.
2. WATER OBTAINED FROM CANVEC NATURAL RESOURCES CANADA, 2012.
3. JAY PIPE LOCATION RECEIVED FROM DOMINION DIAMOND CORPORATION, FILE: jay_kimberlite_pipe_OL.dxf, DATED: JULY 19, 2013.
4. LYNX PIPE LOCATION RECEIVED FROM DOMINION DIAMOND CORPORATION, FILE: lynx_polyline.dxf, DATED: JUNE 25, 2013.

0 1,000 2,000 3,000
SCALE METRES

REV	DATE	DESCRIPTION	DRW	DES	CHK	RVW
0	2014-08-29	ISSUED FOR PFS DESIGN	JD	JR	RM	JCC
B	2014-08-08	DRAFT - ISSUED FOR REVIEW	JD	JR	RM	JCC

SEAL / PERMIT

NOT FOR CONSTRUCTION

CLIENT: DOMINION DIAMOND

CONSULTANT: Golder Associates

PROJECT: 13-1328-0041.2020.25
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE: SUB-BASIN B DIVERSION CHANNEL SITE PLAN

DRAWING No.: MAP 44-1

SHEET No.: 1 OF 1

SHEET SIZE ANSI D 25 mm 0

DOMINION DIAMOND

Information Request Number:	DAR-GNWT-IR-50
Source:	Government of Northwest Territories – Lands: Paul Mercredi
Subject:	Lynx Pit – Post-Closure
DAR Section(s):	3 (Appendix 3A), 4.4, 8.3

Preamble (GNWT):

It is stated throughout the DAR that the Lynx Pit will be used for a component of water management of the Jay project. Specifically, it is noted that high total suspended solids water during dewatering for solid settling and long-term storage. This activity will serve a dual function as during dewatering of the area of Lac du Sauvage to expose the Jay pipe, the water will be also used to backfill the Lynx Pit which is the identified closure option for Lynx. However, it is unclear if the addition of turbid water from Lac du Sauvage to Lynx Pit, as opposed to clean lake water as originally planned, will result in a different post-closure situation at Lynx. While GNWT understands that TSS is expected to settle out in Lynx over time, the specifics around this process and the long-term water quality that will result in Lynx is unclear. This is compounded if the Lynx Pit is to be used as contingency storage for mine water during operations.

Request (GNWT):

GNWT requests additional information and assessment of impacts regarding the post-closure scenario at Lynx Pit and any variance in this regard that may result from the incorporation of Lynx Pit into the water management of Jay Pit as opposed to the original closure scenario for Lynx.

Response:

The closure of Lynx Pit is described in Section 3.5.8.3 of the Developer's Assessment Report (DAR) and Section 5.4.2.1.3 of Appendix 3B. The post-closure scenario for the Lynx Pit is similar to that without the Jay Project in that the closure plan involves filling with freshwater. For the Jay Project, the Lynx Pit will be used for the storage and management of lake water containing elevated total suspended solids (TSS) pumped from Lac du Sauvage during the dewatering phase of the Project. Back-flooding of Lynx Pit with water that comes from the dewatering associated with the Jay Project will not affect the post-closure scenario for the Lynx Pit, in comparison with back-flooding Lynx Pit with water from Lac de Gras. No changes to the post-closure conditions for the Lynx Pit are expected from the incorporation of Lynx Pit into the water management plan for the Jay Project.

Back-flooding of Lynx Pit with water sourced from the dewatering of the diked area will stop three metres (m) below the crest of the Lynx Pit. Natural precipitation and surface water inflow from the area immediately surrounding the Lynx Pit will gradually back-flood the upper 3 m of the Lynx Pit, over an approximately three year period. This time will be suitable for the TSS contained in the back-flooded water to settle and deposit at the bottom of the Lynx Pit. It is expected that based on the size and shape of the pit and the presence of ice during the winters, wind-induced mixing will be minimized, allowing the TSS to settle. However, during this period, water quality in the Lynx Pit will be monitored. Once back-flooding of the Lynx Pit is complete, and providing water quality meets discharge criteria, then the Lynx pit lake will naturally discharge through the existing stream into Lac de Gras.

At closure, the estimated depth of Lynx Pit will be 120 m. As described in Section 8, if adaptive management strategies are identified for minewater management during operational monitoring, there is the potential that Lynx Pit may be considered as a potential alternative minewater storage location. This is currently not part of the water management plan for the Project; however, if this were determined to be required, the use of Lynx pit would be described in a specific adaptive management response plan, which would address the implications of using Lynx Pit for this purpose. This is envisioned to follow the process for adaptive management responses described in the Ekati Mine Aquatic Response Framework (currently under review by the Wek'èezhìı Land and Water Board).

DOMINION DIAMOND

Information Request Number:	DAR-GNWT-IR-56
Source:	Government of Northwest Territories – Lands: Paul Mercredi
Subject:	Re-filling of Pits
DAR Section(s):	8

Preamble (GNWT):

It is stated that re-filling of Misery and Jay Pits will occur from June to October. Has DDEC considered re-filling during winter to reduce the closure period or is this not feasible due to operational and temperature constraints?

Request (GNWT):

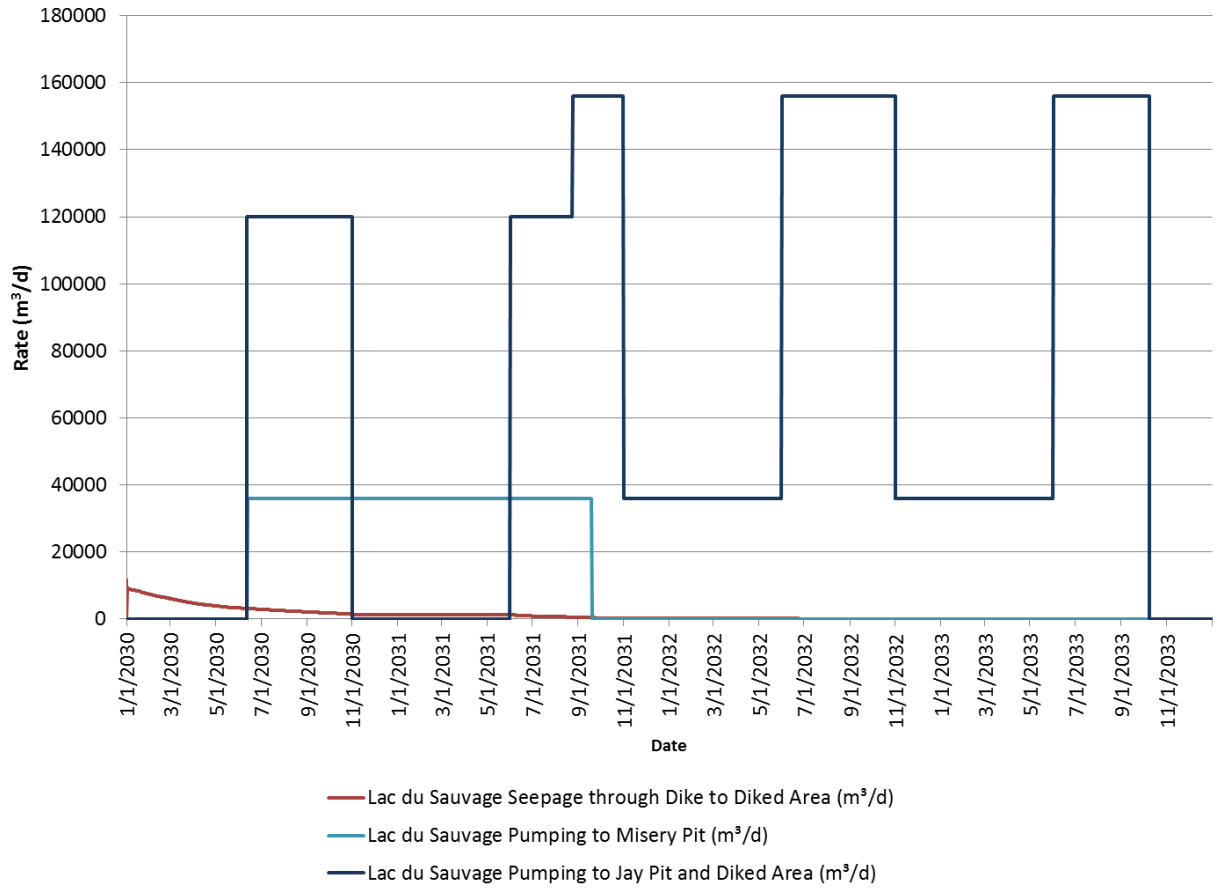
GNWT requests that DDEC provide rationale on the proposed seasonal refilling of Misery and Jay Pits and provide information as whether winter filling has at all been assessed for the project.

Response:

The proposed closure back-flooding plan for Misery and Jay pits accounts for back-flooding occurring year-round; seasonal back-flooding rates from Lac du Sauvage were set to mitigate effects to water levels and discharges in Lac du Sauvage and downstream waterbodies.

Section 8.5.3.2.4 of the Developer's Assessment Report (DAR) includes the water withdrawals from Lac du Sauvage for the back-flooding of the Misery Pit, Jay Pit, and the diked area, and an assessment of the associated effects to water levels and discharges during the year of back-flooding with the greatest effects (2032). Figure 8.5-54 of the DAR, reproduced below as Figure 56-1, shows the daily water withdrawal rates from Lac du Sauvage for back-flooding of the Misery and Jay pits and the diked area.

Figure 56-1 Back-flooding Flow Rates for the Jay and Misery Pits



m^3/d = cubic metres per day.

The hydrology assessment considers the year-round back-flooding of the Misery and Jay pits. The planned pumping rate during November to May is 36,000 cubic metres per day (m^3/d) (1,500 cubic metres per hour [m^3/h]), when natural outflows from Lac du Sauvage are low, and 156,000 m^3/d (6,500 m^3/h) during June to October, as shown on Figure 56-1. The back-flooding of the Misery Pit is expected to occur at a constant rate of 36,000 m^3/d. Pumping rates for the back-flooding of the Jay Pit and diked area will be reduced during concurrent Misery Pit re-filling, to confirm that seasonal rates described above are not exceeded. Year-round back-flooding, with the two pumping rates noted above, was used in the assessment of effects to water levels and discharges within Lac du Sauvage and downstream waterbodies in DAR Section 8.5.3.2.4.

DOMINION DIAMOND

Information Request Number: DAR-GNWT-IR-69

Source: Government of Northwest Territories – Lands: Paul Mercredi

Subject: Wildlife and Wildlife Habitat

DAR Section(s): 13.3.2.1.3, 2013 WEMP

Preamble (GNWT):

In its review of mitigation effectiveness related to carnivores, DDEC states that improvement of waste management practices has been a contributing factor in a general trend of decreasing intentional carnivore mortalities, with no intentional mortalities being reported at Ekati since 2009. While the number of intentional wildlife mortalities provides one metric of assessing improvements to waste management practices, results of the 2013 WEMP highlight other metrics that point to a need for mitigation. Results of landfill monitoring and landfill wildlife observations reported in Section 4 of the 2013 WEMP show that after several years of relatively lower level of wildlife attractants being found and wildlife sightings in the landfill from 2006-2010, there appears to be an increase in these metrics in recent years. DDEC attributed this increase to the opening of the Misery Pit and the associated camp which "introduced many new employees and contractors to the site. This contributed to an increase in misdirected waste." There appears to be a lag period while new employees learn proper waste management at site.

Request (GNWT):

Please elaborate on how DDEC plans to mitigate for this period of acclimatization of new employees to proper waste management.

Response:

Dominion Diamond Ekati Corporation is committed to Environmental Protection as is stated in our Sustainable Development Policy posted across Ekati, Yellowknife, and Sorting and Valuation Facility offices. To achieve this, waste management is a key part of the site orientation, where waste stations and waste streaming is reviewed. Waste streaming and individual responsibility on waste management is outlined in the site orientation that is completed as soon as new employees, contractors, and visitors arrive at site. Waste management is also included as part of the required online training, and both the online training and the site orientation is tracked through the Training Department. As part of the Site Orientation, each person is required to attend a mandatory presentation lead by the President and Chief Operating Officer of Ekati or one of the Managers where the Sustainable Development Policy, Environmental commitments, and individual responsibility are reviewed.

With any update or change to the waste management process, new information and educational materials are distributed site wide via emails, presentations, and workplace Health, Safety and Environment inspections.

Information Request Number: DAR-GNWT-IR-74

Source: Government of Northwest Territories – Lands: Paul Mercredi

Subject: Wildlife and Wildlife Habitat

DAR Section(s): 13.3.2.1.2, 13.2.2.7.2 (Table 13.2.2)

Preamble (GNWT):

There appear to be inconsistencies in reports of wildlife mortalities. P. 13-55 states that there have been 6 unintentional carnivore mortalities associated with vehicle collisions at all the mines, while Table 13.2.2 lists a total of 13 non-intentional mortalities across all mines. This is also in contrast to the statement that 11 carnivores were killed in vehicle collision at Ekati alone since 1998, although this metric appears to be consistent with the table.

Request (GNWT):

Please clarify the history of non-intentional mortalities of carnivores that have occurred at Ekati and other mines.

Response:

The number of non-intentional mortalities of carnivores that have occurred at the Ekati, Diavik, Snap Lake, and Jericho mines are presented in Table 74-1 below (data from references cited in the Developer's Assessment Report). There have been a total of 18 non-intentional mortalities at all four mine sites since 1996 (Table 74-1). Eleven of these non-intentional mortalities have been a result of collisions with vehicles. On the Ekati mine site, nine vehicle-related mortalities (seven fox and one wolf pup) have occurred since 1998.

Table 74-1 Non-Intentional Carnivore Mortalities at the Ekati, Diavik, Snap Lake, andJericho Mines, 1996 to 2013

Site	Year	Phase	Species	Number of Non-Intentional Mortalities	Comments
Diavik	Baseline	exploration	wolverine	1	no information available
	2001	construction	wolverine	1	no information available
	2012	production	wolverine	2	found in burnables bin
Ekati	2002	production	fox	1	struck by vehicle
	2002	production	wolf (pup)	1	struck by vehicle
	2005	production	fox	1	struck by vehicle
	2007	production	fox	1	struck by aircraft
	2008	production	fox	1	struck by vehicle
	2009	production	fox	1	struck by vehicle
	2010	production	fox	1	struck by vehicle
	2011	production	fox	1	struck by vehicle
	2012	production	fox	1	found in landfill
	2013	production	fox	1	struck by vehicle

Table 74-1 Non-Intentional Carnivore Mortalities at the Ekati, Diavik, Snap Lake, andJericho Mines, 1996 to 2013

Site	Year	Phase	Species	Number of Non-Intentional Mortalities	Comments
Snap Lake	2009	production	wolverine	1	stuck by vehicle
	2011	production	fox	1	found in accomodations sewage lift station
	2011	production	wolverine	1	found in shipping container
Jericho	2007	production	wolverine	1	struck by vehicle

DOMINION DIAMOND

Information Request Number: DAR-IEMA-IR-7

Source: Independent Environmental Monitoring Agency: Kevin O'Reilly

Subject: Trends in Fish Contaminants

DAR Section(s): Annex XIV

Preamble (IEMA):

Discussion of historic trends in fish tissue contaminants for the Koala watershed is not complete as the 2012 AEMP results are not included.

Request (IEMA):

DDEC should include the 2012 AEMP fish monitoring results in the DAR discussion of historic fish tissue contaminants.

Response:

The fish tissue chemistry results of the 2012 Aquatic Effects Monitoring Program (AEMP; ERM Rescan 2013) were summarized in the Historical Report Review of the Fish and Fish Habitat Baseline (Section A6, Appendix A, Annex XIV of the Developer's Assessment Report [DAR]). However, an update to the fish tissue chemistry sections in Section 9.2.6 of the DAR is provided below to include the results of the 2012 AEMP; the sentences that are in both bold and italics represent additional information to this section provided by 2012 AEMP fish monitoring results.

Section 9.2.6 (Updated):

A consistent theme across previously completed tissue chemistry studies in the vicinities of the Diavik Mine and the Ekati Mine was natural variation in metal concentrations across time, space (both within and across lakes), and species (Appendix A, Historical Report Review, Annex XIV).

For fish tissue mercury levels, increases in the study lakes may reflect widespread increases in mercury in this part of northern Canada. Golder (2012) reported differences in mercury concentrations in Lake Trout muscle in Lac du Sauvage between 2008 and 2011, and general increases in mercury concentrations in Lac de Gras and Lac du Sauvage before the development of the Diavik Mine to 2011. Importantly, the increase in mercury concentration in Lac du Sauvage trout since baseline was greater than that observed in trout from Lac de Gras; thus, there was no clear indication that the mercury increase in Lac de Gras trout was a result of the Diavik Mine. ***Similar findings were reported in the 2012 AEMP for the Koala and King-Cujo watersheds and Lac de Gras areas as part of monitoring for the Ekati Mine (ERM Rescan 2013).***

Rescan (2008) reported that concentrations of several metals in Round Whitefish liver (barium, mercury, molybdenum, strontium) and muscle (aluminum, barium, mercury, molybdenum, strontium), and in Lake Trout liver (arsenic, mercury, molybdenum) and muscle (barium, mercury) were higher in 2007 versus levels recorded during baseline years, and that most increases appear to be due to natural variation. The

mechanisms underlying changes in metal concentrations in tissue may be shifts in diet, increased metabolism, and/or natural changes in water and sediment chemistry.

Mine-related effects on fish tissue chemistry have also been reported in several historical reports. A tissue chemistry study completed by Golder (2008) concluded that there were several low-level and moderate-level effects observed for Slimy Sculpin in Lac de Gras. The moderate-level effects included elevated mercury concentrations in tissues in exposure areas, which were linked to the mine through observed changes in water quality and sediment quality. Golder (2010) also reported increases in tissue concentrations of bismuth, strontium, titanium, and uranium in Slimy Sculpin from near-field exposure areas in Lac de Gras. These increases were linked to mine-related activities through observed changes in water and sediment chemistry.

ERM Rescan (2013) reported in the 2012 Ekati Mine AEMP that antimony, molybdenum, and selenium concentrations were elevated in fish tissue from monitored lakes in the Koala watershed when compared to reference lakes:

- ***Antimony concentrations were elevated in Lake Trout muscle tissue and Slimy Sculpin from Leslie, Moose, and Nema lakes.***
- ***Molybdenum concentrations were elevated in Lake Trout muscle and Round Whitefish muscle from Leslie and Nema lakes.***
- ***Molybdenum concentrations were elevated in Round Whitefish in Moose Lake.***
- ***Selenium concentrations in Lake Trout muscle and Round Whitefish liver and muscle tissue were elevated in Leslie, Moose, and Nema lakes.***

ERM Rescan (2013) also reported that selenium and uranium concentrations have increased in the King-Cujo watershed due to mine-related effects. Selenium concentrations, while below guideline values, have increased over time in Lake Trout and Round Whitefish in Cujo Lake. Uranium concentrations in Round Whitefish liver tissue have increased at Cujo Lake, while decreasing in reference lakes.

As expected, trends in fish tissue chemistry were species-specific. Lake Trout were consistently reported as having high concentrations of mercury, owing to its top trophic position in the food web and susceptibility to effects from bioaccumulation as a relatively large, long-lived species. Rescan (2008) also reported elevated mercury concentrations in Slimy Sculpin in Lac de Gras, but there was no clear indication that the mercury increase in Lac de Gras Lake Trout was a result of the Diavik Mine. ***Similar results were reported during the 2012 AEMP and it was noted that mercury concentrations have not increased above the 2007 AEMP results (ERM Rescan 2013).***

From a human health perspective, with the exception of the largest fish, mercury levels found in Lake Trout from Lac de Gras and Lac du Sauvage were generally below Health Canada's maximum acceptable levels for the edible portion of retail fish (0.5 micrograms per gram wet weight [µg/g ww])

(Golder 2012). ***ERM Rescan (2013) reported similar results for Lake Trout, Round Whitefish, and Slimy Sculpin in the Koala and King-Cujo watersheds.***

References:

ERM Rescan (ERM Rescan Environmental Services Ltd.). 2013. 2012 Aquatic Effects Monitoring Program (AEMP) Summary Report; Part 1: Evaluation of Effects; Part 2: Data Report; and Part 3: Statistical Report. Prepared for BHP Billiton Diamonds Inc. Yellowknife, NWT, Canada.

Golder (Golder Associates Ltd.). 2008. Fish Report In Support of the 2007 AEMP Annual Report for the Diavik Diamond Mine, NWT. Prepared for Diavik Diamond Mines Inc. Yellowknife, NWT, Canada. Doc No. RPT-616 Ver. 0.

Golder. 2010. Fish Report in Support of the 2010 AEMP Annual Report for the Diavik Diamond Mine, NWT. Prepared for Diavik Diamond Mines Inc. Yellowknife, NWT, Canada. Doc No. RPT-1032 Ver. 0.

Golder. 2012. Mercury in Lake Trout Report in Support of the 2011 AEMP Annual Report for the Diavik Diamond Mine. NWT, Canada. Prepared for Diavik Diamond Mines Inc. Yellowknife, NWT, Canada. Doc No. RPT-1126 Ver. 0

Rescan (Rescan Environmental Ltd.). 2008. 2007 Aquatic Effects Monitoring Program (AEMP) Technical Report; Summary Report; and Appendix B: Data Report. Prepared for BHP Billiton Diamonds Inc., Yellowknife, NWT, Canada.

DOMINION DIAMOND

Information Request Number: DAR-IEMA-IR-9

Source: Independent Environmental Monitoring Agency: Kevin O'Reilly

Subject: Zooplankton Changes

DAR Section(s): 9.4.3.2.2

Preamble:

The DAR states: "Higher concentrations of TDS (in particular calcium) may stimulate growth of Daphnia species and potentially cause a shift in community structure towards larger-sized zooplankton. Calcium limitation may explain the observation that high TDS lakes are associated with higher zooplankton productivity". It is not clear how DDEC reconciles this statement with the results of Rescan 2006 multivariate analysis (in the AEMP Re-Evaluation report) where a decline in the cladocera community in Moose Lake downstream of the LLCF was correlated with elevated TDS, hardness and some major ions.

Request:

DDEC should consider the 2006 Rescan report in re-evaluating the DAR assessment of increasing levels of TDS effects on cladocera growth in the Jay-impacted lake watershed.

Response:

Section 9.4.3.2.2 of the Developer's Assessment Report (DAR) draws an association between *Daphnia* productivity and high total dissolved solids (TDS) in lakes, as increased calcium concentrations may stimulate growth of *Daphnia* and result in a higher proportion of larger-sized zooplankton. The literature indicates that declines in *Daphnia* spp. growth and survival have been correlated with decreases in aqueous calcium levels (Ashforth and Yan 2008; Tan and Wang 2010; Shapiera et al. 2011; Shapiera et al. 2012) and decreases in water hardness (Jesus et al. 2014). The necessity of calcium concentrations above minimum thresholds to *Daphnia* development and survival have also been investigated (Cairns and Yan 2009), as well as the tendency of zooplankton communities to shift towards larger-bodied zooplankton (such as cladocerans) as a result of increased aqueous calcium concentrations (Tessier and Horwitz 1990). Additional information from the literature on the link between TDS and *Daphnia* species was also provided in the response to DAR-MVEIRB-IR-62.

The Aquatic Effects Monitoring Program (AEMP) Re-Evaluation report (Rescan 2006) was reviewed to re-evaluate statements made in the DAR related to the expected relationship between TDS and zooplankton size. The results of multivariate analyses (principal component analysis [PCA] and comparison of Bray-Curtis results with PCA output) in the AEMP Re-Evaluation report (Rescan 2006) indicate that cladoceran abundance was inversely related to the main principal component (PC1). The lower abundance of cladocerans was attributed by Rescan (2006) to higher water hardness, which was found to be significantly correlated along the PC1 axis. However, PC1 was also correlated with other parameters including sulphate, alkalinity, and three metals (antimony, barium, and nickel), which could also have contributed to differences in cladoceran composition.

In addition, the results of the exploratory PCA of water quality data presented by Rescan (2006) in Figures 3.1-1 to 3.1-4 indicate an arch pattern, which suggests the two main axes may not be independent of each other, potentially resulting in a distortion of the relationships inherent in the data. This arch pattern, known as the “horseshoe effect”, is a common mathematical distortion observed in PCA ordinations that can confound the interpretation of ordination results (Legendre and Gallagher 2001).

The more recent analysis in the 2013 Ekati Mine AEMP document (ERM Rescan [2014]), suggests that the decline of cladocerans in Moose and Nema Lakes was due to a reduction in densities of *Holopedium gibberum* whereas *Daphnia* sp. have been observed to increase in these lakes. The increases in *Daphnia* sp. have been small relative to the decline in *H. gibberum* resulting in an overall decline of cladocerans in lakes downstream of mine activities (ERM Rescan 2014). ERM Rescan (2014) attributed changes in zooplankton community composition to availability of nutrients, such as nitrogen and phosphorus.

The decrease in overall cladoceran composition observed in lakes downstream of mine activities does not appear to be linked specifically to increases in TDS in the more recent analysis by ERM Rescan (2014). In addition, the results from the literature suggest that the expected relationship between TDS and *Daphnia* as described in the DAR is valid.

References:

Ashforth D, Yan ND. 2008. The interactive effects of calcium concentration and temperature on the survival and reproduction of *Daphnia pulex* at high and low food concentrations. Limnol Oceanog, *53*(2), 420-432.

Cairns A, Yan N. 2009. A review of the influence of low ambient calcium concentrations on freshwater daphniids, gammarids, and crayfish. *Environmental Reviews*, *17*(NA), 67-79.

ERM Rescan (ERM Rescan Environmental Ltd.). 2014. *Ekati Diamond Mine: 2013 Aquatic Effects Monitoring Program Part 1 – Evaluation of Effects.* Prepared for Dominion Diamond Ekati Corporation by ERM Rescan: Yellowknife, NWT, Canada.

Jesus FT, Martins C, Nogueira AJ. 2014. Changes in life-history parameters of *Daphnia longispina* (Cladocera, Crustacea) as a function of water chemistry. J Limnol, *73*(2).

Legendre P, Gallagher ED. 2001. Ecologically meaningful transformations for ordination of species data. Oecologia. 129: 271-280.

Rescan (Rescan Environmental Ltd.). 2006. AEMP Re-evaluation and Proposed Program for 2007-2009. Prepared for Ekati Diamond Mine, Northwest Territories, BHP Billiton Diamonds, Inc.

Shapiera M, Jeziorski A, Yan ND, Smol JP. 2011. Calcium content of littoral Cladocera in three softwater lakes of the Canadian Shield. Hydrobiologia, 678(1): 77-83.

Shapiera M, Jeziorski A, Paterson AM, Smol JP. 2012. Cladoceran response to calcium decline and the subsequent inadvertent liming of a softwater Canadian lake. Water, Air, & Soil Pollution. 223(5): 2437-2446.

Tan QG, Wang WX. 2010. Interspecies differences in calcium content and requirement in four freshwater cladocerans explained by biokinetic parameters. Limnol Oceanog. 55(3): 1426-1434.

Tessier AJ, Horwitz RJ. 1990. Influence of water chemistry on size structure of zooplankton assemblages. Can J Fish Aquat Sci, 47(10): 1937-1943.

DOMINION DIAMOND

Information Request Number: DAR-IEMA-IR-10

Source: Independent Environmental Monitoring Agency: Kevin O'Reilly

Subject: Phytoplankton Trends

DAR Section(s): Annex XII

Preamble:

The DAR uses Diavik's Lac de Gras AEMP phytoplankton data only to 2011. Data from 2012 and 2013 were not yet available when the report was prepared. The Diavik AEMPs show (1) a declining trend in phytoplankton abundance and biomass in all areas of Lac de Gras from 2008 to 2011, and (2) the FF2 exposure site shows consistently higher phytoplankton abundance and biomass than all the far-field/reference sites, likely due to nutrient enrichment. DDEC should now include the 2012 and 2013 data to confirm whether that trend continues to persist in Lac de Gras. This is important information for the cumulative effects assessment given the suggestion that this phytoplankton trend indicates that "a regional factor beyond Mine-related effects was influencing the phytoplankton community".

Request:

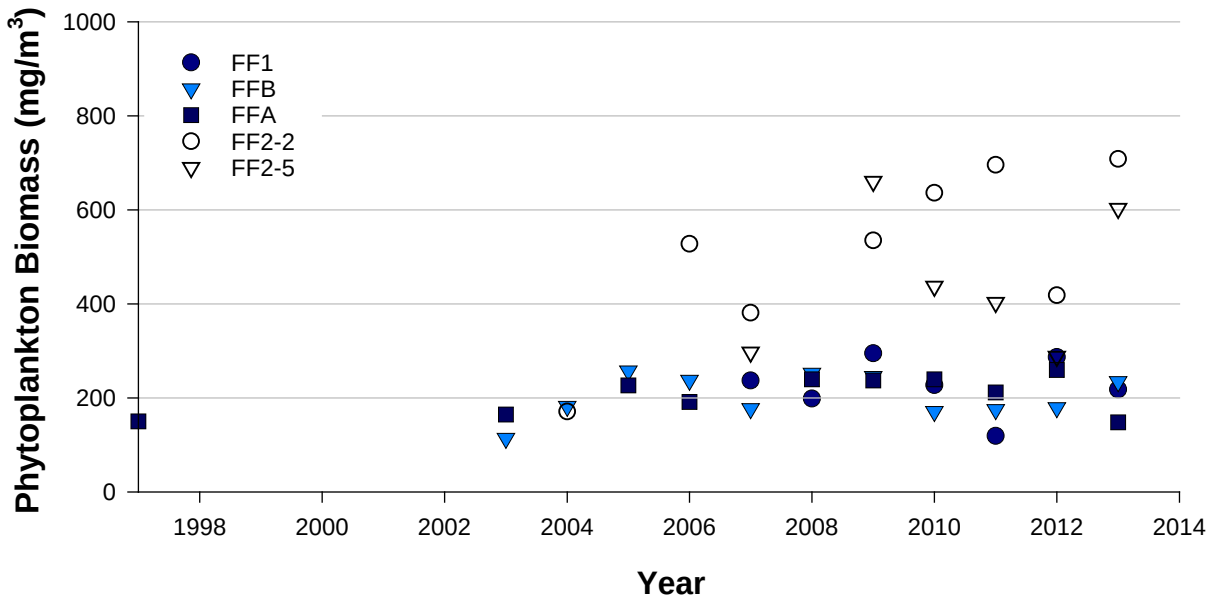
DDEC should incorporate the Diavik 2012 and 2013 AEMP phytoplankton results into its assessment of phytoplankton trends in Lac de Gras.

Response:

The phytoplankton biomass figure (Figure 2.3-26) presented in the Plankton Baseline (Annex XII) of the Developer's Assessment Report has been updated to include the Diavik Mine's Lac de Gras Aquatic Effects Monitoring Program phytoplankton data for 2012 and 2013. Figure 10-1 was reproduced from the Diavik Mine 3-year summary (2011 to 2013) report (Golder 2014), and modified to include all the reference areas (i.e., FF1, FFB, and FFA) along with the FF2 exposure area. Phytoplankton biomass at the two FF2 exposure stations that continue to be sampled by the Diavik Mine (i.e., FF2-2 and FF2-5) decreased in 2012, but increased again in 2013 (Figure 10-1). The FF2 exposure area continues to have higher phytoplankton biomass than the far-field/reference areas. The higher phytoplankton biomass in the FF2 exposure area compared to the far-field/reference areas is thought to be due to nutrient enrichment (Golder 2014). Phytoplankton abundance was not plotted, because biomass is considered to be the ecologically relevant variable, and the 2013 phytoplankton samples were analyzed by a different taxonomist, which reduces comparability of 2013 abundance results to previous years' data (Golder 2014).

Based on the additional data, there do not appear to be any consistent temporal trends in phytoplankton biomass in reference areas and FF2 areas. The apparent decreasing short-term trend noted from 2008 to 2011 does not appear to have persisted in these areas of Lac de Gras. The pattern of FF2 areas being consistently higher than other areas of Lac de Gras remains unchanged and is consistent with the interpretation in the Developer's Assessment Report, Section 9.2.4.3.

Figure 10-1 Total Phytoplankton Biomass in the Far-Field Areas in Lac de Gras, 1997 to 2013



Notes: Phytoplankton taxonomist was changed for the Diavik Mine 2013 Aquatic Effects Monitoring Program.
Source: Golder (2014).
mg/m^3 = milligrams per cubic metre.

Reference:

Golder (Golder Associates Ltd.) 2014. AEMP Version 3.0 (2011 to 2013) Summary Report for the Diavik Diamond Mine, NT. Prepared for Diavik Diamond Mines (2012) Inc. Yellowknife, NWT, Canada. October 2014.

DOMINION DIAMOND

Information Request Number:	DAR-IEMA-IR-11
Source:	Independent Environmental Monitoring Agency: Kevin O'Reilly
Subject:	Blasting Effects on Fish
DAR Section(s):	9.3.2.1.1

Preamble:

The DAR mentions a higher-than-normal blast at Diavik that created some fish egg mortality.

Request:

DDEC should explain (1) what the circumstances were that created this higher-than-normal blast, and (2) what measures will DDEC put in place to ensure this magnitude of blast does not occur at Jay.

Response:

The Developer's Assessment Report (DAR) for the Jay Project included a review of mitigation measures that will be implemented to reduce the effects of blasting in the Jay open pit on fish valued components (VCs) in Lac du Sauvage (DAR Section 9.3.2.1, pages 9-120 to 121). The DAR lists all applicable Fisheries and Oceans Canada (DFO) recommended measures to avoid causing harm to fish from the use of explosives (DFO 2014), all of which will be considered to protect fish. The potential effects of blasting with mitigation measures in place were also screened under the following pathway '*the use of explosives near fish-bearing water can cause injury or mortality to fish in Lac du Sauvage*' in Section 9.3.2.2.1 (pages 9-130 to 131).

As mentioned in Section 9.3.2.2.1 of the DAR, all blasting will occur in the isolated and dewatered area of Lac du Sauvage (i.e., in the Jay open pit and not in water). Additionally, blasting in the Jay open pit will be beyond the recommended DFO setback distances (Wright and Hopky 1998). The setback distances were developed to protect fish and their incubating eggs from maximum allowable limits for blasting-induced overpressure (100 kilopascals [kPa] in the swimbladder of a fish) and peak particle velocity (PPV; 13 millimetres/second [mm/s] in a spawning bed).

The DAR does not mention a higher-than-normal blast at the Diavik Mine that created some fish mortality. To clarify, the DAR refers to a scientific study performed by University of Alberta researchers that examined various effects of overpressure and PPV on eggs of Lake Trout (*Salvelinus namaycush*) positioned at varying distances from the Diavik Mine A154 pit (Faulkner et al. 2006). Eggs were placed in Plexiglass incubators at four sites; three sites were within 220 metres (m) of the A154 pit dike, in a zone where PPVs were predicted to exceed guidelines, and a reference site was located well away of the blast zone (2 kilometres [km] away from the pit). Six blasting events occurred during the early development period of the study (20 days), a period of greatest egg sensitivity to physical disturbance, and all blasts were below the PPV guideline of 13 mm/s at the exposure sites. A total of 96 blasting events occurred over the entire incubation period (September to July), of which, 20 blasts may have exceeded guidelines at the exposure sites during the study.

The University of Alberta study found that after a 20-day exposure period during early development, egg mortality was lower at two of three sites within 220 m of the A154 pit dike, than at the reference location (2 km away from the pit); mortality at the third site did not differ from the reference site (Faulkner et al. 2006). Analysis of eggs retrieved after ice-out (i.e., after the full incubation period) showed that only 10 percent of eggs from one site (one that used non-natural substrate from dike construction) had higher mortality than at the reference site, while mortality at the other two exposure sites did not differ from the reference level. The largest blast exposure (28.5 mm/s) throughout the incubation period was more than double the DFO guideline for PPV, and since it produced egg mortality levels similar to the reference location, Faulkner et al. (2006) concluded that current DFO guidelines provide ample protection. These findings were also supported by a similar study performed by the same researchers in a controlled laboratory setting (Faulkner et al. 2008).

There are currently procedures at the Ekati Mine for the storage and handling of explosives, as well as for blasting. All blasting will occur in the isolated and dewatered area of Lac du Sauvage, and blasting in the Jay open pit will be beyond the recommended DFO setback distances. If these recommended setback distances are approached, then site-specific operating mitigations could be implemented if necessary to protect fish. For example, if necessary, it may be possible to adjust blasting practices during the time of highest biological sensitivity (i.e., the window of early development for eggs of Lake Trout and Lake Whitefish). But even if a nearby spawning bed (which there are none) is exposed to a blast of approximately 28.5 mm/s, egg mortality would remain low given that several studies have demonstrated that eggs are resilient to effects from vibrations within this range (e.g., Faulkner et al. 2006, 2008). Effects to fish populations in Lac du Sauvage are not expected given that the closest known (suitable) spawning shoal for fish VCs is approximately 315 m from the edge of the proposed dike (shoal identified as S4 in DAR Map 9.4-2).

Thus, survival and reproduction rates of fish in nearby surface waters during Project operation will remain unchanged from blasting in the Jay open pit. In Lac du Sauvage, the effect of pressure changes and vibrations from blasting on fish is considered a no linkage pathway because all blasting and excavation will occur in the dewatered areas of the lake where no fish VCs will be present, and at a considerable distance from the fish-bearing portions of the lake outside of the dike. Consequently, the assessment of the pathway in the DAR remains valid. There is no linkage to Arctic Grayling, Lake Trout, and Lake Whitefish populations.

References:

DFO (Fisheries and Oceans Canada). 2014. Measures to avoid causing harm to fish and fish habitat. DFO, Winnipeg, Ontario. Website: http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html. Accessed July 21, 2014.

Faulkner SG, Tonn WM, Welz M, Schmitt DR. 2006. Effects of explosives on incubating lake trout eggs in the Canadian Arctic. N Am J Fish Manage. 26: 833-842.

Faulkner SG, Welz M, Tonn WM, Schmitt DR. 2008. Effects of simulated blasting on mortality of rainbow trout eggs. T Am Fish Soc. 137:1-12.

Wright DG, Hopky GE. 1998. Guidelines for the use of explosives in or near Canadian fisheries waters. Canadian technical report of fisheries and aquatic sciences 2107. DFO, Winnipeg, MB, Canada.

DOMINION DIAMOND

Information Request Number:	DAR-IEMA-IR-19
Source:	Independent Environmental Monitoring Agency: Kevin O'Reilly
Subject:	Cumulative Effects
DAR Section(s):	17.2.3

Preamble:

For Caribou, Grizzly Bear and Wolverine, the Lupin and Jericho mines are listed under future projects (column 3). If these mines are currently under care and maintenance, it would seem that they should also be listed under Base Case since they have open pits, roads and exposed tailings ponds.

Request:

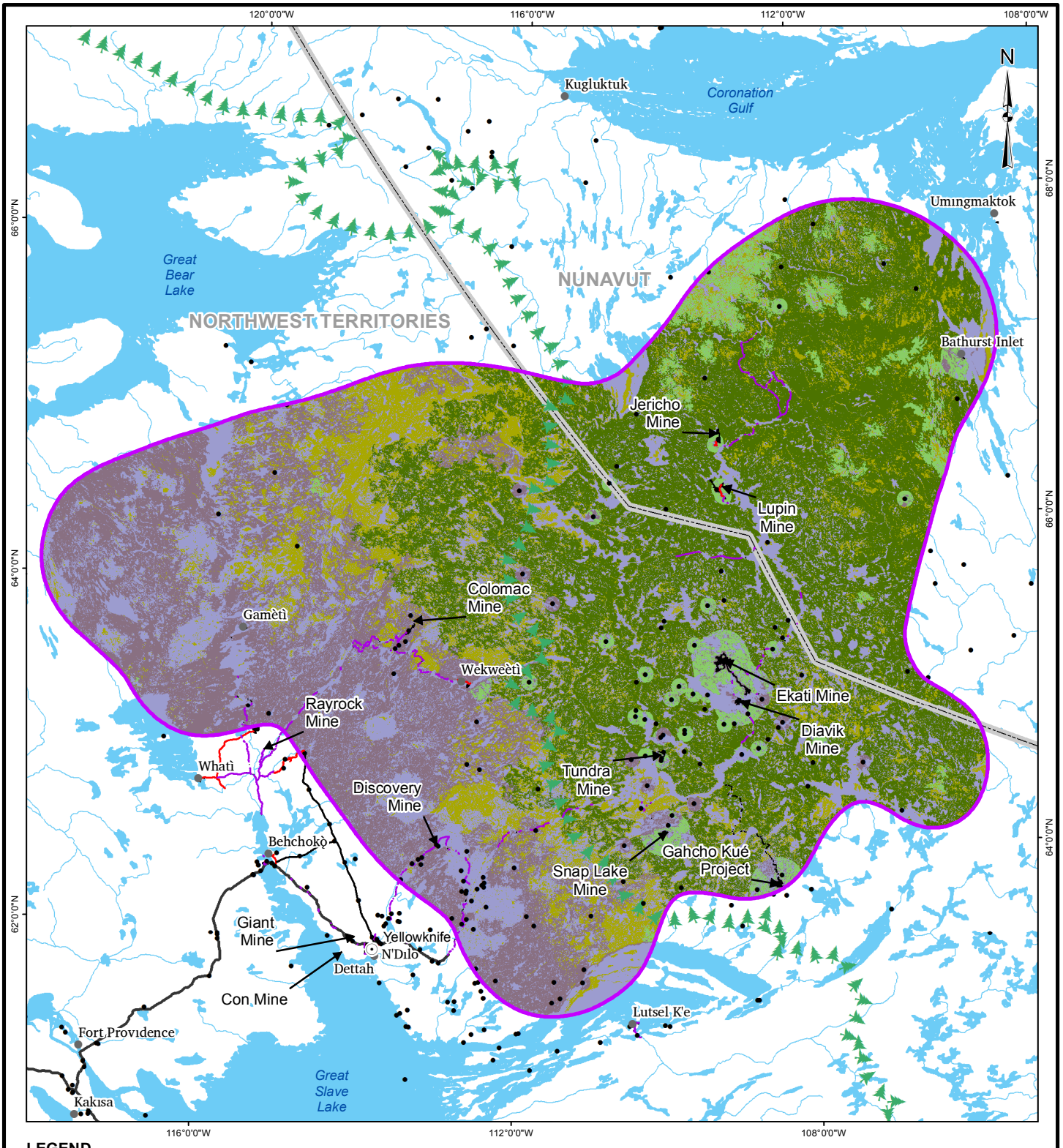
DDEC should assess cumulative effects incorporating the Lupin and Jericho mines within the Base Case.

Response:

For caribou, grizzly bear, and wolverine, the Lupin and Jericho mines were included in the Base Case with associated zones of influence in the Developer's Assessment Report (DAR). Examples from the DAR of 2014 Baseline Condition seasonal ranges for caribou (Map 13A-2), grizzly bear (Map 13C-19), and wolverine (Map 13C-11) are included in this response which show the inclusion of the Lupin and Jericho mines in the 2014 Baseline Condition, and in the cumulative effects analysis of these valued components (Attachment 19-1). Additional maps of 2014 Baseline Condition for each caribou, grizzly bear and wolverine seasonal range are presented in Appendices 12A and 13C of the DAR.

The Lupin and Jericho mines were also listed as reasonably foreseeable future developments to manage the uncertainty that these projects may become operational again during the life span of the Jay Project (i.e., Lupin and Jericho projects were carried through the Reasonably Foreseeable Development Case so that effects would not be underestimated).

ATTACHMENT 19-1



LEGEND

- TERRITORIAL CAPITAL
- POPULATED PLACE
- HIGHWAY
- ALL-SEASON ROAD
- PORTAGE
- TRANSMISSION LINE
- TERRITORIAL/PROVINCIAL BOUNDARY
- TREELINE
- WATERCOURSE
- WATERBODY
- DEVELOPMENT
- DEVELOPMENT
- CARIBOU EFFECTS STUDY AREA (SPRING RANGE)

HABITAT QUALITY

- HIGH
- GOOD
- LOW
- POOR
- NIL

75 0 75

SCALE 1:3,750,000 KILOMETRES

REFERENCE

WATER OBTAINED FROM ATLAS OF CANADA
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
PROJECTION: CANADA LAMBERT CONFORMAL CONIC

DOCUMENT

DEVELOPER'S ASSESSMENT REPORT

PROJECT

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

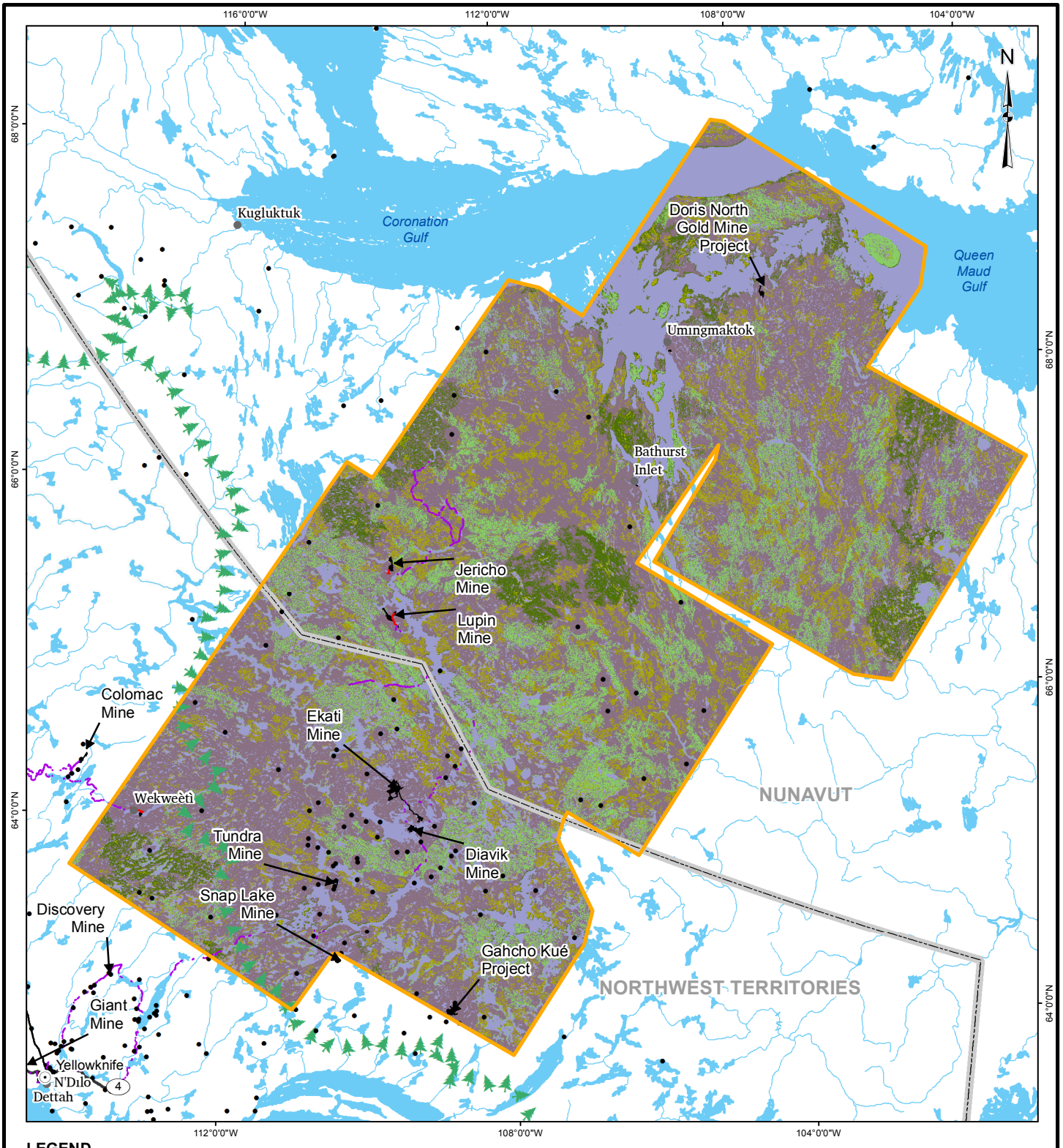
HABITAT QUALITY FOR CARIBOU IN THE SPRING RANGE: 2014 BASELINE CONDITION

Golder Associates

PROJECT	13-1328-0041		FILE No. DAR_Wild_071_GIS	
DESIGN	LD	15/07/14	SCALE AS SHOWN	REV. 0
GIS	ANK	01/10/14		
CHECK	JR	01/10/14		
REVIEW	LD	01/10/14		

MAP 12A-2

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0041 Jay & Lynx EA\Wildlife\DAR\DAR_Wild_071_GIS.mxd



LEGEND

- TERRITORIAL CAPITAL
- POPULATED PLACE
- HIGHWAY
- ALL-SEASON ROAD
- PORTAGE
- TRANSMISSION LINE
- TERRITORIAL/PROVINCIAL BOUNDARY
- TREELINE
- WATERCOURSE
- WATERBODY
- DEVELOPMENT
- DEVELOPMENT
- EFFECTS STUDY AREA

HABITAT SUITABILITY

- HIGH
- GOOD
- LOW
- POOR
- NIL

REFERENCE

WATER OBTAINED FROM ATLAS OF CANADA
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
PROJECTION: CANADA LAMBERT CONFORMAL CONIC

DOCUMENT

DEVELOPER'S ASSESSMENT REPORT

75 0 75
SCALE 1:3,750,000 KILOMETRES

PROJECT
DOMINION DIAMOND
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
HABITAT SUITABILITY FOR GRIZZLY BEAR IN THE SPRING: 2014 BASELINE CONDITION

Golder Associates

PROJECT		13-1328-0041	FILE No. DAR_Wild_043_GIS	
DESIGN	LD	15/07/14	SCALE AS SHOWN	REV. 0
GIS	ANK	01/10/14		
CHECK	LD	01/10/14		
REVIEW	LD	01/10/14		

MAP 13C-19

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0041 Jay & Lynx EA\Wildlife\DAR\DAR_Wild_043_GIS.mxd

LEGEND

- TERRITORIAL CAPITAL
- POPULATED PLACE
- HIGHWAY
- ALL-SEASON ROAD
- PORTAGE
- TRANSMISSION LINE
- TERRITORIAL/PROVINCIAL BOUNDARY
- TREELINE
- WATERCOURSE
- WATERBODY
- DEVELOPMENT
- DEVELOPMENT
- EFFECTS STUDY AREA

HABITAT SUITABILITY

- HIGH
- GOOD
- LOW
- POOR
- NIL

REFERENCE

WATER OBTAINED FROM ATLAS OF CANADA
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
PROJECTION: CANADA LAMBERT CONFORMAL CONIC

DOCUMENT

DEVELOPER'S ASSESSMENT REPORT

75 0 75
SCALE 1:3,750,000 KILOMETRES

PROJECT
DOMINION DIAMOND
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
HABITAT SUITABILITY FOR WOLVERINE IN THE SPRING TO AUTUMN: 2014 BASELINE CONDITION

Golder Associates

PROJECT		13-1328-0041	FILE No. DAR_Wild_035_GIS	
DESIGN	LD	15/07/14	SCALE AS SHOWN	REV. 0
GIS	ANK	07/10/14	MAP 13C-11	
CHECK	LD	07/10/14		
REVIEW	LD	07/10/14		

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DOMINION DIAMOND

Information Request Number: DAR-IEMA-IR-20

Source: Independent Environmental Monitoring Agency: Kevin O'Reilly

Subject: Cumulative Effects

DAR Section(s): 17.9.1

Preamble (IEMA):

For the predicted cumulative impacts on water birds, habitat loss and sensory disturbance are the impacts considered. However, based on past experience, this should be supplemented with direct mortalities from accidental by-catch during fish-out of the diked Jay area. In 2007, a red-throated loon was killed when tangled in gill nets in Kodiak Lake. It is not clear to what lessons have been learned from water bird mortalities from fish-outs and what mitigation measures may have developed to avoid similar occurrences.

Request (IEMA):

DDEC should document and discuss direct water bird mortalities from previous fish-outs, lessons learned and mitigation measures to prevent reoccurrences. Incidental mortalities during fish-outs should also be included in the cumulative effects assessment on water birds.

Response:

Incidental mortality of water birds during fish-outs at mine sites was assessed as a secondary pathway in the Developer's Assessment Report (DAR; Section 13.3.2.2.2, page 13-92) and acknowledged in the Conceptual Fish-Out Plan provided with the DAR (Appendix 9B). The pathway was predicted to result in a measurable minor change to the risk of mortality to diving birds from fish-outs, but would have a negligible residual effect on the populations relative to the Base Case and is not expected to contribute to effects of other existing, approved, or reasonably foreseeable projects to cause a significant effect (Section 13.3.1 of the DAR).

The fish-out within the diked area of Lac du Sauvage will require a *Fisheries Act* Authorization from Fisheries and Oceans Canada, which will be part of permit applications following the environmental assessment review. To avoid the incidental take of birds protected by the *Migratory Birds Convention Act* during the fish-out, Dominion Diamond will develop a diving bird mitigation strategy with Environment Canada, which will be included in the final fish-out plan. Lessons learned from fish-outs at Ekati, Diavik, and Gahcho Kué will be considered and incorporated into the development of the diving bird mitigation strategy.

DOMINION DIAMOND

Information Request Number: DAR-IEMA-IR-24

Source: Independent Environmental Monitoring Agency: Kevin O'Reilly

Subject: Caribou Aerial Survey Data

DAR Section(s): 12.2.2.1 and Annex VII

Preamble (IEMA):

Wildlife baseline report Table 1.5-1 (pg. 1-8) states Ekati conducted "aerial surveys to determine the abundance and distribution of caribou" from 1998 to 2009, but Section 2.1.1.1.1 (pg. 2-1) states "Caribou aerial surveys were completed at the Ekati Mine from 1998 to 2009 and 2012". The 2012 Ekati WEMP (Rescan 2013) does not mention aerial surveys. The wildlife baseline report does not provide or refer to data from 2012 (pg. 3-1), and the assessment report shows data only from 1998 to 2009 (Map 12.2-4). The most recent data available should be used in this assessment.

Request (IEMA):

DDEC should clarify whether aerial surveys to determine caribou abundance and distribution around the Ekati mine complex were carried out in 2012, and demonstrate how these data were considered in the caribou assessment.

Response:

Section 2.1.1.1.1 of the Wildlife Baseline Report (Annex VII of the Developer's Assessment Report [DAR]) correctly indicates that aerial surveys for caribou were conducted in 2012. The surveys, in the combined survey area (Map 2.1-1 of Annex VII) were completed by the Diavik Mine from July to October 2012 as reported in their 2012 Wildlife Monitoring Report (DDMI 2013).

As noted in the Preamble to this request, Table 1.5-1 of DAR Annex VII (Wildlife Baseline Report) is missing the 2012 survey year. Table 24-1 below is an updated version of DAR Annex VII Table 1.5-1. The years included for aerial surveys to determine the abundance and distribution of caribou now extends to 2012 under the list of studies conducted by Diavik.

In the Existing Environment Section of Section 12 of the DAR, Table 12.2-1 (page 12-8) indicates that surveys were carried out in the combined Ekati and Diavik study area in 2009 and 2012. The survey transects are shown in Map 12.2-1 (also Wildlife Baseline Report Map 2.1-1). The results of the 2009 surveys are shown in Map 12.2-4, but the results of the 2012 surveys are not included. Map 24-1 is an updated version of DAR Map 12.2-4; it includes the results of the 2012 aerial surveys.

The absence of the 2012 data from Map 12.2-4 did not affect the assessment of the Jay Project. The assessment of the effects of the Jay Project on barren-ground caribou was conducted over the extent of the barren-ground caribou effects study area, which was delineated from radio-collar and GPS (global positioning system) collar data from the Bathurst herd. Aerial survey data were not used directly in the residual effects analyses in the DAR and the absence of the 2012 aerial survey data does not affect the assessment methods, results, or conclusions.

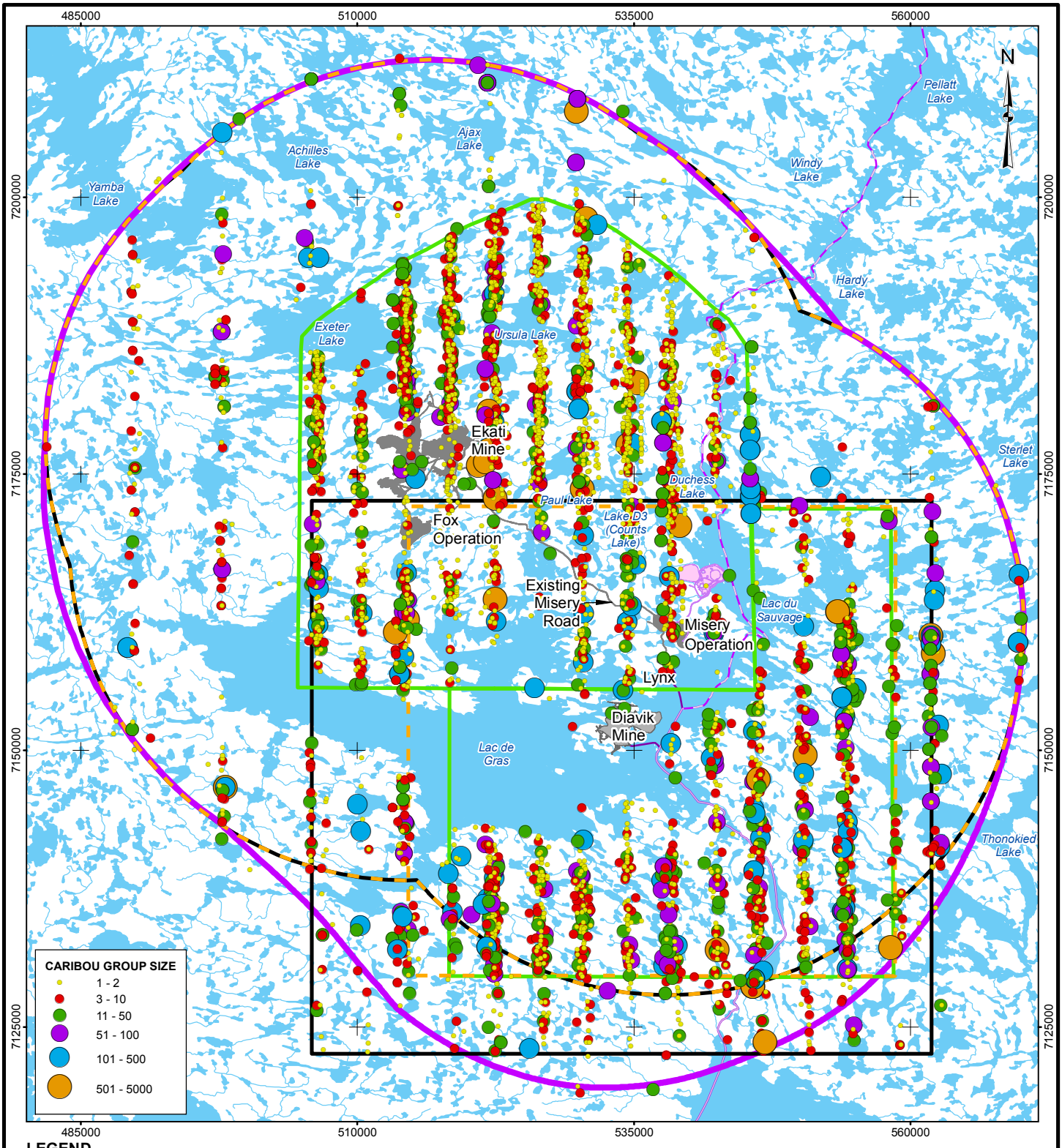
Table 24-1 Summary of Wildlife Monitoring, Surveys, and Studies Completed in the North Slave Region, 1995 to 2013

Originator	Description	Years
Ekati Mine	aerial surveys to determine the abundance and distribution of caribou	1998 to 2009
	caribou remote camera monitoring program	2011 to 2013
	monitoring of caribou behaviour near the mine	1998 to 2013
	monitoring of road permeability to caribou during the northern migration (snow track surveys)	2002 to 2010
	monitoring to: determine whether any caribou are injured by the presence and operation of the Long Lake Containment Facility (LLCF); determine the frequency with which caribou use the LLCF; and, determine group size, group composition, and dominant group behaviours of caribou observed within the LLCF	1999 to 2013
	DNA hair snagging surveys to estimate the abundance, density, and movement of wolverine	2005, 2006, 2010, and 2011
	ground-based surveys to determine the presence of grizzly bear sign within and adjacent to high-quality habitat	2000 to 2008
	DNA hair snagging surveys to estimate the abundance, density, and demographic parameters of grizzly bear	2010 and 2011
	regional DNA hair snagging surveys to estimate the abundance, density, and demographic parameters of grizzly bear	2012 and 2013
	pit wall nest monitoring	2004 to 2013
	North America Breeding Bird Survey	2003 to 2013
	incidental observations of wildlife	2001 to 2013
Diavik Mine	aerial surveys to determine the abundance and distribution of caribou	1995 to 2012
	monitoring of caribou behaviour near the mine	1998 to 2013
	pellet-group count surveys to document the relative use of common vegetation/land cover types by wildlife	1995 and 1996
	ground-based surveys to determine the presence of grizzly bear sign within and adjacent to high-quality habitat	2002 to 2008
	DNA hair snagging surveys to estimate the abundance, density, and demographic parameters of grizzly bear	2010 and 2011
	regional DNA hair snagging surveys to estimate the abundance, density, and demographic parameters of grizzly bear	2012 and 2013
	regional DNA hair snagging surveys to estimate the abundance, density, and demographic parameters of wolverine	2005, 2006, 2010, and 2011
	winter track count surveys to determine the relative use and distribution of wolverine	2003 to 2013
	pit wall/mine infrastructure inspections to determine whether bird nests are present in pit wall or mine infrastructure, identify bird species in these locations, determine location of nesting activity, identify egg- and chick-bearing nests, and determine whether deterrent actions are necessary	2004 to 2013
	ground-based surveys to document the presence of waterbird species	1996 to 2013
	monitoring of caribou behaviour near the mine	2002 to 2013
	ground-based surveys to document use of mine-altered waterbodies by waterfowl	2001 to 2013

Table 24-1 Summary of Wildlife Monitoring, Surveys, and Studies Completed in the North Slave Region, 1995 to 2013

Originator	Description	Years
Gahcho Kué Project	aerial surveys to determine the abundance, distribution, and habitat use of caribou	1999 to 2005
	habitat surveys to determine relative use of preferred habitat by grizzly bear	2005 and 2007
	winter track count surveys to determine the relative use and distribution of carnivores, ungulates, and furbearers that are active during the winter in the wildlife study area	2004 and 2005
	winter track count surveys to measure wolverine activity and distribution in the wildlife study area	2010 to 2012
	DNA hair snagging surveys to estimate the abundance, density, and demographic parameters of wolverine	2005, 2006, 2013
	hair snagging surveys to estimate the abundance of barren-ground grizzly bear	2010 and 2011
	regional DNA hair snagging surveys to estimate the abundance of barren-ground grizzly bear	2013
	breeding bird linear transect surveys to determine the relative abundance, distribution, and habitat use of upland breeding birds	2004 and 2005
	waterbird surveys to document species occurrence, relative abundance, and habitat use during the spring migration, breeding season, and fall migration	2004
	waterbird surveys to determine species occurrence and composition at Kennady Lake and a reference waterbody	2010 to 2013
	raptor nest surveys to document nest sites and breeding success	2004 and 2010
Snap Lake Mine	incidental observations of wildlife	1999 to 2013
	aerial surveys to determine the abundance and distribution of caribou	1999 to 2011
	ground-based surveys to detect changes in bear activity and distribution	2001 to 2009
	hair snagging surveys to estimate the abundance of barren-ground grizzly bear	2010 and 2011
	regional DNA hair snagging surveys to estimate the abundance of wolverine	2013
	winter track count surveys to measure wolverine activity and distribution	2003 to 2009, 2011, and 2012
	regional DNA hair snagging surveys to estimate the abundance, density, and demographic parameters of grizzly bear	2012 and 2013
	DNA hair snagging survey trials to estimate the abundance, density, and demographic parameters of wolverine	2013
	surveys to determine presence and distribution of wolf dens in the study area and determine whether active dens were productive	1995 to 2013
	aerial raptor nest surveys	1999 to 2010
Government of the Northwest Territories	surveys for muskoxen populations	1991, and 1998
	satellite-collar studies to document the seasonal movements of caribou herds	1996 to 2013
	DNA hair snagging surveys to estimate the abundance, density, and demographic parameters of wolverine	2005, 2006, 2010, 2011, and 2013
	Bathurst caribou population monitoring, including cow:calf ratios, composition counts, and calving ground census	Ongoing
	Surveys of known wolf den sites to estimate production	2000 to 2013

Note: Updated from Developer's Assessment Report, Annex VII: Wildlife Baseline Report for the Jay Project, Table 1.5-1.
This is not a comprehensive list of all monitoring studies.
DNA = Deoxyribonucleic acid.



LEGEND

- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- WATERCOURSE
- WATERBODY
- DIAVIK AND EKATI WILDLIFE STUDY AREAS, 1998 - 2005
- DIAVIK AND EKATI WILDLIFE STUDY AREAS, 2006
- DIAVIK AND EKATI WILDLIFE STUDY AREAS, 2007 - 2008
- DIAVIK AND EKATI WILDLIFE STUDY AREA, 2009, 2012

10 0 10

SCALE 1:500,000 KILOMETRES

REFERENCE

NATIONAL TOPOGRAPHIC BASE DATA (NTDB) 1:250,000
CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

IEMA-IR-24

PROJECT
DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

DISTRIBUTION AND SIZE OF CARIBOU GROUPS OBSERVED DURING POST-CALVING SEASON SURVEYS, 1998 TO 2012

Golder Associates

PROJECT		1419751	FILE No. POSTDAR_IR_Wild_026_GIS	
DESIGN	JR	16/03/15	SCALE AS SHOWN	REV. 0
GIS	AK/LS	18/03/15	MAP 24-1	
CHECK	JR	18/03/15		
REVIEW	JV	18/03/15		

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References:

DDMI (Diavik Diamond Mines Inc.). 2013. 2012 Wildlife Monitoring Program Report. Yellowknife, NWT, Canada. March 2013.

Information Request Number:	DAR-IEMA-IR-25
Source:	Independent Environmental Monitoring Agency: Kevin O'Reilly
Subject:	Conclusions from wildlife cameras on caribou deflection rates and implications to uncertainty and confidence in mitigation
DAR Section(s):	Annex VII

Preamble (IEMA):

Snow track surveys from 2002-11 indicate that caribou deflected from crossing the Misery Road ~57% of the time, suggesting the road was a partial barrier to caribou movement (Rescan 2012). The DAR refers to caribou deflection rates on roads within the Ekati mine complex in the 1-2% range based on data obtained from remote cameras (pg. 12-21, 12-96). The DAR justifies this large difference by stating the track counts couldn't differentiate caribou that chose a different location to cross the road (implying that the cameras could). Primary objectives of the caribou camera monitoring program do not list deflection rates (12.2.1.1.6, pg. 12-11), yet DDEC claims that the camera-recorded deflection rates are correct despite acknowledging that the effective range of the cameras is limited (pg. 12-96). The DAR claims that "the effective range of the cameras is likely limited to less than 500 m" (pg. 12-96), but given a far shorter trigger distance for the cameras, how the fate of an animal observed >30 m away would be discerned is not clarified. The trigger range of the cameras is ~25-30 m, and field of view (often down along the road) is not described or quantified. It appears that the cameras are recording presumed crossings of animals that are close enough to trigger a camera. The implication of accepting a 1-2% deflection rate on the road means that mitigation measures do not need to be as rigorous if higher deflection rates were assumed.

Request (IEMA):

DDEC should

a) justify that the cameras are recording actual deflection rates of caribou approaching the Misery Road at any distance,

b) provide details on the mitigation measures in place (and proposed) to enable caribou to freely cross the Misery Road at the traffic volumes suggested.

Response:

a) It is recognized by Dominion Diamond Ekati Corporation (Dominion Diamond) that the cameras recording caribou interaction along roads at the Ekati Mine do not reflect deflection rates that may be occurring at a broader spatial scale. However, the results from these cameras and from the snow trail surveys do indicate that these roads do not act as a complete barrier to caribou movements as was assumed in the Developer's Assessment Report (DAR). Implementation of traffic-related mitigation for the Misery and Jay roads is not dependent on the results from the camera monitoring. Please see the response to DAR-KIA-IR-07 for additional discussion of Dominion Diamond's use of the Camera Report.

b) The mitigations to be used for the Jay Project (Project) is identified in Table 12.3-1 of the DAR and includes mitigation practices and procedures already in place at the Ekati Mine. For review, mitigation associated with road vehicle traffic, which was identified in Table 12.3-1 includes:

- As the Project is an expansion of the Ekati Mine, existing surface facilities will be utilized (i.e. plant site, air strip, Misery Road, main Ekati camp) thereby reducing the area disturbed and new sensory disturbances relative to the Jay Project being a standalone operation;
- A single access road crosses the Lac du Sauvage esker;
- The Jay waste rock storage area is set back 200 metres (m) from the esker;
- Kimberlite stockpile areas have been designed in strategic locations that facilitate continued mine operations while allowing various types of temporary road closures to be implemented;
- The current, effective practices and mitigations for safety of wildlife on roads, the airstrip, and other areas of the Ekati Mine will be continued and expanded as necessary to include the Project. These practices include reporting of wildlife sightings by all employees, and control of encounters with wildlife by Environment staff;
- A minimum flying altitude of 600 m above ground level (except during takeoff and landing, and during field work) will be maintained for cargo, passenger aircraft, and helicopters outside of the Project site;
- Environmental training will be provided for personnel;
- The Wildlife Effects Monitoring Program (WEMP) implemented at the Ekati Mine will include the Project;
- Wildlife always have the right-of-way;
- Vehicles encountering wildlife on roads will communicate the presence of wildlife on the roads to the Environment Department and others in the area;
- Use of signage to alert drivers to the presence of caribou;
- Caribou crossings will be constructed along roads;
- Spatially and temporally staged monitoring of the Bathurst caribou herd will be used to track migratory movements via satellite radio collars and road surveys (i.e., provide advanced information on approaching caribou); and,
- Modified traffic patterns and road closures will be used as necessary to protect caribou and people.

The additional mitigation proposed for the Project includes using a combination of collared caribou locations and road surveys to provide advanced information on the location of caribou relative to the active roads. It is expected that collar locations detected in the Ekati Mine WEMP study area will trigger more frequent road surveys. This monitoring will help determine when and where additional mitigation, such as signage, modification of traffic patterns and road closures, is required. Advanced information on caribou locations will also be communicated to vehicle operators so they may be more vigilant and aware of the presence of caribou.

DOMINION DIAMOND

Information Request Number: DAR-IEMA-IR-30

Source: Independent Environmental Monitoring Agency: Kevin O'Reilly

Subject: Project Effects on Caribou

DAR Section(s): 12.5, Adequacy response DAR-MVEIRB-15

Preamble (IEMA):

b) The DAR does not appear to consider the implications of only Bathurst cows (not bulls) being collared on range use patterns and timing; c) The DAR does not appear to address the implications of the apparent extreme collapse in Bathurst herd numbers in 2014 (Boulanger et al. 2014b), and likely lower resilience to development impacts. This fact is mentioned in modelling provided in response to DAR-MVEIRB-15, but model parameter inputs (e.g., cow survival) do not reflect demography likely during the rapid decline since 2012 (but instead use parameters consistent with a stable herd from 2009 to 2012).

Request (IEMA):

DDEC should re-examine these sources of uncertainty and reconsider how they would affect the conclusions of the DAR with regard to predicted effects on caribou.

Response:

b) The Developer's Assessment Report (DAR) implicitly considers the implications of only female Bathurst herd caribou being collared for the spatial and temporal analysis of range use patterns. The assessment of the effects of the Jay Project is based on the best available data, which are limited to cows only. Overall changes in ungulate population sizes are generally accepted to depend upon combinations of adult female survival rates and calf recruitment rates (Gaillard et al. 1998). Both of these rates can be robustly assessed with female animals alone.

c) As noted in the preamble, population modelling was completed in response to Mackenzie Valley Environmental Review Board (MVEIRB) Jay Project Adequacy Review Item 8.8 and presented in the response to DAR-MVEIRB-15 (hereafter "modelling report"). The apparent continued decline of the Bathurst herd between 2012 and 2014 (Boulanger 2014b) would require demographic vital rates different from those used for the core population modelling presented in the modelling report, which was identified in the report (page 12).

Specifically, for the 2012 to 2014 period, calf:cow ratios were obtained from the Government of the Northwest Territories (GNWT) composition surveys completed in October 2012 (2012 birth year, 24 calves:100 cows) and spring 2014 (2013 birth year, 32 calves:100 cows). However, adult female survival rates from the same period are important in the interpretation of recruitment from calf:cow ratios as they affect the denominator in the ratio. For example, if adult female survival in an interval is 50 percent (%) and calf survival is 100%, then the denominator is half of what is was at the start of the interval and the calf:cow ratio doubles even though the number of calves does not change. Data to confidently estimate adult female survival for 2012 to 2014 are not available. The approach to estimating a set of vital rates for the Bathurst herd used in Boulanger et al. (2011, 2014a) has not

been applied to account for the apparent 2012 to 2014 decline. The vital rates provided following the 2012 calving ground photographic survey (Boulanger et al. 2011, 2014a) are the most recent vital rates that have been calculated for the Bathurst herd that reconcile all available sources of information (Adamczewski 2015). The information required for the determination of vital rates (Boulanger et al. 2014a) requires information not gathered in the 2014 reconnaissance survey.

In the absence of empirical vital rates for the Bathurst herd for the 2012 to 2014 period, the modelling report (page 12) identified that adult survival rates between 51% and 62% were consistent with the 2014 Bathurst herd reconnaissance survey population estimate. Regardless of the specific vital rates that would fit the observed population data, the end result would be the same: an annual decline of 48% over a two-year period.

The absence of information from adult male caribou was implicitly considered in the determination of significance in the DAR and is not considered to be a source of uncertainty that reduces confidence in the impact predictions and determination of significance. As noted in the modelling report (pages 12-13), the current low population of the Bathurst herd should allow more selective use of habitat. As there is no strong mechanism by which development reduces adult female survival, the negative trend in population growth associated with the current estimates of vital rates is predicted to be similar with and without the development-related cumulative changes in habitat quantity and quality, and caribou behaviour and energetics. Consequently, the use of a lower annual adult female survival rate (e.g., consistent with a decline as indicated by results of the 2014 reconnaissance survey) will not change the conclusions regarding the classification of impacts and determination of significance on caribou.

References:

Adamczewski J., 2015. Wildlife Biologist, Ungulates – Environment & Natural Resources, Wildlife Division, Government of the Northwest Territories. Phone call with J. Rettie, Golder Associates. March 2, 2015.

Boulanger J, Croft B, Adamczewski J. 2014a. An Estimate of Breeding Females and Analyses of Demographics For The Bathurst Herd of Barren-ground Caribou: 2012 Calving Ground Photographic Survey. Integrated Ecological Research Unpublished File Report No. 142 for Environment and Natural Resources, GNWT. 81 pp.

Boulanger J, Croft B, Cluff D. 2014b. Trends in size of the Bathurst caribou herd from the 2014 calving ground reconnaissance survey. Integrated Ecological Research. July 31, 2014.

Boulanger J, Gunn A, Adamczewski J, Croft B. 2011. A Data-Driven Demographic Model to Explore the Decline of the Bathurst Caribou Herd. J Wildlife Manage 75: 883-896.

Gaillard JM, Festa-Bianchet M, Yuccoz N. 1998 Population dynamics of large herbivores: variable recruitment with constant adult survival. Trends Ecol Evol 13:58-63.

DOMINION DIAMOND

Information Request Number:	DAR-IEMA-IR-31 and DAR-IEMA-IR-32
Source:	Independent Environmental Monitoring Agency: Kevin O'Reilly
Subject:	Project Effects on Wolves
DAR Section(s):	13.1.4.4 and 13.2.1.1.4

Preamble (IEMA):

The wolf assessment focusses on denning, but the wolf effects study area (ESA) is only 3% of the size of the wolverine and grizzly bear ESA (pg. 13-9 to 13-11). Wolf movements are often long-distance from den sites. Wolf populations are affected by and tied closely to caribou, and any impacts of development on caribou would impact wolves. A study area that considers wolf denning in the larger context of treeline (Heard and Williams 1992) and long distance movements during denning would be more appropriate. The Review of Regional Effects Monitoring and Research for wolves (13.2.1.1.4) ignored several regional papers (Heard and Williams 1992, Walton et al. 2001, Mattson et al. 2009, Dean Cluff and current student's larger study areas).

Request (IEMA):

DDEC should a) redefine the wolf ESA to consider an area that encompasses wolf movements during the denning period, or justify why the ESA selected is adequate to assess potential impacts on wolves, and b) update the literature review and discussions of wolf denning success and pup productivity (all declining in recent years), and provide this context for the evaluation of development impacts on wolves.

Response:

The request in DAR-IEMA-IR-31 is incomplete and appears to be the same as the request in DAR-IEMA-IR-32. It is assumed that the response provided here also applies to DAR-IEMA-IR-31.

Several sources of information were considered when selecting the Effects Study Area (ESA) for wolf. Caribou are the primary prey of barren-ground wolf, as noted in the preamble, and the annual distribution of barren-ground wolf are associated with movements of barren-ground caribou (Hansen et al. 2013). Wolf populations are believed to be most sensitive to development disturbance during the denning stage of their annual life cycle (Thiel et al. 1998; Theuerkauf et al. 2003). Barren-ground wolf prefer esker as denning habitat (Cluff et al. 2000; McLoughlin et al. 2004), which represents a small proportion of different habitat types available in the North Slave region. The ESA used in the Developer's Assessment Report (DAR) incudes 23 wolf dens monitored for occupancy and productivity from 1995 to 2013, which occur within the central band of eskers in the North Slave region where wolf dens have been historically abundant (Heard and Williams 1992; Cluff et al. 2000). The ESA used in the DAR also includes a high proportion of previous and active developments relative to the Jay Project and non-disturbed area, which represents an ecologically relevant scale for assessing the cumulative direct and indirect effects to the reproductive portion of the wolf population. Use of a larger ESA would reduce the amount of direct and indirect changes to wolf habitat resulting from development disturbance relative to undisturbed habitats. The ESA used in the DAR is appropriate to assess potential impacts on wolves.

The lines of evidence supporting the assessment of impacts to wolf are provided in Sections 13.2.2.2.1 and 13.2.2.2.2 and include reference to Walton et al. (2001) along with recent publications (e.g., Nesbitt and Adamczweski 2013; Cluff and Klaczek 2014). Patterns of wolf den productivity are discussed in Section 13.2.2.4.1 in the context of including possible explanations for the apparent decline in productivity related to wolf denning ecology (Frame et al. 2007) and relationships to the Bathurst caribou herd (Nesbitt and Adamczweski 2013; Cluff and Klaczek 2014). In 2009, at a Wildlife Monitoring Workshop hosted by the Government of the Northwest Territories and attended by regulators, community organizations, mine agencies (including the Independent Environmental Monitoring Agency), and mining companies, it was agreed that the mines are successful at mitigating conflicts with wolves and are not causing any measurable degradation to wolf den habitat or productivity (Marshall 2009).

References:

Cluff D, Walton L, Paquet P. 2000. Northwest Territories wolf notes: A newsletter on wolf studies in the central Arctic, NWT Canada. Issue number 5. Prepared by the Department of Resources, Wildlife and Economic Development, GNWT, Canada.

Cluff D, Klaczek M. 2014. NWT Wolf Project 2013. Yellowknife, NWT, Canada. 20 pp.

Frame PF, Cluff DF, David SH. 2007. Response of wolves to experimental disturbance homesites. J Wild Manage 71:316–320.

Hansen IJ, Johnson CJ, Cluff HD. 2013. Synchronicity of movement paths of barren-ground caribou and tundra wolves. Polar Biol DOI:10.1007/s0030-013-1356-y. 9pp.

Heard DC, Williams TM. 1992. Distribution of wolf dens on migratory caribou ranges in the Northwest Territories, Canada. Can J Zool 70:1504-1510.

Marshall R. 2009. Diamond Mine Wildlife Monitoring Workshop Report. Prepared for Environment and Natural Resources. Yellowknife, NWT, Canada.

McLoughlin PD, Walton LR, Cluff HD, Paquet PC, Ramsay MA. 2004. Hierarchical habitat selection by tundra wolves. J Mammal 85:576-580.

Nesbitt L, Adamczewski J. 2013. Decline and Recovery of the Bathurst Caribou Herd: Workshops Held in Yellowknife, NWT October 1 and 2, and 5 and 6, 2009. Manuscript Report No. 238. 66 pp.

Theuerkauf J, Rouys S, Jedrzejewski W. 2003. Selection of den, rendezvous, and resting sites by wolves in the Bialowieza Forest, Poland. Can J Zool 81: 163-167.

Thiel RP, Merrill S, Mech LD. 1998. Tolerance by denning wolves, Canis lupus, to human disturbance. Can Field-Natur 122: 340-342.

Walton LR, Cluff HD, Paquet PC, Ramsay MA. 2001. Movement patterns of barren-ground wolves in the central Canadian Arctic. J Mammal 82: 867-876.

DOMINION DIAMOND

Information Request Number: DAR-IEMA-IR-33

Source: Independent Environmental Monitoring Agency: Kevin O'Reilly

Subject: Project Effects on Raptors

DAR Section(s): 13.2.1.2.2

Preamble (IEMA):

The DAR states under baseline surveys that "An aerial survey was completed on July 24 and 25, 2013, of 36 potential nest sites located in highly suitable habitat (high elevation and steep terrain) to determine the presence of raptors" (pg. 13-38). Late July does not capture nest site occupancy (misses nest sites occupied earlier in the nesting period and abandoned and thus gives a misleading indication of occupancy; and gyrfalcons would have likely fledged by this period). The raptor distribution and abundance section (13.2.2.3, pg. 13-41 to 42) does not provide any data from 2013.

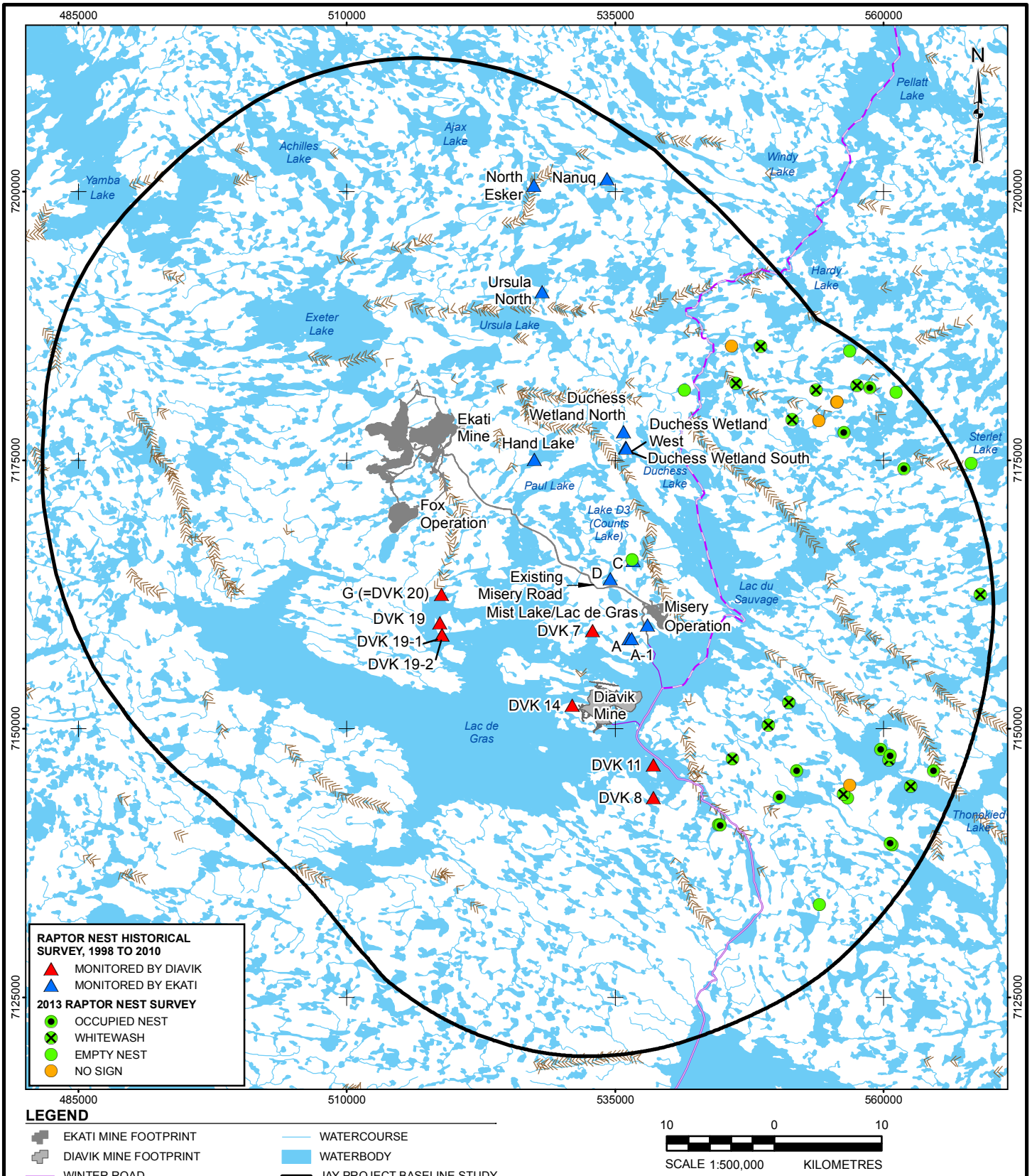
Request (IEMA):

DDEC should provide the results of the 2013 raptor survey data, justify why these data represent a rigorous assessment of the raptors nesting within the study area, and demonstrate how the 2013 data were incorporated into the Project and cumulative assessment.

Response:

The section referenced in the preamble provides the description of the Existing Environment for raptors (falcons, hawks, eagles, and owls) in the Developer's Assessment Report (Section 13.2.2.3). The methods and results of the analysis of primary pathways on the abundance and distribution of raptors are in Sections 13.4.2 and 13.4.3. The survey completed in 2013 was to determine the presence of previously unidentified nests in the area surrounding the Jay Project that may be directly affected. The survey was focused on highly suitable nest habitat (high elevation, steep slopes adjacent to deep water) as indicated by the scientific literature (Poole and Bromley 1988; Wightman and Fuller 2005; Coulton et al. 2013). A total of 31 of 36 locations visited indicated evidence of use by raptors, such as, the presence of an empty stick nest (n=7), an active nest (n=12), or perches with whitewash (n=12) in the targeted search areas (Map 33-1). The nest sites will become part of the regional falcon nest database that will be monitored during the Canadian Peregrine Falcon Survey (CPFS), next to occur in 2015. During the CPFS, species using these sites will be determined. Annual surveys for raptor nest occupancy and productivity are no longer required as part the effects monitoring programs for diamond mines (Handley 2010).

The incremental and cumulative direct and indirect effects to the abundance and distribution of raptors were quantified and assessed using a habitat suitability index (HSI) model described in Section 13.4.2. This model followed the approach of peer-reviewed research on the cumulative effects to the use and success of nests monitored from 1998 to 2010 by the Ekati and Diavik diamond mines and in the Effects Study Area for raptors (Coulton et al. 2013). As described in Section 13.4.3.1.1, the HSI scores of nest sites monitored historically from 1998 to 2010 and newly detected in 2013 (stick and active nests) were used to qualify the distribution of high, good, low, and poor HSI categories used in the assessment.



LEGEND

- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ESKER
- WATERCOURSE
- WATERBODY
- JAY PROJECT BASELINE STUDY AREA

10 0 10

SCALE 1:500,000 KILOMETRES

REFERENCE

NATIONAL TOPOGRAPHIC BASE DATA (NTDB) 1:250,000
CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

IEMA IR 33

PROJECT
DOMINION DIAMOND
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

RAPTOR NEST SITES, 1998 TO 2013

Golder Associates

PROJECT		1419751	FILE No. POSTDAR_IR_Wild_010_GIS	
DESIGN	DC	24/02/15	SCALE AS SHOWN	REV. 0
GIS	ANK	26/02/15	MAP 33-1	
CHECK	DC	26/02/15		
REVIEW	DP	26/02/15		

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0041 Jay & Lynx EA\Wildlife\POST-DAR IRs\POSTDAR_IR_Wild_010_GIS.mxd

References:

Coulton DW, Virgl JA, English C. 2013. Falcon nest occupancy and hatch success near two diamond mines in the southern Arctic, Northwest Territories. Avian Conserv Ecol 8: 14. http://dx.doi.org/10.5751/ACE-00621-080214.

Handley J. 2010. Diamond Mine Wildlife Monitoring Workshop Report. Prepared for Environment and Natural Resources. Yellowknife, NWT, Canada.

Poole KG, Bromley RG. 1988. Interrelationships within a raptor guild in the central Canadian Arctic. Can J Zool 66: 2275-228.

Wightman CS, Fuller MR. 2005. Spacing and physical selection patterns of peregrine falcons in Central West Greenland. Wilson Bull 117:226-236.

DOMINION DIAMOND

Information Request Number: DAR-IEMA-IR-35

Source: Independent Environmental Monitoring Agency: Kevin O'Reilly

Subject: Winter Road Operating Season

DAR Section(s): 16.3

Preamble (IEMA):

The dataset used to generate Figure 16.3-2 and resultant conclusions is based on the period 1994-2006. As the data is used to determine future effects and related mitigation, the latest data should be used to confirm or amend projections.

Request (IEMA):

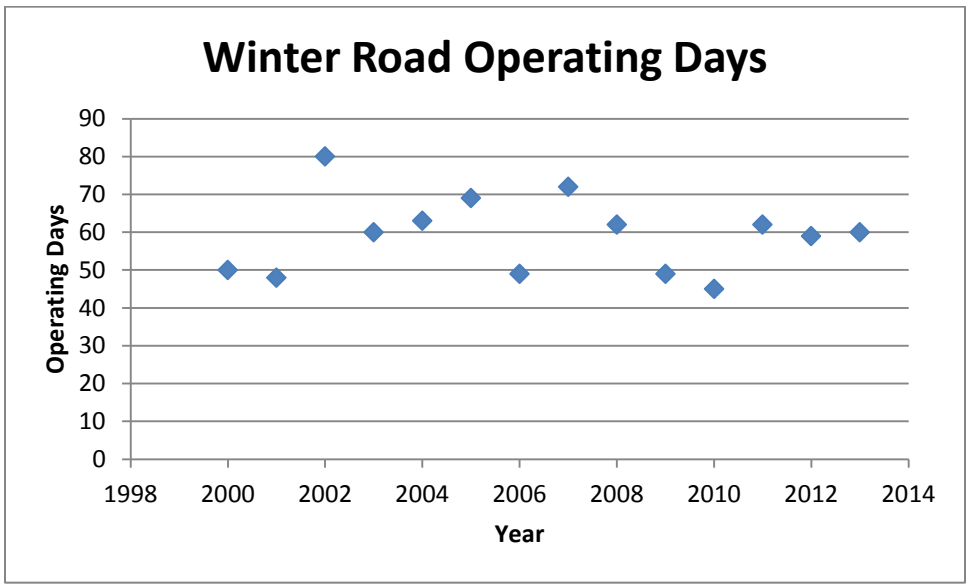
DDEC should provide the latest data and confirm or amend the conclusions drawn from the dataset.

Response:

As described in Section 16.3 of the Developer's Assessment Report (DAR), a study was conducted by EBA Engineering Consultants Ltd. (EBA 2007) to examine the risks from climate warming on future operations of the Tibbitt to Contwoyto Winter Road by developing a correlation between length of operating season and the cumulative air freezing index for the season (McGregor et al. 2008). Figure 16.3-1 and Figure 16.3-2 presented in Section 16.3 of the DAR are sourced from the McGregor et.al. (2008) report, and therefore, only present information up until 2006. The report found that the combination of winter freezing index and snow cover controls the rate of natural ice growth and the ability of the ice sheet to sustain loads late in the season.

However, conclusions presented in Section 16.3 of the DAR have also included the analysis of annual air temperature data from 1959 to 2013 which indicated a positive statistically significant trend (Section 10.3.1 of the DAR). Annual air temperatures have increased at an estimated rate of 0.05 degrees Celsius per year. The data indicates that the current operational winter road season consists of approximately 65 days. Figure 35-1 graphically shows the number of days the winter road has operated between 2000 and 2013. However, projected changes to the winter freezing index suggests that the operational days may decrease approximately to 54 days by 2020 or beyond. As such, the conclusions within Section 16.3 of the DAR remain appropriate.

Figure 35-1 Winter Road Operating Days (2000 – 2013)



References:

EBA (EBA Engineering Consultants Ltd.). 2007. An Overview of Strategic Transportation Options to Supplement the Tibbitt to Contwoyto Winter Road. Submitted to Tibbitt to Contwoyto Winter Road Joint Venture.

McGregor RV, Hassan M, and Hayley D. 2008. Climate Change Impacts and Adaptations: Case Studies of Roads in Northern Canada. EBA Engineering Consultants Inc. Paper prepared for presentation at the “Climate Change and the Design and Management of Sustainable Transportation” Session of the 2008 Annual Conference of the Transportation Association of Canada, Toronto, ON, Canada.

DOMINION DIAMOND

Information Request Number: DAR-IEMA-IR-48

Source: Independent Environmental Monitoring Agency: Kevin O'Reilly

Subject: Fish Habitat Enhancement

DAR Section(s): Appendix 3B

Preamble (IEMA):

There is no discussion of fish habitat enhancements in the Sub-Basin B Diversion Channel. Significant efforts and lessons learned from fish habitat enhancements at Ekati in the Panda Diversion Channel and Pigeon Stream Diversion should be used in the Jay Project.

Request (IEMA):

DDEC should describe what fish habitat enhancements it intends to apply to the Sub-Basin B Diversion Channel based on the experience from the Ekati Panda Diversion Channel and Pigeon Stream Diversion.

Response:

The proposed Sub-Basin B Diversion Channel will be designed to convey water during operations from two fish-bearing streams (Stream B0 and Stream Ac35) that would otherwise enter the dewatered area, and also to facilitate passage of fish from Lac du Sauvage to upstream locations. The design features will reduce indirect effects from the isolation of the dewatered area, and direct effects from stream diversions on available habitat for Arctic Grayling. Any temporary losses associated with the diversion of waters from Stream Ac35 and Stream B0 below the diversion channel location are considered in the Conceptual Offsetting Plan (see Appendix 9A of the Developer's Assessment Report), and will be considered in the Final Offsetting Plan to be submitted to Fisheries and Oceans Canada (DFO) during the regulatory phase of the Project. Specific habitat enhancements used at the Ekati Panda Diversion Channel do not apply for the Sub-Basin B Diversion Channel because the goals of the Panda Diversion Channel were set for a permanent channel design as part of a habitat compensation agreement for an authorization from DFO under the Fisheries Act for the Ekati Mine (Fisheries Authorization SCA96021). The Ekati Mine Pigeon Stream Diversion was similarly designed to be a permanent channel providing permanent fish habitat as a compensation requirement of the *Fisheries Act* Authorization (SC99037).

Dominion Diamond Ekati Corporation is confident that the proposed channel design is appropriate for a temporary channel that will be reclaimed at closure when the dike is breached, allowing the natural channels to be reconnected to Lac du Sauvage. Fisheries aspects of the channel will be the subject of detailed discussion with DFO and communities as part of the regulatory permitting of the Jay Project for an Authorization under the *Fisheries Act*.

DOMINION DIAMOND

Information Request Number:	DAR-IEMA-IR-51
Source:	Independent Environmental Monitoring Agency: Kevin O'Reilly
Subject:	Reclamation Schedule
DAR Section(s):	Appendix 3B

Preamble (IEMA):

A more detailed schedule that includes actual year of work would be helpful in understanding how progressive reclamation will be carried out across the Ekati Mine. DDEC provides a reclamation schedule for the Jay Project that contains very few details, unlike the schedule that appears in the approved ICRP as Figure 8.5-1.

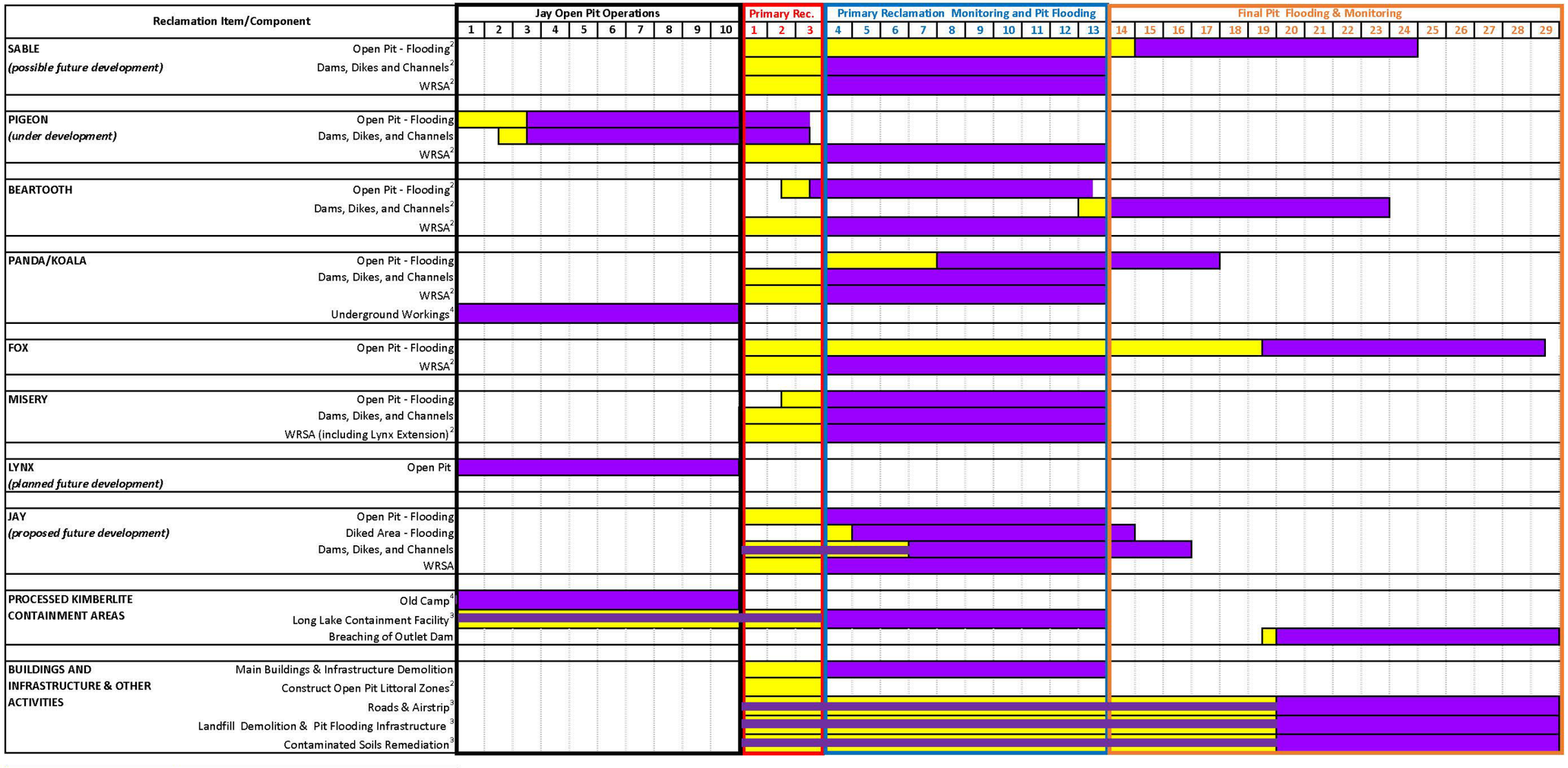
Request (IEMA):

DDEC should provide a reclamation schedule for the Jay Project that shows the same level of detail and integration with the ICRP Reclamation Schedule (Figure 8.5-1).

Response:

A schedule addressing the request above is included as Figure 51-1.

Figure 51-1 Jay Project – Conceptual Reclamation Schedule



Notes:
1. This conceptual schedule illustrates a likely approach to closure and reclamation in the context of an approved Jay Project consistent with the level of planning and design in the Jay Project DAR.
2. This item may be a candidate for progressive reclamation during operation of the Jay Project depending on circumstances.
3. This item is conducted intermittently as areas or materials become available for reclamation.
4. This item would be completed prior to Jay Project operations.

DOMINION DIAMOND

Information Request Number:	DAR-KIA-IR-06
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Baseline study area appears too small to capture the potential ZOI on caribou to the east of the project
DAR Section(s):	Annex VII (Map 1.4-1)

Preamble (KIA):

The wildlife baseline study area shown on this map does not appear to extend far enough to the east of the Jay Pipe project location to capture the 11- 14 km zone of influence of the project on caribou that occurred around the Ekati project (Boulanger et al. 2012). It appears that the study area boundary extends to approximately 10 km to the east of the Jay Pipe project, and it appears to be the same study area as used for the farther west Ekati project.

Request (KIA):

Please include rationale for the distance chosen for the baseline study area, particularly to the east of the proposed project.

Response:

As described in Section 1.4 of the Wildlife Baseline Report (Annex VII of the Developer's Assessment Report [DAR]), the wildlife baseline study area (BSA), equivalent to the Ekati 2006 caribou aerial survey study area (Map 1.4-1; Annex VII), was selected to be an appropriate spatial boundary for quantifying baseline conditions on wildlife species with wide distributions. The BSA was selected to capture the zone of influence from the Jay Project (Project), the Ekati and Diavik mines, and reference areas (i.e., areas outside the zone of influence where caribou behaviour and probability of occurrence are not influenced by the Project or the Ekati and Diavik mines).

Monitoring associated with the Ekati and Diavik mines on a variety of wildlife species, including all wildlife Valued Components, has been collected throughout the BSA from 1995 to 2013 (Annex VII, Table 1.5-1). This study area also contributed baseline information on barren-ground caribou including the aerial survey data used by Boulanger et al. (2012). Additional baseline surveys at the Project site and in the surrounding area were completed in 2013 and 2014 (Annex VII of the DAR). The wildlife and caribou information collected in this area represents the best available information on the baseline condition before development of the Project, and therefore, is appropriate for the assessment of potential effects on wildlife from the Jay Project.

The smallest distance between the proposed Jay Project footprint and the BSA boundary (Map 1.4-1), including to the eastern extent, is 24.1 km and larger than the zone of influence estimated by Boulanger et al. (2012). A larger Effects Study Area, including the seasonal ranges of Bathurst caribou, was used to assess the incremental and cumulative effects to barren-ground caribou in the DAR (see Map 12.1-3).

References:

Boulanger J, Poole KG, Gunn A, Wierzchowski J. 2012. Estimating the Zone of Influence of Industrial Developments on Wildlife: a Migratory Caribou *Rangifer tarandus groenlandicus* and Diamond Mine Case Study. Wildlife Biol 18: 164-179.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-07
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Problematic interpretation of former study by Rescan of road crossing by caribou.
DAR Section(s):	Annex VII (Sections 2, 3, and 12)

Preamble (KIA):

Section 2.1.1.1.6 outlines the goals of previous camera-based monitoring of caribou at Ekati by Rescan (2014b) and notes the 6 main goals aimed at determining how caribou respond to road structures. Section 3.1.2, referencing the same camera-based study, states that "in most cases, deterrence of caribou from roads could not be linked to a specific trigger such as a vehicle" Later, in Section 12.2.2.2, in the last sentence of paragraph 1, the same study is summarized as "the key factor affecting crossings appears to be berm height and not traffic volume or maximum road height (ERM Rescan 2014)". While berm height is likely a factor, we have concerns that the impacts of traffic cannot be determined by this study and that these data are being misinterpreted. We have several issues with the way in which the results of this study by Rescan (2014b) have been interpreted. First, the study design needs to be considered. Monitoring of roads associated with Ekati by Rescan was done by setting up motion-triggered cameras at set intervals along roads to see how caribou reacted to those roads (Rescan 2014b). The goal of correlating traffic frequency at various distances to caribou with their behaviours near or on the road was not a goal of the study. To adequately address the question of whether road traffic impacted caribou crossing and road use, photos from all cameras along the road, even at great distances from a reacting caribou, would need to be checked for the presence of a vehicle with a time stamp similar to, or just prior to, a caribou being captured on camera exhibiting a response like running along the road, off the road, or turning from the road. It is our understanding that this exercise of checking for and correlating vehicular presence at distances far up and down the road from caribou behavioural events captured was not done in the study, and only vehicles captured in the same frame as the caribou were noted. If caribou respond to traffic, they are likely responding to vehicles farther up the road, when noise and vibrations are first detected by the animal, which would require an analysis of vehicles captured on at greater distances on other cameras, by correlating time stamped vehicles with caribou responses. Further, if impacts of traffic on caribou occurred, it would not only cause deflections from the road, as in the 2% of caribou deterred from crossing, but could also cause caribou to run from the road, along the road, or off the road in response to distant traffic approaching. Other caribou that were greatly deterred by road traffic would simply not approach the road, which would not be captured in the study cited.

Request (KIA):

Please review the study in full and revise references and verbage regarding interpretations of the effect of vehicles on caribou behaviour at roads. While we feel that traffic was not analysed in a way that can be connected with any of these behaviours in the Rescan study, please comment on the prevalence of behaviours in the Rescan study that imply a startle response (possibly to traffic), such as running along the road, or off the road, in addition to the 2% of caribou that deflected from the road if this reference is retained. Please discuss results from other studies that have explored the impacts of roads, and traffic, on caribou to contextualize these results. Please consider collecting additional information along Misery road on the impacts of vehicles on caribou behaviours at roads (e.g., running, deterrence), along with information about the distance at which caribou respond to vehicles of various sizes. We suspect that

caribou have stronger behavioural responses to vehicles than to tundra road verges, and implementing an additional road monitoring program, or sorting the existing data in another way that can answer this question properly would be necessary prior to concluding that, as the proponent does in Section 12.2.2.2, "the key factor affecting crossings appears to be berm height and not traffic volume or maximum road height (ERM Rescan 2014)"

Response:

The conclusions of the remote camera study presented in ERM Rescan (2014a) are based on three years of data, representing over 22,000 camera-days of effort. Over this time, 587 caribou groups were photographed, and 2,379 individual caribou were observed in motion-triggered photos. Dominion Diamond has put substantial effort into this program and has compiled a unique data set, and it is particularly relevant to the Jay Project Developer's Assessment Report (DAR) as it was collected in the same tundra environment, with the same caribou population.

The results of this study indicate that caribou were typically calm near roads, as documented by cameras both on (within 50 metres [m]) and off the road (more than 50 m from the road). Caribou showing stressed behaviours (i.e. caribou that were alert, deflected, or running) on roads included 6 percent (%) of the observations, while 35% displayed calm behaviours (bedded, foraging, and investigating the camera, averages adjusted by effort). Considering absolute numbers, the most common behaviours at the group level at roads were foraging (135 observations), crossing or crossed the road running (15 observations), walking across/along roads (169 observations), and alert (88 observations) (ERM Rescan 2014a).

However, there are practical limitations to the data provided by remote cameras; they are stationary and cannot follow a caribou group, they have a limited field of view and range, and local topography leads to differences in the area sampled by each. Given these limitations and the difficulty in determining the behaviour of caribou that are not very close to the camera, the analysis of caribou responses to vehicles included only caribou groups captured by motion-trigger photos, and timed photos in the same field of view as the motion-triggered photos. An attempt to correlate caribou responses in photos triggered by caribou within 30 m of the camera to traffic observed in surrounding cameras would require a large increase in the level of effort, as the timed photographs are collected every 10 minutes (likely far too large a time scale to capture the vehicles causing the caribou reaction).

The concerns raised by the Kitikmeot Inuit Association are better addressed by the ground-based focal behaviour observations undertaken at the Ekati Mine. During this ground-based monitoring, observers completed extended observations of individual caribou to record their behaviour and response to stressors (ERM Rescan 2014b). A total of 62 individual caribou were observed from 2011 through 2013. Analysis of these data indicated that light vehicles and medium vehicles were significantly associated with increased alertness in caribou, but not heavy vehicles (possibly due to a low sample size for this category). The results showed that the duration of caribou alert response to stressors was short. Considering all stressors (vehicles, aircraft, people), the average duration of behavioural change was 35 ± 10 (standard error [SE]) seconds for male caribou and 16 ± 3 (SE) seconds for females before they returned to a non-stress behaviour, such as feeding or resting.

Considering the results of these two intensive studies on the Misery Road, Dominion Diamond feels that the data have been correctly interpreted and the conclusions presented in the DAR are a good estimate of the effects of traffic and the Misery Road on caribou behaviour.

Dominion Diamond has also conducted site visits with Inuit from Kugluktuk to view caribou behaviour and highly values these field-based engagement activities. As well, Dominion Diamond has undertaken other engagement activities with Inuit of Kugluktuk that have included workshops and meetings to discuss plans for caribou mitigation for the Jay Project. There have been a number of 'caribou and mines' workshops in recent years led by the Government of the Northwest Territories that have been attended by Inuit from Kugluktuk.

Dominion Diamond would be pleased to discuss suggestions for operational caribou monitoring at the Ekati Mine through these engagement activities.

References:

ERM Rescan (ERM Rescan Environmental Services Ltd.). 2014a. Ekati Diamond Mine: 2013 WEMP Addendum — Wildlife Camera Monitoring Summary Report. Prepared for Dominion Diamond Ekati Corporation by ERM Rescan: Yellowknife, Northwest Territories.

ERM Rescan. 2014b. Ekati Diamond Mine: 2013 Wildlife Effects Monitoring Program. Prepared for Dominion Diamond Ekati Corporation. Appendix 5.1 Caribou Behaviour Direct Monitoring Program. March 2014.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-08
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Paucity of Grizzly Bear data collection effort to the Northeast of the proposed Jay Pipe project
DAR Section(s):	Annex VII (Section 2)

Preamble (KIA):

In all years except for 2013, there exists a paucity of grizzly bear data collection efforts to the northeast of the proposed Jay Pipe project, as no grizzly bear habitat study plots were completed in that area from 2000 to 2008 (Maps 2.1-3 and 2.1-4) and hair snagging stations in 2012 (Map 2.1-5) were located to the north-northeast (NNE) of the proposed project.

Request (KIA):

Please comment on whether at least one additional year of baseline data collection be done using the grizzly bear hair snagging grid used in 2013 (Map 2.1-6).

Response:

The regional grizzly bear hair snagging program and study area were developed with and reviewed by regulators, communities, mine operators, and monitoring agencies (Handley 2010; GNWT 2013) and are representative of the North Slave Region. The regional grizzly bear hair snagging program was completed in 2012 and 2013 collaboratively by the Ekati and Diavik mines in the northern study area depicted in Map 13.4-14 of the DAR (see also ERM Rescan 2014). De Beers Canada Inc. completed a hair snagging program in 2013 and 2014 in the southern study area (Jessen et al. 2014). A follow-up hair snagging program will be conducted in 2017. The frequency and location (i.e., study area) of future grizzly bear monitoring in the Lac de Gras area will be determined through discussion among the Government of the Northwest Territories, mine operating companies, community organizations, and monitoring agencies.

References:

ERM Rescan (ERM Rescan Environmental Consultants Ltd.). 2014. Ekati and Diavik Diamond Mines: 2014 Final Lac de Gras Regional Grizzly Bear DNA Report. Prepared for Dominion Diamond Ekati Corporation and Diavik Diamond Mines (2012) Inc. by ERM Consultants Canada Ltd. Yellowknife, NWT, Canada.

Jessen, T, Dieppstraten R, Musiani M, Massolo A, Galpern P, McDermid G. 2014. Summary Report 2014: Joint Regional Grizzly Bear DNA Project, Snap Lake Mine and Gahcho Kué Project. University of Calgary, AB, Canada.

GNWT (Government of the Northwest Territories). 2013. Final Minutes of the Wildlife Monitoring Workshop, March, 2013. Prepared by the Department of the Environment, Government of the Northwest Territories. Yellowknife, NWT, Canada.

Handley J. 2010. Diamond Mine Wildlife Monitoring Workshop Report. Prepared for Environment and Natural Resources. Yellowknife, NWT, Canada.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-09
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Spatial context of data collection for other projects not provided relative to the location of the proposed project.
DAR Section(s):	Annex VII (Maps 2.1-7, 2.1-10, 2.1-15 and 2.1-4)

Preamble (KIA):

Throughout the wildlife baseline section, wildlife data collection efforts done at project sites such as Snap Lake and Gacho Kue, but they are not place in spatial context of other efforts done closer to the proposed project to evaluate spatial relevance and methodological similarity among sites.

Request (KIA):

On the maps indicated, please provide an inset showing the relative locations of the Snap Lake grizzly hair collection stations and survey efforts relative to the proposed project, or include all projects onto one map.

Response:

Map 13.2-14 in Section 13.2.1.1.6 of the Developer's Assessment Report shows the entire sampling grid for the regional grizzly bear hair snagging program, including the locations of the Snap Lake, Ekati, and Diavik mines and the Gahcho Kué Project relative to the Jay Project. Section 13.2.1.1.6 also summarizes this program. A single hair snagging device was located approximately centre of each grid-cell. Surveys were completed in the BHP Billiton/Rio Tinto study area around the Ekati and Diavik mines in 2012 and 2013 and for the De Beers Canada Inc. study area around the Snap Lake mine and the Gahcho Kué Project, in 2013 and 2014. Survey effort for the program included six visits to each hair snagging device to collect hair. Visits occurred approximately every 10 days from late June to September, annually.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-10
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Wolverine hair sampling methods
DAR Section(s):	Annex VII: (Map 2.1-9)

Preamble (KIA):

This map shows a large, contiguous area monitored for wolverine hair samples between 2005-2013. From the text and maps, it is difficult to tell whether methodologies used for the Diavik grids (2005 to 2006 and 2010 to 2011), the Ekati grid (2005 to 2006 and 2010 to 2011) and the Daring Lake grid (2005 to 2006, and 2010 to 2011) were similar, and can thus be combined into a meta-dataset.

Request (KIA):

Please clarify whether methodologies, grid sizes, and temporal sampling periods were the same among sites and time periods. Where differences in methodologies occurred, please identify them.

Response:

Section 13.2.1.1.5 of the Developer's Assessment Report and Section 2.1.5 of the Wildlife Baseline Report (Annex VII), describe the details of the monitoring and research that have been completed in the North Slave Region for wolverine. All of the regional wolverine hair snagging programs use standardized methods outlined in Government of Northwest Territories (GNWT) guidelines for this type of monitoring (GNWT 2013a). The Daring Lake, Diavik Mine, and Ekati Mine hair snagging programs used a 3 kilometre (km) by 3 km grid-cell design, as did the Gahcho Kué Project (Kennady Lake) in 2005 and 2006. The programs at the Snap Lake Mine and Gahcho Kué Project completed in 2013 and 2014 used a 5 km x 5 km grid-cell. Grid-cell and study area size were increased at the Gahcho Kué Project to detect a minimum of 20 individuals as discussed during Wildlife Monitoring Workshops in Yellowknife (GNWT 2013b). In 2011, post locations were modified in the field to accommodate reduced accessibility. These monitoring programs have been combined into a meta-data set and analyzed by the GNWT (GNWT 2014). The hair snagging programs at the Ekati Mine are scheduled to be completed in 2015.

References:

GNWT (Government of the Northwest Territories). 2013a. Draft Monitoring Protocol: Wolverine Hair Snagging. Prepared by the Department of Natural Resources, the Government of the Northwest Territories, Yellowknife, NWT, Canada.

GNWT. 2013b. Final Minutes of the Wildlife Monitoring Workshop, March, 2013. Prepared by the Department of Natural Resources, the Government of the Northwest Territories, Yellowknife, NWT, Canada.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-11
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Insufficient caribou baseline effort
DAR Section(s):	Annex VII (Section 2)

Preamble (KIA):

A one-day survey was done on August 12, 2013, to identify caribou travel surrounding the Jay project area (east-centred from the project) by helicopter.

Request (KIA):

Please comment on the rationale for conducting this survey on August 12, 2013 when caribou are expected in the area, as indicated in this same baseline report, from May 1-31 (during northern migration), June 16- Jul 1 (post-calving), from July 2- August 3, and between September 1 to October 31 (fall migration). Will additional surveys be conducted for this area during the aforementioned periods of expected caribou presence, prior to project development?

Response:

As described in Section 2.3.1 of the Wildlife Baseline Report (Annex VII), the aerial survey completed on August 12, 2013, identified locations of historical caribou trails, which does not require the presence of caribou. A representative photo of a caribou trail taken near the narrows of Lac de Gras and Lac du Sauvage is shown in Photo 11-1. The locations of these caribou trails are presented in the Developer's Assessment Report (DAR; Map 12.2-5), and provide a high-level overview of migration routes in the Lac de Gras region. In 2014, additional ground-based caribou trail surveys were completed on July 12 and 13. These surveys resulted in maps of digitized caribou trails and were reported in Appendix I of the Sable Addendum (Dominion Diamond 2014).

Section 12.1.4.2 of the DAR indicates that caribou may be present in the baseline study area from May 1 to May 31 (during northern migration), June 16 to July 1 (post-calving aggregation), July 2 to August 31 (summer dispersal), and September 1 to October 31 (fall migration). Caribou are, and will continue to be, monitored when present at the Ekati Mine site.

Photo 11-1 Caribou Trail from Ground Level

References:

Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Jay Project Developer's Assessment Report Sable Addendum. Prepared by Golder Associates Ltd., December 2014. Yellowknife, NWT, Canada.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-12
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Baseline report reads like a literature review of previous data collection
DAR Section(s):	Annex VII (Section 3)

Preamble (KIA):

While Annex VII is presented as the baseline report supporting the proposed Jay Pipe Project, many sections deal almost exclusively with discussions of past data and trends from data collection efforts at Diavik, Ekati, Daring Lake, and Snap Lake. These data are useful as informing the impact assessment, and should be included in the environmental setting of such a document, rather than as a baseline. The baseline report should focus on baseline data for wildlife collected within the potential Zone of Influence (ZOI) for the Jay pipe project itself, in a way that will facilitate predictions and a Before-After-Control-Impact analysis against monitoring data, if the project is built. For example, Section 3.10.1 includes a discussion of past data and trends from Diavik and Ekati on raptors, but does not indicate whether any suitable raptor cliffs with nesting activities have been identified within 5 to 10 km of the proposed project, even though other project areas did not include surveys of habitat sufficiently far east to the east of the Jay Pipe project to be considered as covering the potential ZOI for that project.

Request (KIA):

Please provide at least 2 years of systematic baseline data for each of the indicated wildlife VECs within the Zone of Influence of the proposed Jay Pipe project, which can be combined and compared against later monitoring data for that same area.

Response:

Since 1998, the Ekati Mine Wildlife Effects Monitoring Program (Ekati WEMP), and since 1995, the Diavik Mine Wildlife Monitoring Program have collected information for all wildlife (and caribou) valued components assessed in the Developer's Assessment Report (DAR), including data collection from within and around the area of the Jay Project (i.e., within the Zone of Influence). Additional environmental baseline data on caribou, upland birds, carnivores, raptors, and waterbirds at the Jay Project site in 2013 and 2014 are available in Appendix VII of the Jay Project DAR and the Sable Addendum (Dominion Diamond 2014). The temporal and spatial extent of wildlife and caribou data collected at and in the area surrounding the Project is sufficient for the purpose of describing baseline conditions and assessing effects of the Project on caribou and wildlife. Monitoring for the Ekati WEMP and baseline studies for the Jay Project will continue in 2015. The Ekati WEMP will be expanded to include caribou and wildlife monitoring at the Jay Project upon Project approval.

References:

Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Jay Project Developer's Assessment Report Sable Addendum. Prepared by Golder Associates Ltd., December 2014.

DOMINION DIAMOND

Information Request Number: DAR- KIA-IR-15 and DAR- KIA-IR-17

Source: Kitikmeot Inuit Association: Tannis Bolt

Subject: Different survey methods for caribou not presented.

DAR Section(s): Annex VII (Section 12)

Preamble (KIA):

This report states that maps of previous study areas for surveying caribou are provided in Annex VII. However, these could not be found in Annex VII, which only provides aerial transect survey maps for Ekati and Diavik in 2009 and 2012, and for the Gahcho Kue project from 1999 to 2005. Inclusion of all maps will allow the reader to see the difference in survey widths, transect lengths, and areas surveyed over time, which will affect their ultimate confidence in the EA assessment for caribou.

Request (KIA):

Please provide additional survey maps for noted surveys in this section, namely: 1) 1995-1997 Diavik Surveys, 2) 1998-2001 Ekati Surveys, 3) 2002 surveys for Ekati and SE shore of Lac de Gras, 4) 2006 Ekati Survey, 5) 2006 Diavik Survey, and 6) 2007 Diavik Survey.

Response:

Map 12.2-4 in Section 12.2 (Existing Environment) of the Developer's Assessment Report (DAR) shows the survey designs requested and cumulative results of group size and distribution recorded during all aerial surveys. Within the Ekati Mine study area, transect width varied among years resulting in 50 percent (%) coverage (line of sight was 1 kilometre [km] on either side of helicopter) of the study area in 1998, and from April through July of 1999. Since August 1999, survey width was 1.2 km (line of sight was 600 metres on either side of helicopter) for the baseline study area and remained at this distance for all future surveys. From 1998 to 2006, transect spacing was 4 km, and in 2007, was expanded to 8 km spacing when the study area increased. The changes in the aerial survey design that have occurred are described in Table 12.2-1 of the DAR. The information provided in Table 12.2-1 of the DAR has been replicated in Table 15-1 below.

Table 15-1 Caribou Aerial Survey Frequencies and Study Areas for the Ekati and Diavik Mines, 1995 to 2012

Year	Survey Timing and Frequency	Study Area	Coverage	Number of Transects	Number of Segments
1995 to 1997	• Weekly from mid-April to mid-October in the regional study area • Frequency of surveys in the regional study area varied depending on caribou abundance, distribution, and presence of large herds	Diavik – 1,200 km^2	Varied	Varied	Varied

Table 15-1 Caribou Aerial Survey Frequencies and Study Areas for the Ekati and Diavik Mines, 1995 to 2012

Year	Survey Timing and Frequency	Study Area	Coverage	Number of Transects	Number of Segments
1998 to 2001	• Weekly from mid-April to mid-October	Ekati – 1,600 km^2	Ekati 1998 to 1999: 50%; 1999 to 2001: 30%	10	393
2002 to 2005	• Weekly from mid-April to mid-October • Every second transect from mid-June to mid-July	Ekati and Diavik (combined) – 2,800 km^2	30%	13	675
2006	• Weekly from mid-April to mid-October	Ekati – 5,425 km^2 Diavik – 1,870 km^2	Ekati 15% Diavik 31%	18	968
2007 and 2008	• No northern migration surveys • Weekly surveys from mid-July to mid-October	Ekati – 5,425 km^2 Diavik – 2,867 km^2	Ekati 15% Diavik 31%	19	1,138
2009 and 2012	• No northern migration surveys • Weekly surveys from mid-July to mid-October	Ekati and Diavik (combined) – 5,933 km^2	15%	12	696

km^2 = square kilometre;% = percent.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-26
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Power line as an attractant to predators
DAR Section(s):	12.4.2.2.2

Preamble (KIA):

The potential effects of power lines are discussed on pages 12-97 to 12-98. The potential for grizzly bears to be attracted to power lines, as they may be considered attractive as scratching opportunities, is not considered in relation to how this could impact caribou through predation.

Request (KIA):

Please comment on attraction of grizzly bears to power line poles.

Response:

Grizzly bears are not expected to use the power lines for scratch posts. The existing transmission line poles along the Long Lake and Grizzly Lake roads have not been an area of interest to grizzly bears based on 16 years of monitoring at the Ekati Mine. The power lines will be situated parallel to the Misery Road, and will have a gravel base. Further, grizzly bears will often scratch on large erratic boulders, which are common in the Ekati Mine area. Consequently, no changes to caribou predation from grizzly bears is expected as a result of the proposed transmission line.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-28
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Barren-Ground Caribou - Minor not defined for low magnitude
DAR Section(s):	12.6.1.1 (Table 12.6-1)

Preamble (KIA):

For magnitude ratings, low magnitude is defined as the amount of change to measurement indicator results in no measurable effect on population abundance and distribution, or results in a minor measurable residual effect on the population.

Request (KIA):

Please define "minor". This is an important definition as magnitude is the main criterion on which significance is based.

Response:

A minor residual effect is a change in a measurement endpoint that is measurable but will have a negligible residual effect on the population, relative to the Base Case. A minor (small measurable) change would also not be expected to contribute to effects of other existing, approved, or reasonably foreseeable projects to cause a significant effect (Section 12.3.1 of the Developer’s Assessment Report).

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-33
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Wildlife and Wildlife Habitat - Breeding bird surveys and tundra breeding bird plots
DAR Section(s):	13.2.1.1.1

Preamble (KIA):

All assumptions about breeding birds are derived from previous data collected for the Ekati, Gahcho Kue and Snap Lake projects. Only breeding bird surveys, done within Ekati and along Misery road, were done recently (2003 to 2013), and tundra breeding bird surveys were stopped in 2008. The breeding bird surveys conducted along Misery road were obviously conducted to enable before-after comparisons of the impact of Misery road on breeding birds. These data were not coupled with control points, and are considered unsuitable for a BACI study even for this purpose. However, none of the studies previously done for other projects have surveys points within the proposed project area. While other data may give some idea about the species present in the area, the actual site itself must be sufficiently surveyed during baseline years, along with control plots to: a. enable the detection of potential high quality or critical habitat for breeding birds or breeding bird SAR associated with the specific footprint of the project, and b. to enable a BACI study that is able to measure the impact of the proposed Jay Pipe project on breeding bird populations.

Request (KIA):

Please provide information on whether the proponent will be conducting baseline surveys for this project. We recommend conducting baseline surveys for breeding birds at an appropriate time, and over a two year period, within the proposed project footprint, as well as in comparable habitats paired to survey points outside of the likely ZOI for birds.

Response:

Baseline surveys for upland breeding birds were completed to document breeding territories of all species (including bird species at risk) within the Jay Project development area in 2013 and 2014 (see Dominion Diamond [2014] and response to DAR-EC-IR-29). During these surveys, three people walking abreast within the proposed Project footprint covered a swath of approximately 100 metres, documenting all upland birds encountered and relevant incidental observations. These surveys indicated that species composition is typical of the region.

There have been extensive upland breeding bird surveys in the area around Ekati as part of this mine's Wildlife Effects Monitoring Program from 1996 to 2008 (summarized in the Wildlife Baseline Report, Annex VII, Section 3.8 page 3-16), but these surveys were unable to discern Mine-related effects to species richness, diversity, or density (Smith et al. 2005; Rescan 2010). Further, intensive studies of Lapland longspur did not identify changes in nesting success of nests near roads (Male and Nol 2005). As such, upland breeding bird monitoring for the Ekati Mine was discontinued in 2008, with the agreement of Environment Canada and the Independent Environmental Monitoring Agency; therefore,

more intensive upland bird surveys were not undertaken for the Jay Project. Currently, Ekati contributes to a national monitoring initiative through the North American Breeding Bird Survey (ERM Rescan 2014).

References:

Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Jay Project Developer's Assessment Report Sable Addendum. Prepared by Golder Associates Ltd., December 2014.

ERM Rescan (ERM Rescan Environmental Ltd.). 2014. Ekati Diamond Mine: 2013 Wildlife Effects Monitoring Program. Prepared for Dominion Diamond Ekati Corporation by ERM Rescan: Yellowknife, NWT, Canada.

Male, SK, Nol E. 2005. Impacts of roads associated with the Ekati Diamond Mine™, Northwest Territories, Canada, on reproductive success and breeding habitat of Lapland longspurs. Can J Zool 83: 1285-1296.

Rescan (Rescan Environmental Services Ltd.). 2010. Ekati Diamond Mine 13-Year Breeding Bird Monitoring Program Summary. Prepared for BHP Billiton Canada Inc.

Smith AC, Virgl JA, Panayi D, Armstrong AR. 2005. Effects of a diamond mine on tundra-breeding birds. Arctic 58: 295-304.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-40
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Wildlife and Wildlife Habitat - Minor not defined for low magnitude
DAR Section(s):	13.6.1.1 (Table 13.6-1)

Preamble (KIA):

For magnitude ratings, low magnitude is defined as the amount of change to measurement indicator results in no measurable effect on population abundance and distribution, or results in a minor measurable residual effect on the population.

Request (KIA):

Please define "minor". This is an important definition as magnitude is the main criterion on which significance is based.

Response:

A minor residual effect is a change in a measurement endpoint that is measurable but will have a negligible residual effect on the population, relative to the Base Case. A minor (small measurable) change would also not be expected to contribute to effects of other existing, approved, or reasonably foreseeable projects to cause a significant effect (Section 13.3.1 of the Developer’s Assessment Report).

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-47
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Maps missing or wonky labels
DAR Section(s):	Vegetation Section 11.2.2.2.1 (Map ?, page 11-14; Map 11.2-3; page 11-16) Section 11.4.2.2.1 (Map ?, page 11-47; Map ?, page 11-51; Map 11.4-4, page 11-56)

Preamble (KIA):

The map on page 11-14 is blank. Map 11.2-3 on page 11-16 is labelled with square wingding symbols only, with wingdings symbols in the legend. The map on page 11-47 is blank. The map on page 11-51 is blank. Map 11.4-4 on page 11-56 is labelled with windings.

Request (KIA):

Please add and correct the maps in this section.

Response:

Dominion Diamond has checked the maps referenced in the preamble in the Jay Project Developer's Assessment Report (DAR):

- Map 11.2-2 Ecological Landscape Classification in the Effects Study Area on page 11-14 has been checked and is present.
- Map 11.2-3 Locations of Listed Plant Species Observations on page 11-16 has been checked and appears to be printed correctly.
- Map 11.4-2 Ecological Landscape Classification for the reference condition on page 11-47 has been checked and is present.
- Map 11.4-3 Ecological Landscape Classification Map Unit Distribution for the Application Case on page 11-51 has been checked and is present.
- Map 11.4-4 Locations of Listed Plant Species Observations for the Application Case on page 11-55 has been checked and appears to be printed correctly.

These maps were included in the hard copies, CDs, and the files that were submitted to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) public registry at the following link: http://www.reviewboard.ca/upload/project_document/EA1314-01_S_11_Vegetation.PDF.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-83
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Effects on Economy
DAR Section(s):	14.3.3

Preamble (KIA):

Unclear what economic effects are anticipated for Nunavut LSA communities (i.e. through the Kitikmeot Corporation or other LSA businesses and contractors that can either service the mine's expansion and/or be affected by its activities)

Request (KIA):

Identify and discuss economic effects anticipated for Nunavut LSA and Inuit communities: Identify specific employment opportunities for Kitikmeot residents; specific economic opportunities for Kitikmeot LSA residents; businesses and contractors and/ or other LSA businesses and contractors that can either service the mine's expansion and/or be affected by its activities.). Need to be explicit about direct and indirect economic effects for Kitikmeot and Inuit residents and businesses, including capital expenditures.

Response:

The Hamlet of Kugluktuk, Bathurst Inlet, and Umingmaktok are identified as Nunavut communities within the socio-economic local study area. Bathurst Inlet and Umingmaktok are seasonally populated, and do not have an annual resident labour force from which employment could be drawn. Dominion Diamond has an Impact Benefit Agreement (IBA) with the Hamlet of Kugluktuk and the Kitikmeot Inuit Association (KIA). The specific Project-related employment and economic opportunities for Kugluktuk, including businesses and contractors, are identified in the IBA, the contents of which are confidential. However, as the Jay Project is an extension of the existing Ekati Mine, Dominion Diamond Ekati Corporation will continue to work with the Hamlet of Kugluktuk and the KIA through its business arm, Kitikmeot Corporation to maximize the specific Project-related employment and economic opportunities for the community.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-84
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Local Business Capacity
DAR Section(s):	14.3.1.6 (p.14-55)

Preamble (KIA):

Business capacity for Kitikmeot LSA communities and Kitikmeot region in general is not discussed; this is required to demonstrate how the Proponent will engage with the Kitikmeot LSA communities to enhance potential business capacity and opportunities as per Section 8.1 of the TOR. The Kitikmeot Corporation is mentioned (p.60) yet no discussion about how the Proponent will enlist the organization in a business capacity.

Request (KIA):

Complete a local business use analysis and identify impacts on local businesses in the Kitikmeot. Evaluate the effects of business capacity for Kitikmeot LSA communities and Kitikmeot region; demonstrate how the Proponent will engage with the Kitikmeot LSA communities to enhance potential business capacity and opportunities.

Response:

The Hamlet of Kugluktuk, Bathurst Inlet, and Umingmaktok are the only Kitikmeot communities within the socio-economic local study area. Bathurst Inlet and Umingmaktok do not have a business contracting base that could service the mining industry. Dominion Diamond Ekati Corporation (Dominion Diamond) has an Impact Benefit Agreement (IBA) with the Hamlet of Kugluktuk and Kitikmeot Inuit Association (KIA). While the specific use of businesses from this IBA community is considered confidential, as the Jay Project is an extension of the existing Ekati Mine, Dominion Diamond will continue to work with the Hamlet of Kugluktuk and the KIA through its business arm, Kitikmeot Corporation to maximize the specific Project-related economic opportunities for the community.

In order to evaluate the business capacity of the Kitikmeot region, a business capacity assessment would be required. This would involve creating an inventory of businesses, identify all applicable service offerings, and analyzing their capacity as a ratio of available resources to the backlog (i.e., predicted future workload). A business capacity assessment for the Kitikmeot region is beyond the scope of the Jay Project Developer's Assessment Report.

Dominion Diamond is committed to engaging with all IBA communities with respect to contracting with community businesses, wherever practicable, for the Jay Project. Through ongoing engagement with IBA communities, Dominion Diamond will seek to identify business opportunities and strategies to maximize the use of local businesses.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-85
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Employment Effects
DAR Section(s):	14.4.3.1. (Page 14-75)

Preamble (KIA):

No discussion of trans-boundary employment effects (outside the RSA of NWT); required to reflect employment effects (e.g. estimate of percentage of hires out of direct, indirect employment and contractor positions the mine's expansion will create during construction and operations) for Nunavut LSA communities and Kitikmeot region (and IBA community) as per the TOR

Request (KIA):

Include discussion of trans-boundary employment effects to reflect employment effects (e.g. estimate of percentage of hires out of direct, indirect employment and contractor positions the mine's expansion will create during construction and operations) for Kitikmeot LSA /IBA communities and Kitikmeot region.

Response:

The Hamlet of Kugluktuk, Bathurst Inlet, and Umingmaktok are the only Kitikmeot communities within the socio-economic local study area. Bathurst Inlet and Umingmaktok are seasonally populated, and do not have an annual resident labour force from which employment could be drawn. Dominion Diamond Ekatiu Corporation (Dominion Diamond) has an Impact Benefit Agreement (IBA) with the Hamlet of Kugluktuk and the Kitikmeot Inuit Association (KIA). The specific Project-related employment and economic opportunities for Kugluktuk, including businesses and contractors, are identified in the IBA, the contents of which are confidential. Therefore, Project employment opportunities specific to Kugluktuk are not broken out in this response. However, as the Jay Project is an extension of the existing Ekati Mine, Dominion Diamond will continue to work with the Hamlet of Kugluktuk and the KIA through its business arm, Kitikmeot Corporation to maximize the specific Project-related employment and economic opportunities for the community.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-87
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Education
DAR Section(s):	14.5.1.4 (Pages 14-83 and 14-84)

Preamble (KIA):

Information requested about the awareness building and education initiatives that will take place in non-NWT LSA/IBA communities in the Kitikmeot Region.

Request (KIA):

Describe education and skills building initiatives in non-NWT/IBA-LSA communities in Kitikmeot.

Response:

Nunavut Arctic College, which has a campus in Cambridge Bay, provides post-secondary education for non-Northwest Territories (NWT) / Impact Benefit Agreement – local study area communities in Kitikmeot. Educational programs offered at the Kitikmeot Campus in the 2014 to 2015 school year include adult basic education, college foundations, office administration, and camp cooking (Nunavut Arctic College 2014). Other educational initiatives include the Actua program, a science, technology, engineering and math education outreach program for youth in the Kitikmeot region (Actua 2013). Actua delivers community-based, hands-on and culturally relevant programming in science and technology to communities such as Kugluktuk.

The Northwest Territories Mine Training Society (NWT MTS) provides education and skills building initiatives in the NWT and Kitikmeot, and is supported in partnership by Dominion Diamond Ekati Corporation, other mining companies, the Governments of Canada and the NWT, Aurora College, and Aboriginal groups. Kugluktuk is one of 11 communities in either the NWT or the Kitikmeot region that receives training programs from the Mine Training Society's two-year mining sector-skills training program (CBC 2013). The Mining the Future Program, a $5.8 million program funded by the federal government, provides training on-site at the Diavik, Snap Lake, and Ekati mines. Successful applicants will be placed in a range of jobs by six local employers (De Beers Canada Inc., Rio Tinto Diavik Diamond Mines Inc., Avalon Rare Metals Inc., Procon Mining and Tunneling, We La Dai Corporation Ltd., and Bouwa Whee Catering) (CBC 2013). By the conclusion of the program in March 31, 2015, the program is expected to have 400 participants, trained 260 people, and found employment for 250 (Mining and Exploration 2013).

In 2012, the Kitikmeot Inuit Association (KIA) formed a partnership with the NWT MTS to organize and deliver mine-training in the Kitikmeot Region (KIA 2012). The KIA made $300,000 in funding available for Inuit employment training in the northern mining sector. In conjunction with the Nunavut Arctic College and the federal Aboriginal Skills and Employment Strategy, the NWT MTS offer training opportunities such as a six-week course on underground mining in Kugluktuk in January 2013 (Nunatsiaq Online 2015). Other training courses offered by the NWT MTS are the Mine Safety Boot Camps where students learn various health and safety certifications that meet the mining industry's safety requirements in the

NWT, Nunavut, Alberta and federally-controlled jurisdictions. A Mine Safety Boot Camp was recently held in Kugluktuk on March 9, 2015 (NWT MTS 2015; WSCC 2015).

Other training initiatives include the remote delivery of a field assistant training program in Kugluktuk that took place September 10 to 30, 2014, in partnership with the KIA, NWT MTS, and the Canadian High Arctic Research Station (Northwest Community College 2014). This 21-day program prepared seven graduates for field work in mineral exploration, environmental services, and natural resources fields. Another skills building initiative is the Nunavut Community Aquatic Monitoring Program (N-Camp), developed by the Government of Nunavut's Fisheries and Sealing division. This pilot program trained and certified Nunavummiut in sampling for fisheries development and aquatic research projects (Canada's Arctic Journal: Above and Beyond 2015). Training was completed in Kugluktuk in September 2014, and will allow the community to complete many of its fisheries development and aquatic health projects (Northern News Service Online 2014).

References:

Actua. 2013. Mining companies join forces to promote youth science education in Nunavut's Kitikmeot Region: Joint industry initiative provides $165,000 to deliver science workshops and camps. Available at: http://www.actua.ca/storage/Actua%20Sabina%20MMG%20and%20Xstrata%20Press%20ReleaseVER4.pdf. Accessed March 11, 2015.

Canada's Arctic Journal: Above and Beyond. 2015. Available at: http://www.ncamp.ca/sites/default/files/files/Jan-Feb%202015Setting_Our_Nets.pdf. Accessed March 9, 2015.

CBC (Canadian Broadcast Corporation). 2013. Harper Trumpets N.W.T. mining program. Available at: http://www.cbc.ca/news/canada/north/harper-trumpets-n-w-t-mining-jobs-program-1.1365166. Accessed March 9, 2015.

KIA (Kitikmeot Inuit Association). 2012. Kitikmeot Inuit Association Makes $300,000 in Funding Available for Inuit Employment Training in the Northern Mining Sector. Available at: http://kitia.ca/en/about-kia/bulletins/kia-mto-press-release. Accessed March 6, 2015.

NWT MTS (Northwest Territories Mine Training Society) 2015. Programs. Available at: http://minetraining.ca/programs. Accessed March 9, 2015.

Mining and Exploration. 2013. Yellowknife's Mine Training Society gets $5.8 million in funding. Available at: http://www.miningandexploration.ca/mines/article/mine_training_society_welcomed_the_prime_minister_and_received_5.8_million/. Accessed March 9, 2015.

Northwest Community College. 2014. NWCC Delivers Field Assistant Training in Nunavut. Available at: http://www.nwcc.bc.ca/news/nwcc-delivers-field-assistant-training-nunavut. Accessed March 9, 2015.

Northern News Service Online. 2014. Fisheries Strategy at Work. Available at: http://www.nnsl.com/frames/newspapers/2014-11/nov3_14leg.html. Accessed March 9, 2015.

Nunatsiaq Online. 2015. Eager to Learn About Underground Mining – the KIA Wants You. Available at: http://www.nunatsiaqonline.ca/stories/article/65674eager_to_learn_about_underground_mining_the_kia_wants_you/. Accessed March 6, 2015.

Nunavut Arctic College. 2014. 2014-2015 Arctic College Programs. Available at: http://www.arcticcollege.ca/en/2014-2015-program-offerings. Accessed March 9, 2015.

WSCC (Worker's Safety and Compensation Commission). 2015. Partner Courses. Available at: http://firewall.wcb.nt.ca/YourWSCC/SafetyEducation/Pages/PartnerCourses.aspx. Accessed March 9, 2015.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-88
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Education Residual Effects / Northern Labour Force Development
DAR Section(s):	14.5.4 (Page14-86)

Preamble (KIA):

Recognition and discussion requested of Northern trans-boundary education /northern workforce development and how educational enhancement plans will be extended to the non-NWT LSA communities

Request (KIA):

Describe Northern trans-boundary education /northern workforce development and specifically how educational enhancement plans will be extended to the non-NWT LSA / IBA communities and residents of Kitikmeot

Response:

The extension of educational enhancement plans to non-Northwest Territories (NWT) communities applies only to the Hamlet of Kugluktuk, with which Dominion Diamond Ekati Corporation (Dominion Diamond) holds an Impact Benefit Agreement (IBA). A discussion of the provision of educational enhancement plans to other communities outside the NWT (excluding Kugluktuk) is out of scope for the Developer's Assessment Report of the Jay Project.

Dominion Diamond will continue to work with the Mine Training Society in the delivery of mining-related programming (e.g., recent [March 2015] Mining Boot Camp program delivered in Kugluktuk) to the Hamlet of Kugluktuk. Dominion Diamond will extend on the job training opportunities, including apprenticeships, to employees at the Ekati Mine, including those who reside in Kugluktuk. Through ongoing consultation with IBA communities, including the Hamlet of Kugluktuk, Dominion Diamond will work to identify opportunities to provide education and training to residents of IBA communities, where practicable.

DOMINION DIAMOND

Information Request Number: DAR- KIA-IR-100

Source: Kitikmeot Inuit Association: Tannis Bolt

Subject: Phytoplankton community composition

DAR Section(s): Section 9 (Page 9-187)

Preamble (KIA):

The proponent states: "The predicted TDS concentrations in Lac du Sauvage and Lac de Gras are well below any potential thresholds for effects to aquatic health (Section 8.5.5) and also appear to be below concentrations that would be expected to result in shifts in community composition." While toxicity testing information is available in section 8.5.5, information relating to the threshold concentrations triggering community composition shifts were not found.

Request (KIA):

Please indicate what TDS concentrations would potentially cause a shift in phytoplankton community composition, using examples from cited scientific literature.

Response:

The relationship between phytoplankton and total dissolved solids (TDS) is not clearly defined in the scientific literature, although phytoplankton are thought to be tolerant to a wide range of TDS concentrations (Prepas 1983; Vyverman et al. 1996; Wilson et al. 1994; Wilson et al. 1996). Vyverman et al. (1996) found that diatom richness was not substantially affected by calcium concentrations ranging from 8 to 203 microequivalent per litre (µeq/L; 160 to 4,060 micrograms per litre [mg/L]). Prepas (1983) found that TDS had no predictable relationship with phytoplankton biomass based on 25 lakes in central Alberta in which TDS ranged from 128 to 1,545 mg/L. The range of TDS values evaluated by Prepas (1983) were much higher than the highest TDS concentrations predicted to occur during Project operations (80 mg/L in Lac du Sauvage and 30 mg/L in Lac du Gras). Therefore, changes to TDS concentrations from the Project are not expected to contribute to changes to the phytoplankton community in Lac du Sauvage or Lac de Gras.

References:

Prepas EE. 1983. Total dissolved solids as a predictor of lake biomass and productivity. Can J Fish Aquat Sci. 40: 92-95.

Vyverman W, Vyverman R, Rajendran VS, and Tyler P. 1996. Distribution of benthic diatom assemblages in Tasmanian highland lakes and their possible use as indicators of environmental changes. Can J Fish Aquat Sci. 53: 493-508.

Wilson SE, Cumming BF, Smol JP.1994. Diatom-salinity relationships in 111 lakes from the Interior Plateau of British Columbia, Canada: the development of diatom-based models for paleosalinity reconstructions. J Paleolimno 12: 197-221.

Wilson SE, Cumming BF, Smol FP. 1996. Assessing the reliability of salinity inference models from diatom assemblages: an examination of a 219-lake data set from western North America. Can J Fish Aquat Sci. 53: 1580-1594.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-101
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Chronic effects on fish
DAR Section(s):	Section 9.4.3.2.3

Preamble (KIA):

While it is clearly stated that water quality predictions are not likely to be acutely toxic, it is not clear whether potential long-term chronic effects on fish health or aquatic biota were considered in an aquatic risk assessment.

Request (KIA):

Please determine and describe whether or not water quality predictions may induce chronic effects on fish or aquatic biota in the study area.

Response:

Predicted changes in water quality are not expected to result in adverse chronic effects on fish or aquatic biota in the study area.

The potential for chronic effects on fish or aquatic biota due to predicted changes in water quality in Lac du Sauvage and Lac de Gras was assessed in Section 8.5.5.3 of the Developer's Assessment Report (DAR). Updated predicted changes in water quality for Lac de Gras, made after the submission of the DAR (Golder 2015a) were also reviewed in support of this response, and are not expected to change predictions made in the aquatic health assessment section of the DAR (Section 8.5.5.3).

For this assessment, potential effects on aquatic health in Lac du Sauvage and Lac de Gras through predicted changes to water quality were evaluated through three exposure pathways:

- direct effects resulting from direct exposure to constituents of potential concern (COPC) in the water column;
- indirect effects resulting from direct exposure of food chain components to COPC in the water column; and,
- indirect effects resulting from potential accumulation of constituents within fish tissue via uptake from both water and diet.

Potential effects related to direct waterborne exposure including to food chain components were assessed using maximum modelled water concentrations across all Jay Project (Project) phases (i.e., construction, operations, closure, and post-closure). The assessment of indirect effects on fish tissue chemistry was done by using measured baseline water quality (Base Case; reference [pre-development] and 2014 baseline condition), modelled water quality, and measured fish tissue chemistry (DAR Annex

XIV, Appendix A) in order to predict tissue concentrations of substances within fish. Tissue chemistry results for Lake Trout collected in 2014 from Lac du Sauvage (Golder 2015b) were also reviewed and found to be similar to the results presented in the DAR; therefore, the predictions made in the DAR are not expected to change as a result of the new tissue chemistry data. Predicted tissue concentrations were compared to toxicological benchmarks to evaluate the potential for aquatic health effects related to tissue chemistry. The methods and results of both evaluations are summarized below; further details are provided in Section 8.5.5.3 of the DAR.

Waterborne Exposure

Maximum modelled water quality concentrations were screened to identify COPCs in water, which are constituents for which the modelled concentrations were higher than those observed under existing conditions and also higher than relevant federal and provincial water quality guidelines (WQGs) for the protection of aquatic life or site-specific water quality objectives (SSWQOs).

The WQGs and SSWQOs used in the aquatic health assessment included:

- SSWQOs developed for the Ekati Mine for chloride (Elphick et al. 2011), sulphate (Rescan 2012a), potassium (Rescan 2012b), molybdenum (Rescan 2012c), nitrate (Rescan 2012d), and vanadium (Rescan 2012e);
- SSWQO for strontium developed for the Snap Lake Mine (Golder 2013; McPherson et al. 2014);
- SSWQO for total dissolved solids (TDS[1]) as approved for the Diavik Mine in August 2013 (Wek'èezhìi Land and Water Board [WLWB] 2013);
- Canadian Water Quality Guidelines for the Protection of Aquatic Life (Canadian Council of Ministers of the Environment [CCME] 1999); and,
- British Columbia Ministry of Environment Water Quality Guidelines for the Protection of Aquatic Life (BC MOE 2014).

These WQGs and SSWQOs are conservative in regards to protecting aquatic life; they represent substance concentrations below which no adverse effects on survival, growth, or reproduction of aquatic life are expected to occur as a result of long-term exposure. Thus, modelled concentrations below WQGs and SSWQOs are expected to result in negligible potential for adverse effects on aquatic biota.

There were no constituents that had maximum modelled concentrations over the life of the Project (i.e., during all Project phases) that were higher than those observed under existing conditions and higher than relevant WQGs or SSWQOs.

Therefore, although changes in concentrations of some metals, major ions, and TDS were predicted as a result of the Project, these changes are not predicted to result in adverse effects on aquatic health through waterborne exposure.

Indirect Exposure Through Changes in Fish Tissue Chemistry

[1] In August 2013, WLWB approved a TDS benchmark of 500 milligrams per litre in Lac de Gras for the Diavik Mine (WLWB 2013); this value is considered an SSWQO for the purposes of this assessment.

Potential changes to fish tissue concentrations, which may occur through accumulation of constituents within fish tissue via uptake from both water and diet, in Lac du Sauvage and Lac de Gras were estimated by multiplying maximum modelled concentrations in water over the life of the Project by constituent-specific bioaccumulation factors (BAFs). Potential changes due to specific constituents were considered only if the following criteria were met:

- maximum modelled concentrations of the constituent in water exceeded existing concentrations in the direct waterborne assessment;
- site-specific BAFs could be derived for the constituent[2]; and,
- toxicological benchmarks for the constituent could be defined[3].

Of the constituents that could be assessed for this indirect exposure pathway (i.e., aluminum, arsenic, cadmium, chromium, nickel, selenium, and vanadium), all predicted tissue concentrations were below their respective tissue benchmarks, with the exception of aluminum in Lac du Sauvage and aluminum and vanadium in Lac de Gras. However, adverse effects to fish health due to elevated concentrations of aluminum and vanadium in fish tissue were evaluated as not likely to occur. The assessment methods included conservative assumptions, and therefore, predicted concentrations in tissue are likely overestimated (Section 8.5.5.3.2). For example, for aluminum, a relatively high BAF was considered even though the current scientific understanding of aluminum is that it does not bioconcentrate, and that tissue concentrations are poor predictors of toxicity (Wilson 2012). For vanadium, the bioaccumulation factor used to predict tissue concentration was the maximum upper-bound estimate of the range of site-specific BAFs developed for the Project. If the minimum upper-bound estimate were used, then the predicted tissue concentrations would have been four times lower, and below the tissue benchmark.

In conclusion, based on the aquatic health assessment described in Section 8.5.5.3, predicted changes in water quality are not expected to result in adverse chronic effects on fish or aquatic biota in the study area.

References:

BC MOE (British Columbia Ministry of Environment). 2014. Water Quality Guideline (Criteria) Reports. Available online: http://st-ts.ccme.ca/. Accessed August 7, 2014.

CCME (Canadian Council of Ministers of the Environment). 1999, with updates to 2014. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Summary Table. In: Canadian Environmental Quality Guidelines, 1999. Canadian Council of Ministers of the Environment, Winnipeg MB, Canada. Available online: http://st-ts.ccme.ca/en/index.html. Accessed August 7, 2014.

Elphick JRF, Bergh KD, Bailey HC. 2011. Chronic toxicity of chloride to freshwater species: effects of hardness and implications for water quality guidelines. Environ. Toxicol. Chem 30: 230-246.

[2] Site-specific BAFs were derived for constituents for which there were available matching water and fish tissue data for the lakes of interest.

[3] Studies of tissue concentrations of constituents linked to toxicity endpoints are limited in the toxicological literature; therefore, tissue-based toxicity benchmarks could not be derived for all possible constituents.

Golder (Golder Associates Ltd.). 2013. Development of Strontium Benchmark for Aquatic Life for the Snap Lake Mine. Prepared for De Beers Canada Inc. Yellowknife, NWT, Canada.

Golder. 2015a. Jay Project – Lac de Gras Hydrodynamic Model Updates. Technical Memorandum. Prepared for Dominion Diamond Ekati Corporation. Yellowknife, NWT, Canada.

Golder. 2015b. 2014 Fish Tissue Chemistry Memorandum. Technical Memorandum. Prepared for Dominion Diamond Ekati Corporation. Yellowknife, NWT, Canada. (In-Preparation).

McPherson C, Lawrence G, Elphick J, Chapman PM. 2014. Development of a strontium chronic effects benchmark for aquatic life in freshwater. Environ. Toxicol. Chem. 33: 2472-2478.

Rescan (Rescan Environmental Ltd.). 2012a. EKATI Diamond Mine: Site-specific Water Quality Objective for Sulphate. Prepared for BHP Billiton Canada Inc. Yellowknife, NWT, Canada.

Rescan. 2012b. EKATI Diamond Mine: Site-Specific Water Quality Objective for Potassium. Prepared for BHP Billiton Canada Inc. Yellowknife, NWT, Canada.

Rescan. 2012c. EKATI Diamond Mine: Site Specific Water Quality Objective for Molybdenum, 2011. Prepared for BHP Billiton Canada Inc. Yellowknife, NWT, Canada.

Rescan. 2012d. EKATI Diamond Mine: Site-Specific Water Quality Objective for Nitrate, 2012. Prepared for BHP Billiton Canada Inc. Yellowknife, NWT, Canada.

Rescan. 2012e. EKATI Diamond Mine: Site-specific Water Quality Objective for Vanadium. Prepared for BHP Billiton Canada Inc. Yellowknife, NWT, Canada.

WLWB (Wek'èezhìi Land and Water Board). 2013. AEMP Design Version 3.1. File W2007L2-0003. Letter to Diavik Diamond Mine Inc., Yellowknife, NWT, Canada.

Wilson RW. 2012. Aluminum. Chapter 2 in Wood CM, Farrell AP, Brauner CJ (eds). Homeostasis and Toxicology of Essential Metals. Fish Physiology, Volume 31A. Elsevier Academic Press, New York, NY, USA.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-102
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Potential parameters of concern to fish - Aluminum
DAR Section(s):	Section 9.4.3.2.3

Preamble (KIA):

Aluminum and vanadium were identified as being potential parameters of concern to fish: "Potential indirect effects to fish related to accumulation of substances within fish tissue via uptake from both water and diet were identified for aluminum (during operations and into closure) and vanadium (during operations and into closure); however, adverse effects to the health of fish VCs are unlikely. The assessment methods included very conservative assumptions, and therefore, predicted concentrations in tissue are likely overestimated (Section 8.5.5.3.2). For example, for aluminum, a relatively high bioaccumulation factor was considered even though the current scientific understanding of aluminum is that it does not bioconcentrate, and that tissue concentrations are poor predictors of toxicity (Wilson 2012). For vanadium, the bioaccumulation factor used to predict tissue concentration was the maximum upper-bound estimate of the range of site-specific bioaccumulation factors (BAFs) developed for the Jay Project (Project). If the minimum upper-bound estimate was used, then the predicted tissue concentrations would have been four times lower, and below the tissue benchmark."

Request (KIA):

Please indicate whether or not aluminum is below the tissue benchmark if the bioaccumulation factor is removed.

Response:

The bioaccumulation factor (BAF) cannot be removed for this assessment, as a BAF is necessary to calculate predicted tissue concentrations; predicted tissue concentrations are calculated by multiplying the BAF by the modelled water concentration. However, for the Developer’s Assessment Report (DAR), the BAF and the water quality modelling used to predict fish tissue concentrations were conservative, resulting in likely overestimated aluminum tissue concentrations. As part of this response, less conservative BAFs are used to predict aluminum tissue concentrations to reduce conservatism as requested by the reviewer, without removing the BAF.

Detailed descriptions of the methods and results for predicting tissue concentrations of aluminum and other metals using BAFs in the DAR are described in the Indirect Exposure – Changes to Fish Tissue Chemistry section (DAR Section 8.5.5.3.1). Conservative assumptions used to predict metal concentrations in fish included:

- metals uptake is linearly proportional to water concentration, although non-linearity in bioaccumulation has commonly been observed for metals due to exposure-dependent bioaccumulation relationships; bioaccumulation rates of metals tend to decrease as exposure concentrations increase (e.g., McGeer et al. 2003);

- selecting the highest BAF derived from the most reliable data;
- calculating predicted tissue concentrations using maximum modelled water concentrations for each Jay Project (Project) phase, which have conservatism built in (DAR Section 8.5.4 and Appendix 8F); and,
- comparing predicted tissue concentrations to conservative tissue-based benchmarks, which were derived using laboratory toxicity testing as reported in the toxicological literature. In this condition, the metals tested were likely more bioavailable than they would potentially be under site conditions. In the DAR assessment, the total metal concentrations were used, a proportion of which is expected not to be bioavailable.

Concentrations of metals in fish tissue were predicted by multiplying the maximum predicted metal concentrations in water for each Project phase by the corresponding BAF. Site-specific BAFs for aluminum were derived for each lake, fish species, and year using water quality concentrations and fish tissue concentrations measured during previous sampling programs at the Ekati and Diavik mines (DAR Annex XIV, Appendix A). The lake-, species-, and year-specific BAFs were calculated using the following formula:

$$BAF(lake, species, year) = \frac{C_{fish}}{C_{water}}$$

where:

- $BAF_{(lake,\ species,\ year)}$ is the median BAF for a specific lake, fish species, and year;
- C_{fish} is the concentration of constituent "x" in fish (milligrams per kilogram wet weight [mg/kg ww]); and,
- C_{water} is the concentration of constituent "x" in water (milligrams per litre [mg/L]).

Based on the quality of data available from the previous programs, BAFs were categorized as most reliable, less reliable, or unreliable (DAR Section 8.5.5.3.1). The BAF used in the assessment was preferentially selected from the category of most reliable BAFs. To be conservative, if more than one BAF was categorized as most reliable, the BAF with the highest value was chosen. For aluminum, several site-specific BAFs were categorized as most reliable; for this assessment, the most reliable BAFs ranged from 67 to 730, with a median value of 467. In comparison, Cleveland et al. (1991) calculated a BAF of 36 in a study using pH 7.2, which is similar to that observed in the receiving environment of the Project[1]; this BAF is less than half the minimum BAF calculated for this assessment.

In the DAR, using the highest reliable BAF (730), predicted concentrations of aluminum in fish tissue exceeded the tissue-based benchmark (20 mg/kg ww) indicating potential adverse effects to fish due to elevated water concentrations. Given the conservatism in the method used to predict tissue concentrations, tissue concentrations are likely overestimated. There is also conservatism in the tissue-

[1] The median existing pH condition in Lac du Sauvage during under-ice conditions and open-water conditions was 6.7 (DAR Section 8.2, Table 8.2-49). The median baseline pH in Lac de Gras during under-ice conditions ranged from 6.6 to 7.0 (DAR Section 8.2, Table 8.2-51) and during open-water conditions ranged from pH 6.8 to 7.0 (DAR Section 8.2, Table 8.2-52).

based benchmark as the study used to derive the benchmark investigated aluminum toxicity at a much lower pH (4.8; Peterson et al. 1989), where aluminum is more bioavailable and more toxic (Wilson 2012), than is observed in Lac du Sauvage or Lac de Gras. If a lower, less conservative BAF were used, predicted tissue concentrations of aluminum would be below the tissue benchmark.

To demonstrate this point, predicted aluminum tissue concentrations for Lac du Sauvage and Lac de Gras are recalculated below using the methods described above, and using the maximum, median, and minimum most reliable site-specific BAFs, and the BAF calculated by Cleveland et al. (1991). Water quality predictions for Lac de Gras were updated after the DAR was submitted and are used in this response (Golder 2015). Tables 102-1 and 102-2 present predicted fish tissue concentrations of aluminum calculated using the maximum, median, and minimum site-specific BAFs, and the BAF calculated by Cleveland et al. (1991) for Lac du Sauvage and Lac de Gras, respectively.

Maximum predicted aluminum concentrations exceed the tissue-based benchmark during the operations and closure phases in Lac du Sauvage, when using the maximum and median BAFs (Table 102-1)[2]. Maximum predicted aluminum concentrations exceed the tissue-based benchmark during under-ice conditions in the early operations phase in Lac de Gras, when using the maximum BAF (Table 102-2)[3]. When using the minimum site-specific BAF, or the BAF calculated by Cleveland et al. (1991), the maximum predicted aluminum concentration does not exceed the tissue benchmark for any Project phase in Lac du Sauvage and Lac de Gras. The use of the minimum site-specific BAF results in predicted aluminum concentrations approximately 5 and 10 times below the tissue-based benchmark in Lac du Sauvage and Lac de Gras, respectively (Table 102-1 and 102-2). If predicted tissue concentrations do not exceed the tissue benchmark, adverse effects to fish from aluminum are not expected to occur.

As described in Section 8.5.5.3.2 of the DAR, it is unlikely that predicted water concentrations of aluminum in Lac du Sauvage and Lac de Gras during the life of the Project and into operations, calculated using the highest BAF, will result in adverse effects on fish through changes in fish tissue chemistry. This conclusion is based on the following:

- The maximum BAF used to predict aluminum tissue concentrations was conservative. If a less conservative BAF is used, which is consistent with BAFs reported in the scientific literature, the maximum predicted aluminum concentrations would not exceed the tissue-based benchmark (Tables 102-1 and 102-2).
- Aluminum does not bioconcentrate or biomagnify in aquatic organisms (Rosseland et al. 1990); in fact, aluminum potentially undergoes trophic dilution up the food chain (Wilson 2012).
- Aluminum toxicity in fish occurs mainly through waterborne exposure. In water-only exposure, aluminum quickly accumulates in the muscle, and then declines (Cleveland et al. 1991). Dietary studies in fish (Poston 1991; Handy 1993) indicate that bioaccumulation and toxicity via aluminum in the diet is not likely (Wilson 2012).

[2] The predicted aluminum tissue concentrations in Table 102-1 differ slightly from those in Table 8.5-30 of the DAR (Section 8.5.5.3.2) due to the rounding of numbers. There are no differences to the overall results of the assessment presented in the DAR.

[3] The predicted aluminum tissue concentrations in Table 102-2 differ from those in Table 8.5-31 of the DAR (Section 8.5.5.3.2), because the water quality predictions for Lac de Gras used for the calculations were updated after the DAR was submitted (Appendix A, Table A-2; Golder 2015).

- Fish tissue concentrations are higher in low pH exposure (e.g., pH 5.3 and 6.1) compared to neutral pH exposure (pH 7.2) (Cleveland et al. 1991). This is likely due to the higher bioavailability of aluminum in low pH waters, as aluminum is largely insoluble at circumneutral pH (Wilson 2012). Significant toxicity is also observed in the low pH exposures, compared to no toxicity at the pH 7.2 exposure (Cleveland et al. 1991). Most studies investigated aluminum toxicity at low pH ranges that are not representative of the pH ranges observed in the study area or expected as a result of the Project, including the study used to derive the aluminum tissue-based benchmark (pH 4.8; Peterson et al. 1989).

In summary, if a lower BAF is used, which is consistent with BAFs reported in the scientific literature, predicted aluminum tissue concentrations do not exceed the tissue-based benchmark during any Project phase in Lac du Sauvage or Lac de Gras. Thus, adverse effects to fish at the maximum predicted aluminum concentration are not expected using the minimum BAF, which is expected given adverse effects to fish were not expected using the maximum BAF in the DAR.

Table 102-1 Predicted Aluminum Concentrations in Fish Tissue Using a Range of Bioaccumulation Factors, Lac du Sauvage

Bioaccumulation Factor		Maximum Predicted Aluminum Concentrations in Water (µg/L)								Predicted Aluminum Concentrations in Fish Tissue (mg/kg ww)							
		Early Operations (2019 - 2023)		Operations (2024 - 2029)		Closure (2030 - 2033)		Post-Closure (2034 - 2060)		Early Operations (2019 - 2023)		Operations (2024 - 2029)		Closure (2030 - 2033)		Post-Closure (2034 - 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Maximum	730	4.4	8.8	63	62	62	53	13	16	n/a	n/a	**46**	**45**	**45**	**39**	n/a	n/a
Median	467									n/a	n/a	**29**	**29**	**29**	**25**	n/a	n/a
Minimum	67									n/a	n/a	4.2	4.2	4.2	3.6	n/a	n/a
Cleveland et al. (1991)	36									n/a	n/a	2.3	2.2	2.2	1.9	n/a	n/a

Notes: **Bolded** predicted aluminum concentrations in fish tissue indicate an exceedance of the tissue benchmark of 20 mg/kg ww. Maximum predicted aluminum concentrations in water are those presented in the Jay Project Developer's Assessment Report (DAR Section 8.5.4.2.2, Table 8.5-24).

µg/L = micrograms per litre; mg/kg ww = milligrams per kilogram wet weight; n/a = aluminum not retained as constituent of potential concern for this Project phase or seasonal condition (DAR Section 8.5.5.3.2).

Table 102-2 Predicted Aluminum Concentrations in Fish Tissue Using a Range of Bioaccumulation Factors, Lac de Gras

Bioaccumulation Factor		Maximum Predicted Aluminum Concentrations in Water (µg/L)								Predicted Aluminum Concentrations in Fish Tissue (mg/kg ww)							
		Early Operations (2019 - 2023)		Operations (2024 - 2029)		Closure (2030 - 2033)		Post-Closure (2034 - 2060)		Early Operations (2019 - 2023)		Operations (2024 - 2029)		Closure (2030 - 2033)		Post-Closure (2034 - 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Maximum	730	29	28	27	25	23	24	21	19	**21**	20	20	18	17	18	15	13
Median	467									14	13	13	12	11	11	9.8	8.4
Minimum	67									1.9	1.9	1.8	1.7	1.5	1.6	1.4	1.2
Cleveland et al. (1991)	36									1.0	1.0	1.0	0.9	0.8	0.9	0.8	0.6

Notes: **Bolded** predicted aluminum concentrations in fish tissue indicate an exceedance of the tissue benchmark of 20 mg/kg ww. Maximum predicted aluminum concentrations in water are those presented in the Jay Project Lac De Gras Hydrodynamic Model Updates memorandum (Appendix A, Table A-2; Golder 2015).

µg/L = micrograms per litre; mg/kg ww = milligrams per kilogram wet weight.

References:

Cleveland L, Little EE, Ingersoll CG, Wiedmeyer RH, Hunn JB. 1991. Sensitivity of brook trout to low pH, low calcium and elevated aluminum concentrations during laboratory pulse exposures. Aquat. Toxicol. 19: 303-318.

Golder (Golder Associates Ltd.). 2015. Jay Project – Lac de Gras Hydrodynamic Model Updates. Technical Memorandum. Prepared for Dominion Diamond Ekati Corporation. Yellowknife, NWT, Canada.

Handy RD. 1993. The accumulation of dietary aluminum by rainbow trout, *Oncorhynchus mykiss*, at high exposure concentrations. J. Fish Biol. 42: 603-606.

McGeer JC, Brix KV, Skeaff JM, DeForest DK, Brigham SI, Adams WJ, Green A. 2003. Inverse relationship between bioconcentration factor and exposure concentration for metals: Implications for hazard assessment of metals in the aquatic environment. Environ. Toxicol. Chem. 22: 1017 1037.

Peterson RH, Bourbonniere RA, Lacroix GL, Martin-Robichaud DJ, Takats P, Brun G. 1989. Responses of Atlantic salmon (*Salmo salar*) alevins to dissolved organic carbon and dissolved aluminum at low pH. Water Air Soil Pollut. 46: 399-413.

Poston HA. 1991. Effects of dietary aluminum on growth and composition of young Atlantic salmon. Prog. Fish Cult. 53: 7-10.

Rosseland BO, Eldhuset TD, Staurnes M. 1990. Environmental effects of aluminum. Environ. Geochem. Health. 12: 17-27.

Wilson RW. 2012. Aluminum. Chapter 2 in Wood CM, Farrell AP, Brauner CJ (eds). Homeostasis and Toxicology of Essential Metals. Fish Physiology, Volume 31A. Elsevier Academic Press, New York, NY, USA.

DOMINION DIAMOND

Information Request Number:	DAR- KIA-IR-107
Source:	Kitikmeot Inuit Association: Tannis Bolt
Subject:	Aquatic Effects Monitoring Program
DAR Section(s):	Section 9 (page 9-6, Table 9.1-2), Appendix 9C

Preamble (KIA):

Proposed fisheries measurement indicators include fish survival, reproduction, abundance and distribution. Thus, it is very useful to have baseline measurements of these parameters in order to asses any potential effects from mining

Request (KIA):

Future stages of the Aquatic Effects Monitoring Plan should be reviewed by the KIA in order to determine (1) the proposed metrics for assessing fish survival, reproduction, abundance and distribution and (2) the available baseline data associated with these parameters.

Response:

As described in the Appendix 9C (Conceptual Aquatic Effects Monitoring Program [AEMP] of the Developer's Assessment Report, an AEMP will be required of the Jay Project (Project) through the water licence and will involve programs focused on the receiving environment. Given the Project is an extension of the existing Ekati Mine, it is anticipated that the proposed fisheries metrics will be aligned with the existing Ekati Mine AEMP (ERM Rescan 2013). There will be an opportunity for community engagement and comment on the conceptual design of the AEMP related to the Jay Project during the water licensing phase of the Project.

References:

ERM Rescan (ERM Rescan Environmental Ltd.). 2013. Ekati Diamond Mine Aquatic Effects Monitoring Program Plan for 2013 to 2015. Prepared for Dominion Ekati Corporation by Rescan Environmental Services Ltd. Yellowknife, Northwest Territories.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-2
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Caribou and other wildlife crossing dewatered lakebed.
DAR Section(s):	13.3

Preamble (MVEIRB):

On page 13-78, DDEC assessed injury or mortality to wildlife being trapped in exposed lakebed sediments as a pathway with no linkage resulting in the pathway not being carried through in the assessment. Therefore no mitigation was proposed (Table 13.3-1 and 12.3-1). However, page 13-93 in the wildlife section and 12-62 in the caribou section observe that vegetation establishment in the lakebed may attract wildlife, in particular caribou to the drained lakebed. The current 5 km dike design results in a 4.2 km portion of lakebed exposed during mine operations. Due to nearby presence of the esker and water rock management area, wildlife including caribou may move along the dike and cross portions of the dewatered lake bed.

Request (MVEIRB):

Dominion, please provide evidence for statement that “the dewatered portion of Lac du Sauvage will form a hard pan crust” as rationale for concluding that this pathway has no linkage. Please describe how DDEC will manage caribou and other wildlife that migrate through or enter the exposed lakebed in the diked area of Lac du Sauvage and mitigate any adverse impacts.

Response:

To clarify, this pathway was assessed as ‘secondary’ for caribou (Section12.3.2.2.2 of the Developer’s Assessment Report [DAR]) and ‘no linkage’ for grizzly bear, wolf, and wolverine (Section 12.3.2.2.1). For carnivores, there is no record of individuals becoming trapped in exposed lakebed sediments during the 15 to 17 years of construction and operations of the Ekati and Diavik mines. Three caribou died after becoming stuck in exposed lakebed sediments during the dewatering of King Pond at the Ekati Mine that occurred in 2000/2001; no other caribou mortalities have occurred involving lakebed sediments (BHP 2012). There is no record of injury or mortality to caribou or other wildlife from becoming trapped in processed kimberlite fines in the processed kimberlite containment areas at existing diamond mine sites in the NWT. Subsequently, this pathway was assessed as no linkage for carnivores and secondary for caribou.

The risk for mortality from being stuck in exposed lakebed sediments is likely to be higher during the final stages of dewatering when the lakebed sediments are saturated with water. Experience from the Diavik Mine suggests that the exposed lakebed will develop a hard, caked or crusted surface upon desiccation. Soils with high clay and silt content (such as lakebed sediments) have higher bulk density and penetration resistance than other soil types (Daddow and Warrington 1983). The sediments in Lac du Sauvage are predominantly silt (median = 50 percent [%]) followed by clay (median = 30%) (Section 8.2.5.3 of the DAR). As such, dry lakebed sediments are anticipated to pose less of a threat for caribou mortality.

Additionally, if and when vegetation colonizes the lakebed sediments, the sediment is anticipated to be in a state that would likely represent little risk for caribou (and carnivores) to become trapped.

The proposed Jay dike is expected to limit caribou access to the exposed lakebed sediments. Additionally there will be a high amount of traffic and other sensory disturbance associated with the Jay Pit, which is likely to limit caribou attraction to the dewatered portion of Lac du Sauvage. The Jay dike and pit area will be part of routine site surveillance monitoring for the Ekati Wildlife Effects Monitoring Program. If caribou approach the diked area, Dominion Diamond will implement deterrent procedures (e.g., walking towards caribou) to keep animals and people safe (DAR Section 12.3.2.2.2).

References:

Daddow RL, Warrington GE. 1983. Growth-Limiting Soil Bulk Densities as Influenced by Soil Texture. Watershed Systems Development Group Report WSDG-TN-00005. USDA Forest Service, Fort Collins, CO, USA.

BHP Billiton. 2012. Ekati Diamond Mine 2012 Environmental Impact Report. Yellowknife, NWT, Canada. October 2012.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-3
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Project Alternatives - Alternatives assessment of waste rock storage areas
DAR Section(s):	2.5.2

Preamble (MVEIRB):

The multiple accounts analysis for the waste rock storage area was based on a number of assumptions, some of which are a bit unclear.

Request (MVEIRB):

Dominion, please provide additional detail on the following:

1) Why are the closure and reclamation costs for all three alternatives considered to be similar?

2) Why would the contingency seepage water management for alternative two be more complex than alternative one?

Response:

1) The waste rock storage area (WRSA) would be reclaimed according to the methods described in the Ekati Mine Interim Closure and Reclamation Plan and would focus on providing a relatively flat upper surface that discourages snow accumulation, and provides for wildlife safety through caribou emergency egress ramps. In addition, the WRSA(s) would be designed and operated to achieve overall 3 horizontal to 1 vertical slopes and to maintain geochemical stability, in consideration of the intended closure concept. As a result, minimal effort is anticipated for reclamation and closure of the WRSA(s) following operations, and therefore, the costs associated with reclamation work were not considered substantial enough to differentiate between the alternatives.

2) Collection of seepage water is not anticipated based on geochemical testing and past experience at the Ekati Mine. However, the management of potential seepage water from the Alternative 2 WRSA location in the south is more complex because if poor quality seepage is experienced to the degree that necessitates active management, water would have to be collected and pumped to the Jay Sump which is within the dewatered area around the Jay Pit. This pumping infrastructure would be required to cross (or go around) the proposed Sub-Basin B Diversion Channel and the Project access road. The Alternative 1 WRSA location is adjacent to the Jay Pit with most of the potential seepage reporting through natural flowpaths into the diked area. The collection of potential seepage and direction of this seepage to the Jay Sump, if necessary, would be expected to be more straightforward.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-8

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Fish and Fish Habitat - Fish habitat and dike interstitial waters

DAR Section(s): 9.3.2.2.2

Preamble (MVEIRB):

7.3.2 Impacts to fish and fish habitat from project components states “The developer will describe (incorporating seasonal variation and the sensitivities of specific life cycle stages) the impacts to fish, aquatic life, species-at-risk, and respective habitats from project-related changes to: … the potential for fish use of the Lac du Sauvage diking as fish spawning habitat and the potential for impacts to eggs or fry from any contaminants coming off or within the interstitial spaces of the dike” Vol. 9 Sect. 9.3.2.2.2, p. 9-150 describes the inert nature of the granite used to build the dike. The conclusion above is based on a) an unqualified statement that the granite material is inert and does not address direct assessments of leaching that were carried out by Diavik Diamond Mines in 2010 (DDMI. 2011. Lakebed sediment, water quality and benthic invertebrate study A154 Dike - Year 4 Results, A 418 Dike - Year 2 Results. August 2011. Rpt. 1073-00) b) Partial conclusions of the Fitzsimons (2013) report on spawning activity, which found no evidence of spawning activity on the dikes but which also discussed the problems of detecting spawning lake trout anywhere in Lac de Gras.

Request (MVEIRB):

Dominion, plese re-evaluate the pathway “The dike isolating the Jay pipe may provide spawning habitat for fish where any potential contaminants within interstitial spaces may affect survival of eggs or fry in Lac du Sauvage” with a complete discussion of the supporting evidence.

Response:

The egg survival pathway identified in the information request was assessed in Section 9.3.2.2.2 of the Developer’s Assessment Report (DAR) for the Jay Project under the pathway of *The dike isolating the Jay pipe may provide spawning habitat for fish where any potential contaminants within interstitial spaces may affect survival of eggs or fry in Lac du Sauvage*.

The potential concern related to the dike material and spawning is whether the dike material may elevate concentrations of metals within interstitial spaces of the dike materials such that they are toxic to fish eggs that may be deposited within the spaces, affecting survival of developing embryos. Fish species, such as Lake Trout, deposit eggs on rocky spawning shoals; the eggs settle into cracks and crevices in the shoal, where they incubate from four to five months (species life history reviewed in Richardson et al. 2001). If shoal-spawning fish such Lake Trout were attracted to the dike material (i.e., the dike material attracts fish from their natal spawning location), which is not expected (see below), there could be a potential for effects on populations of fish if water quality was extremely poor, which is not expected (see below).

Within the DAR, the assessment of the pathway was based on results of the acid generation tests on granite summarized in the Geochemistry Baseline Report (Annex VIII), and a review of the potential use of dike materials as spawning habitat using information in the Fitzsimons (2013) report and the Fish and Fish Habitat Baseline Report (Annex XIV). The assessment of the pathway concluded that the potential for fish eggs or fry to be affected by contaminants coming off or within the interstitial spaces of the dike was negligible because of:

1) the inert nature of the granite to be used to construct the dike; and,

2) the predicted low levels of spawning activity by shoal-spawning species on the dike.

As such, the pathway was determined to be secondary and have negligible residual effects to Lake Trout and Lake Whitefish.

The following provides additional information for the pathway and to provide further evidence to support the assessment that the potential for fish eggs or fry to be affected by contaminants coming off of or within the interstitial spaces of the dike is predicted to be negligible. As described in Section 3.3.2 of the DAR and the Geochemistry Baseline Report (Annex VIII), geochemical characterization of the main rock types at the Ekati Mine has been ongoing since 1995. A regional geochemical dataset was compiled using existing data from the Ekati Mine, which were collected between 1995 and 2014. The regional dataset was used to develop an understanding of the acid rock drainage and metal leaching potential of the main rock types in the Project area, including granite. The granitic rock at the Ekati Mine has been characterized as non-potentially acid generating (non-PAG); this is the reason that granite is used, commonly as a requirement of the Water Licence or the Inspector, for all construction activities at the Ekati Mine. As stated in the DAR, the dike isolating the Jay pipe in Lac du Sauvage will be constructed of granite rockfill which geochemical testing determined to be non-PAG (Section 8.2.2.3; Annex VIII). Therefore, parameter concentrations (e.g., metals) would not increase to levels harmful to developing embryos as a result of leaching from the dike material. Based on the placement of the dike and associated fetch in Lac du Sauvage, wind and wave action along the dike will allow for flushing and movement of water into the interstices of the dike. As a result, the water chemistry within the interstitial spaces of the dike is not expected to deviate substantially from ambient lake water, or from interstitial water at natural spawning habitat.

Given the close proximity of the Jay Project to the Diavik Diamond Mine (Diavik Mine), it is anticipated that the rockfill material used to construct the dike for the Jay Project would be of similar composition to that of the dikes at the Diavik Mine. Monitoring was conducted for two dikes at the Diavik Mine (i.e., Dikes A154 and A418), which are located near East Island in Lac de Gras. The results are reported in “Lakebed Sediment, Water Quality and Benthic Invertebrates Study: A154 Dike – Year 4 Results; A418 Dike – Year 2 Results” (DDMI 2011); it was determined that the dikes have little effect on water quality, sediment quality, and benthic invertebrate communities

DDMI (2011) investigated the potential effects of the two dikes on water quality, sediment quality, and benthic invertebrate communities, while taking into account the confounding factor provided by mine water discharge. The study design compared samples from several radial transects extending from the dikes to control locations in Lac de Gras. The water quality investigation included samples from near the lake bottom, and samples collected from interstitial spaces in the dike material using passive diffusion samplers. Increased concentrations of water quality parameters could not be conclusively linked to

leaching from the dike, and if leaching from the dike was occurring, it was most likely to be restricted to only increases in major ions and turbidity (DDMI 2011). Furthermore, the only parameter to exceed the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life was pH, which was naturally below the guideline's lower limit in samples collected from control locations (DDMI 2011).

Similarly, DDMI (2011) found that potential for effects on sediment quality from the dikes were low. Concentrations of arsenic, chromium, and copper frequently exceeded CCME Sediment Quality Guidelines at both locations near the dikes and at control locations, indicating naturally elevated concentrations. Benthic invertebrate communities also showed no negative responses to the dikes. With the exception of the sampling locations nearest to the mine water discharge, all sampling transects nearest to the A154 dike had higher benthic invertebrate densities when compared to control stations, which the researchers suggest potentially indicates a positive effect of the dikes on invertebrate density (DDMI 2011). Proximity to the dike did not appear to have an effect on benthic invertebrate diversity and richness.

Results of geochemical testing of granitic waste rock from the Renard Diamond Project, located in Quebec, Canada (Stornoway 2011a,b) were also reviewed for additional context. The environmental impact statement for the Renard Diamond Project (Stornoway 2011a) which includes three open pits for mining kimberlite pipes and a 740 metre (m) deep shaft for underground extraction of kimberlite pipes, provides another example where granite material is shown to be relatively inert. Kinetic geochemical testing to determine the potential for leaching was conducted on the granitic waste rock which concluded that the material was not leachable, nor acid generating (Stornoway 2011a,b). As such, metals were not expected to leach at concentrations that that could represent a risk to aquatic life (Stornoway 2011a). These characteristics allowed waste rock to be used for construction without restrictions (Stornoway 2011a).

Potential use of the dike material as spawning habitat for Lake Trout and Lake Whitefish is another consideration in the potential assessment of exposure to water chemistry in the interstitial spaces (where habitat use is generally defined the way an animal uses the habitat). Use of the dike may be driven by external considerations such as competition (e.g., exclusion), or by active selection by fish for the characteristics of the dike (e.g., Beyer et al. 2010). Thus, potential use of the dike may be determined by the suitability of the material for spawning (e.g., substrate size, location of the material relative to prevailing winds), and the availability of spawning shoals in the lakes (i.e., within both Lac de Gras and Lac du Sauvage). For example, if the availability or abundance of spawning shoal habitat is a limiting factor for population sizes in a lake (i.e., there is very little suitable habitats for spawning), then it is expected that there could be a high potential for adults to leave their natal spawning locations and use (or select) newly deposited dike material for spawning. However, a previous assessment of the Diavik Mine dike in Lac de Gras did not detect Lake Trout spawning on the dike or adjacent habitats even though they were constructed of appropriately sized substrates for spawning (Fitzsimons 2013). The findings suggest that spawning habitat is not limiting in Lac de Gras for species such as Lake Trout. Rather, fish populations are likely limited at other life history stages or by other factors, such as food production. In oligotrophic Arctic lakes where nutrient inputs can be limited (e.g., Johnson 1976), changes in bottom-up processes (e.g., production of plankton) can influence fish abundance if food is limiting. An increase in the size of a waterbody (i.e., the amount of foraging habitat) can have a similar effect on fish abundance.

The findings in Fitzsimons (2013) are also supported by the fact that the existing environment for fish provides an abundance of suitable spawning habitat throughout Lac de Gras and Lac du Sauvage, as summarized in Section 9.2.4.1.1 of the DAR (and also reported in Annex XIV, see Map 2.2-1 to 2.2-3). Within Lac du Sauvage, an estimated 18 million square metres (m^2) of Lake Trout spawning habitat of good and fair quality was identified as present as non-attached shoals and shoals extending from small islands. Lac de Gras may provide as much as 58 million m^2 of Lake Trout spawning habitat (Annex XIV). Thus, the addition of dike material in Lac du Sauvage is unlikely to attract fish for spawning because of existing conditions that provide an abundance of natural shoal habitats throughout the effects study area. The "if you build it, they will come" scenario may not apply for the dike for spawning fish in Lac du Sauvage and Lac de Gras due to the abundance of high quality natural spawning habitat in Lac du Sauvage and Lac de Gras. Although incidental use of the dike for egg placement by fish is possible, there remains negligible to no potential for significant adverse effects to the eggs of the few fish that may spawn on the dike.

In summary, the potential for fish eggs or fry to be affected by contaminants coming off of or within the interstitial spaces of the dike is predicted to be negligible and the conclusion of this pathway in the DAR remains valid. The pathway is determined to be secondary and have negligible residual effects to Lake Trout and Whitefish populations.

References:

Beyer HL, Haydon DT, Morales JM, Frair JL, Hebblewhite M, Mitchell M, Matthiopoulos J. 2010. The interpretation of habitat preference metrics under use–availability designs. Philosophical Transactions of the Royal Society of London B: Biological Sciences 365: 2245-2254.

DDMI (Diavik Diamond Mines Inc.). 2011. Lakebed sediment, water quality and benthic invertebrate: A154 dike – year 4 results, A418 dike – year 2 results.

Dominion Diamond. 2014. Jay Project Developers Assessment Report: Section 9 Fish and Fish Habitat. October 2014.

Fitzsimons JD. 2013. Assessment of the use of dikes at Diavik Diamond Mine Lac de Gras for Lake Trout Spawning 2011. Unpublished Report. Available online: http://www.mvlwb.ca/Boards/WLWB/Registry/2007/W2007L2-0003/W2007L2-0003%20-%20Diavik%20-%20Assessment%20of%20Dike%20Exteriors%20for%20Lake%20Trout%20Spawning%20in%20Lac%20De%20Gras%20-%20Jan%2015_13.pdf; accessed September 21, 2014. 24 pages.

Johnson L. 1976. Ecology of Arctic populations of lake trout, *Salvelinus namaycush*, lake whitefish, *Coregonus clupeaformis*, Arctic char, *Salvelinus alpinus*, and associated species in unexploited lakes of the Canadian Northwest Territories. J Fish Res Bd Canada 33: 2459-2488.

Richardson ES, Reist JD, Minns CK. 2001. Life history characteristics of freshwater fishes occurring in the Northwest Territories and Nunavut, with major emphasis on lake habitat requirements. Can Manusc Rep Fish Aquat Sci 2569: vii + 146 p.

Stornoway (Stornoway Diamond Corporation). 2011a. Environmental and Social Impact Assessment – Main Report. Renard Diamond Project. Available online: http://www.ceaa-acee.gc.ca/050/documents-eng.cfm?evaluation=55169. Accessed February, 2015.

Stornoway. 2011b. Environmental and Social Impact Assessment – Appendix 3.6.1. Static and kinetic testing of waste rock, kimberlite and processed kimberlite. Renard Diamond Project, Quebec.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-16
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Mitigation of Effects of Project Infrastructure and Dike Construction to Water Quantity, Roads and Culverts
DAR Section(s):	8.4.2.2.1

Preamble (MVEIRB):

Dominion stated that culverts will be designed for peak flows corresponding to a 1 in 50 yr, 24hr rainfall event.

Request (MVEIRB):

How was this event chosen? Does the 24hr event represent the peak Intensity-Frequency-Duration event?

Response:

The Developer's Assessment Report (DAR) indicated that culvert designs consider the 1 in 50 year event (excluding for the culverts associated with the Sub-Basin B Diversion Channel, as discussed in responses to other Information Requests) in Table 8.4.1 and Section 8.4.2.4.2 of the DAR. Section 8.4.2.2.4 also identifies the 1 in 50 year, 24-hour duration rainfall event as the design event.

The design criteria for culverts will be to the 1 in 50 year return period peak event for the rainfall intensity and duration associated with the site-specific time of concentration for the contributing watershed. This can also be worded as the peak Intensity-Duration-Frequency event for the watershed time of concentration. The contributing watershed time of concentration, and therefore, the rainfall intensity will be determined during the detailed design phase. Calculation of the watershed time of concentration may lead to a duration of less than the 24-hour rainfall event (and therefore a greater rainfall intensity) being selected for design; short-duration rainfall intensities applicable to the Jay Project area are presented in Table 8.2-16 of Section 8.2.3.4.2 of the DAR.

Culverts will be designed and constructed such that structures will provide a minimum design conveyance for the 1-in-50 year event without overtopping the roadway, maintain natural drainage patterns and reduce the use of ditches and diversion berms. In addition, culverts will be installed or upgraded as necessary, and monitored along site access roads to use and maintain natural drainage patterns and minimize potential for erosion.

Information Request Number: DAR-MVEIRB-IR-20

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Hydrogeology - Secondary Pathways

DAR Section(s): 8.4.2.4.2 (Page 8-184)

Preamble (MVEIRB):

With respect to potential changes to groundwater discharges to lakes nearby to the open pit, it is concluded that there may be effects to Lake C1 but that: "Early monitoring during initial stages of Jay pit dewatering will allow refinement of the extent of the enhanced permeability zone, and if necessary, the implementation of mitigation for changes in groundwater discharge from Lake C1".

Request (MVEIRB):

What kind of mitigation could be implemented in this case?

Response:

The lateral extent of the enhanced permeability zone (EPZ) east of the Jay pipe is uncertain and in reality may not pass through Lake C1. Moreover, the transmissive properties of the EPZs (i.e., the permeability and/or the width) may decrease with distance from the Jay pipe. Conceptually, the genesis of a kimberlite pipe would indicate that the greatest disturbance to the rock mass through fracturing would be near to the kimberlite pipe and that this disturbance would reduce with distance away from the pipe and with depth. Similarly, the width and permeability of the EPZ would be greatest near to the kimberlite pipe and that this would be diminish with distance away from the pipe and with depth. The hydrogeological model (Appendix 8A of the Developer's Assessment Report [DAR]) conservatively assumes that the EPZ passes through Lake C1 and that EPZ permeability and width does not change with distance from the pipe (both assumptions result in predicted mine inflow and predicted effects to the lake that are conservatively high). With these conservative assumptions in place, the resulting potential effect on Lake C1 is anticipated to be limited to small changes in water level, with monthly mean stages of water levels during the open water season (June to September) being expected to change by less 0.04 m during mining (DAR Section 8.5.2.3). Therefore, there is limited potential for these water level changes to affect water quality and sediment quality (DAR Section 8.4.2.4.2, Page 8-205) and effects to fish habitat are expected to be negligible (DAR Section 9.3.2.2, Page 9-146). Lake C1 is a relatively deep lake (23.5 m in maximum depth) with populations of Round Whitefish, Lake Trout, Arctic Grayling, and Slimy Sculpin; habitat connectivity between Lac du Sauvage and Lake C1 is maintained by Stream C1 (DAR Section 9.2). Once again, these predictions in water level changes are based on conservative assumptions of the location of the EPZ (DAR Section 8.4.2.4.2; Appendix 8A).

Despite the expectation of only a small water level change in Lake C1 during mining, water levels and outlet discharge will be monitored to track the hydrological conditions at Lake C1 as part of the environmental monitoring programs (DAR Section 8.8.2, Page 8-456). These data will be compared to the effects predictions for lake water levels, discharges, and basin connectivity for Lake C1, and thus provide a mechanism to identify unanticipated effects if they occur. If changes are identified that indicate a trend

that exceeds DAR expectations, the data will be used inform the implementation of adaptive management plans. In the unlikely event that observations collected in the early stages of mining indicate that the EPZ near the Jay pipe does affect lake levels or outlet water flow in Lake C1 such that fish populations in Lake C1 may be adversely affected, then mitigation could be considered if necessary under the adaptive management framework. The need for, and extent of any, mitigation would be discussed with Fisheries and Oceans Canada as part of the monitoring and adaptive management framework.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-22

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Hydrogeology Baseline Report

DAR Section(s): Annex IX (Section 1.3)

Preamble (MVEIRB):

Section 1.3 describes the baseline study area for hydrogeology but does not rationalize how the area was chosen or provide any references.

Request (MVEIRB):

Please describe how the boundaries for the BSA for hydrogeology was chosen or provide a reference to another part of the DAR.

Response:

A description of the baseline study area (BSA) for hydrogeology is provided in Section 1.3 of the Hydrogeology Baseline Report (Annex IX of the Developer's Assessment Report [DAR]). The extent of the BSA for hydrogeology was selected such that it encompassed the area where groundwater might be affected by the Jay Project (Project) activities, and a buffer zone where these activities were not expected to have any effect. This was accomplished early in the study by conducting analytical calculations and model simulation trials to establish the maximum extent of the drawdown cone that could be created during mine dewatering. Because the Jay open pit will be surrounded on three sides by Lac du Sauvage, the drawdown cone is not expected to extend over large distances due to recharge from this lake that would mitigate potential decreases in hydraulic heads in the underlying bedrock. Nevertheless, the BSA was extended well beyond the anticipated drawdown cone: approximately 7.5 kilometres (km) south of the Jay pipe to encompass a portion of Lac de Gras,10 km east to include the eastern arm of Lac du Sauvage, 11 km north to include a portion of Duchess Lake, and 10 km west to include a number of smaller waterbodies, and a portion of Paul Lake.

Figure 8A3-8 in Appendix 8A of the DAR presents the extent of the predicted drawdown at the end of mining, when the Jay open pit is at its ultimate extent and the extent of the drawdown cone is near its maximum. The 1 metre drawdown contour encompass an area where some changes in groundwater flow conditions could be expected. The footprint of this area is entirely within the BSA and shows that BSA is of sufficient extent to include all groundwater affected by Project activities.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-25

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Water Quality - Methods

DAR Section(s): 8.2.5.1

Preamble (MVEIRB):

In this section, a supplemental program for collecting additional data in 2014 was described. It states that analysis and reporting of these data will be provided in a separate addendum at a later date.

Request (MVEIRB):

Why was additional data collected in 2014, how will this information be incorporated into this environmental assessment, will it affect the effects assessment conclusions and when will the information be submitted?

Response:

Additional water quality and sediment quality data were collected in 2014 to supplement the data set collected in 2013 to better understand the spatial and seasonal variability in the study area. For the 2014 sampling program, samples were collected from Lac du Sauvage, small lakes near the Jay Project (Project) site (e.g., Christine Lake and Lake P5), and Lac de Gras (east bay near the Lac du Sauvage outlet and Slipper Bay downstream of the Slipper Lake outlet).

The design of the 2014 program was developed to build upon information used for the Developer's Assessment Report (DAR) from the historical dataset and the data collected in 2013 applicable to the Project; 2014 provided another year of baseline data collection for Lac du Sauvage. An additional year of baseline data collection focusing on Lac du Sauvage was useful because this lake will be subject to direct effects from the Project, and because this region of the watershed has not been as comprehensively monitored as the watersheds near the Ekati Mine and Diavik Mine operations.

Data from the 2014 program have been reviewed and are similar to the baseline data used in the DAR to characterize the effects study area under existing conditions and that were used as calibration data for the DAR water quality modelling. As such, the additional year of baseline data does not change the conclusions of the DAR. Nevertheless, these data will be, and have been, referenced in addressing post-DAR information requests and technical comments, and modelling updates, and will be used as a reference in the development of future monitoring programs.

The 2014 baseline supplemental report is being finalized and will be posted to the Mackenzie Valley Environmental Impact Review Board site as soon as it is available.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-26
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Water Quality in Lac du Sauvage and Lac de Gras during Operations to Post closure
DAR Section(s):	8.5.4.2.2

Preamble (MVEIRB):

The analysis for Lac du Sauvage shows that the maximum predicted concentrations of total phosphorus will be about 0.012 mg/L which is higher than the level of phosphorus corresponding to oligotrophic lakes. However, Dominion concludes the following: "Given the potential for natural variability in TP in Lac du Sauvage of up to 0.018 mg P/L, the CCME (2004) trigger for mesotrophic to meso-eutrophic status was used as the screening value. All predicted TP concentrations are less than this trigger value."

Request (MVEIRB):

The conclusion here contradicts Dominion's earlier characterization of Lac du Sauvage as oligotrophic (see Section 8.2.5.2.1). Is the lake considered oligotrophic or not? Is it common practice to assign a trophic status (and therefore a phosphorus objective) based on a maximum measured value or on a median or mean? If the lake is oligotrophic, then the conclusion that "no COPCs were identified for nutrients" as stated on page 8-357 is not correct.

Response:

In Section 8.2.5.2.1 of the Developer’s Assessment Report (DAR), the characterization of Lac du Sauvage as oligotrophic is made in reference to the median total phosphorus (TP) concentration (0.006 milligrams phosphorus per litre [mg P/L]) under existing conditions (i.e., for data collected from 2004 to 2013) compared to the TP trigger ranges for Canadian lakes and rivers (CCME 2004). As shown in Table 26-1 (extracted from Table 8.2-49 in the DAR), the range of TP concentrations for open-water and under-ice conditions in Lac du Sauvage is 0.0026 to 0.018 mg P/L (n = 234), which broadens the characterization of Lac du Sauvage from ultra-oligotrophic to mesotrophic.

TP concentration data used to characterize water quality, and in particular trophic status, in Lac du Sauvage were collected in 2004, 2006, 2010, 2011, 2012, and 2013 (Table 8.2-49 in the DAR). The summary statistics for TP in Lac du Sauvage, updated with data collected in 2014, are provided below in Table 26-1.

Table 26-1 Base Case Total Phosphorus Concentrations in Lac du Sauvage (2004, 2006, 2010, 2012, 2013, 2014)

Parameter	Unit	Lac du Sauvage							
		Under-Ice				Open-Water			
		Count	Minimum	Median	Maximum	Count	Minimum	Median	Maximum
Total phosphorus	mg P/L	96	0.0034	0.0052	0.0098	171	0.0026	0.0064	0.018

Note: updated from the Developer's Assessment Report.

mg P/L = milligrams phosphorus per litre.

The maximum projected concentration of TP in Lac du Sauvage, presented in Section 8.5.4.2.2 of the DAR (Table 26-2), is 0.012 mg P/L, and is expected to occur in the final year of Misery Pit discharge; the peak median value is 0.0092 mg P/L (Table 26-2). The predicted values are within the natural measured range for the lake. The screening value for TP was set at 0.02 mg P/L to account for the natural measured range in Lac du Sauvage. Predicted TP did not exceed the screening threshold, and thus, the conclusion that TP is not a constituent of potential concern (COPC) is reaffirmed.

Table 26-2 Predicted Total Phosphorus Concentrations in Lac du Sauvage by Project Phase and Assessment Location

Assessment Location	Early Operations (2019 to 2023)			Operations (2024 to 2029)			Closure - Pit Back-Flooding Period (2030 to 2033)			Post-Closure (2034 to 2060)		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Under-Ice												
LDS-P1	0.0068	0.0072	0.0072	0.0069	0.0092	**0.012**[(a)]	0.0067	0.0079	**0.012**[(a)]	0.0068	0.0074	0.0076
LDS-P2	0.0067	0.0071	0.0073	0.0069	0.009	**0.012**[(a)]	0.0067	0.0079	**0.012**[(a)]	0.0069	0.0073	0.0076
LDS-P3	0.0067	0.0071	0.0073	0.0068	0.0079	**0.011**[(a)]	0.0065	0.0077	**0.011**[(a)]	0.0066	0.0074	0.0077
Open-Water												
LDS-P1	0.0066	0.0067	0.007	0.0064	0.0069	0.0091	0.0064	0.0067	0.0085	0.0065	0.0067	0.0073
LDS-P2	0.0065	0.0067	0.0071	0.0064	0.0068	0.0082	0.0064	0.0066	0.0075	0.0065	0.0067	0.0072
LDS-P3	0.0065	0.0066	0.0069	0.0063	0.0068	0.0077	0.0063	0.0066	0.0072	0.0064	0.0068	0.0072

Note: Units are mg P/L = milligrams per litre as phosphorus.

a) Concentration higher than the CCME (2004) trigger range for Canadian lakes and rivers for transition from oligotrophic to mesotrophic status (0.01 mg P/L).

Min = minimum; Med = medium; Max = maximum

The effects of the increase in nutrients in Lac du Sauvage as a result of the Misery Pit discharge to fish and other aquatic life valued components were assessed in the Fish and Fish Habitat section of the DAR (Section 9). Section 9 concluded that the biomass of phytoplankton, zooplankton, and benthic invertebrates in Lac du Sauvage will likely increase during operations, but a clear, defined change in composition of plankton and benthic invertebrate communities is not expected as a result (Section 9.4.4). Thus, from a fish and fish habitat perspective, the conclusion that TP is not a COPC is also reaffirmed.

Maximum TP concentrations (from depth averaged modelling projections) in Lac du Sauvage by mining phase and assessment location were presented in the DAR (Table 8.5-24 in the DAR). To put these TP

concentration projections into context, minimum, median, and maximum statistics from the DAR modelling results are presented (Table 26-2).

In summary:

- median predicted TP concentrations remain less than the CCME (2004) oligotrophic trigger value concentration for lakes and rivers (0.01 mg P/L) at all assessment locations through all Jay Project (Project) phases.
  - the maximum TP concentration predicted in Lac du Sauvage is 0.012 mg P/L (Table 26-2); this is within the natural measured variability of the lake (Table 26-1), but higher than the oligotrophic trigger value.
- as existing TP concentrations range between oligotrophic and mesotrophic trophic levels, using the mesotrophic trigger value (0.02 mg P/L) as the screening criterion for Lac du Sauvage was appropriate.

The DAR concluded that TP is not a COPC because the Project will not cause a change in the lake outside of the measured range of natural variability, and because a community shift in lower trophic organisms was not anticipated as a result of the predicted TP concentrations.

During the construction, operations, closure, and post-closure phases of the Project, water quality in Lac du Sauvage will be monitored, as well as lower trophic communities. Water quality monitoring will include seasonal sampling for nutrients and dissolved oxygen within Lac du Sauvage.

References:

CCME (Canadian Council of Ministers of the Environment). 2004. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Phosphorus: Canadian Guidance Framework for the Management of Freshwater Systems. In: Canadian Environmental Quality Guidelines, 2004. Publication No. 1299. Winnipeg, MB, Canada. ISBN: 1-896997-34-1.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-28
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Water Quality in Lac du Sauvage and Lac de Gras during Operations to Post-closure
DAR Section(s):	8-360

Preamble (MVEIRB):

The second paragraph on this page seems to have incorrect units for the reported peak concentrations for various metals (i.e., written here as mg/L but likely meaning ug/L).

Request (MVEIRB):

Please confirm what the correct units are for each metal.

Response:

The correct units in the second paragraph on page 8-360 should be micrograms per litre (µg/L), and not milligrams per litre (mg/L). The paragraph should read:

> *Maximum concentrations of aluminum, barium, bismuth, cobalt, molybdenum, strontium, and uranium in Lac du Sauvage are predicted to peak in late operations coinciding with the final year of Misery Pit discharge to Lac du Sauvage. To show trends in metals, figures for aluminum, molybdenum, strontium, and uranium are provided (Figure 8.5-86; Figure 8.5-87; Figure 8.5-88; Figure 8.5-89). Peak concentrations of aluminum, barium, bismuth, cobalt, molybdenum, strontium, and uranium are predicted to be 18 µg/L, 0.7 µg/L, 0.006 µg/L, 0.1 µg/L, 0.6 µg/L, 521 µg/L, and 0.6 µg/L higher than maximum measured existing condition data, respectively. In post-closure, steady state concentrations of these metals are expected to be similar or slightly higher than maximum measured concentrations under existing conditions:*

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-45
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Assessment of alternatives – Cardinal Pipe
DAR Section(s):	2.4.6

Preamble (MVEIRB):

The Cardinal Pipe is apparently economically viable but the Alternative of diversion/drawdown and mining of Jay and Cardinal pipes was removed. It is unclear why mining the Cardinal pipe by stand-alone dike was not included in the alternatives assessment? Table 2.4-1 shows that stand alone dike was only considered for the Jay+Cardinal alternative.

Request (MVEIRB):

Why was the Cardinal Pipe not assessed as an alternative for development by a stand-alone dike?

Response:

The Cardinal kimberlite pipe is not economically viable as a stand-alone project because it is a much smaller pipe than the Jay kimberlite pipe and does not support the high costs of a stand-alone dike and other capital costs associated with pit development. As such, a stand-alone dike for mining the Cardinal pipe was not included in the Project Alternatives (Section 2) of the Developer's Assessment Report (DAR). Extraction from the Cardinal pipe was considered for the diversion and drawdown alternative (Section 2.4.3 of the DAR) because the cost to construct the diversion and drawdown dikes that would allow for the development of both the Jay and Cardinal pipes may have been economically viable.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-49
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Water balance model and water management for FPK
DAR Section(s):	3

Preamble (MVEIRB):

The ore from the Jay pit will be processed at the Ekati main camp.

Request (MVEIRB):

Will the processed kimberlite for the Jay Pit differ from other pits on site? And if so, what are the consequences.

Response:

Two kimberlite samples were collected from the Jay pipe area in 2014 (Geochemistry Baseline Report, Annex VIII of the Developer's Assessment Report [DAR]). The kimberlite samples underwent acid base accounting (ABA), net acid generation testing, and bulk metal composition analysis. One sample was submitted for short-term leach testing.

The total sulphur content of kimberlite samples from the Jay pipe area (greater than [<] 0.005 percent [%] to 0.83%; 2 samples) was within the range of total sulphur content of kimberlite samples collected from the other open pits at the Ekati Mine (<0.005% to 1.94%; 359 samples). Both samples of Jay kimberlite were classified as non-potentially acid generating (non-PAG) according to the results of ABA. One kimberlite sample from the Jay pipe had a lower neutralization potential (2.5 kilograms of calcium carbonate equivalent per tonne of material [kg $CaCO_3$/t]) than any kimberlite samples from the other locations (9 kg $CaCO_3$/t to 176 kg $CaCO_3$/t). The other sample had a neutralization potential within the range of the other locations (121 kg $CaCO_3$/t).

Jay pipe kimberlite samples had lower concentrations of some solid phase metals in comparison to the range of concentrations of kimberlite samples collected from the Ekati Mine, including arsenic, barium, mercury, magnesium, nickel, antimony, strontium, and tungsten. Kimberlite from the Jay pipe reported concentrations of silver, bismuth, chromium, molybdenum, magnesium, nickel, and thorium that were similar to those in samples collected from other pits.

No coarse processed kimberlite (CPK) or fine processed kimberlite (FPK) was available from the Jay pipe area at the time of the 2014 geochemical testing program, but similar to the kimberlite, CPK and FPK samples from the Ekati Mine were classified as non-PAG.

Although the Jay sample dataset does not include CPK and FPK samples, the geochemical characteristics of CPK and FPK are expected to be similar to those of kimberlite. The diamond beneficiation process is physical, and relies largely on grain size reduction to recover diamonds from kimberlite ore. The kimberlite from the Ekati Mine has similar geochemical characteristics to CPK and FPK, according to the evaluation presented in the Geochemistry Baseline Report for the Jay Project

(Annex VIII). Furthermore, as stated in the Geochemical Characterization and Metal Leaching Management Plan, the general composition of kimberlite is predictable at the Ekati Mine (BHP Billiton 2007). Therefore, the composition of Jay pipe kimberlite is not expected to vary from the known range of composition of kimberlite from the Ekati Mine.

References:

BHP Billiton (BHP Billiton Canada Inc.). 2007. Geochemical Characterization and Metal Leaching (ML) Management Plan. EKATI Diamond Mine. August 2007.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-50
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Regional Water Balance
DAR Section(s):	Appendix 8B

Preamble (MVEIRB):

The regional water balance study of Desteffany lake used a 4 hr timestep where as the site water balance model used a 1 day timestep. This was apparently done to correspond with the long-term climate data; however, the timestep can be set independently of the daily climate data.

Request (MVEIRB):

Please elaborate on why there was a difference in the timestep used.

Response:

The regional water balance model, including the Desteffany Lake, Lac de Gras, and Lac du Sauvage watersheds, used 4-hour time step to allow a higher frequency of lake outlet discharge calculations. The regional water balance model has approximately 500 lake outlets modelled in parallel and in series. At each lake outlet, the volume of water and corresponding water depth of the lake reservoir during the computation time step, is applied to the lake outlet stage-discharge rating curve and discharged accordingly. Based on manual optimization runs of the model, using a 1-day time step artificially attenuated water within the system of lake reservoirs, especially at smaller modelled lake outlets. A 4-hour time step was observed to improve the lake outlet discharge hydrographs, in particular the peak freshet flows at inlets to Lac du Sauvage. A further reduction to a 1 hour time step did not noticeably improve the results and greatly increased the model runtime.

The site water balance model is based on direct volume transfers, which do not depend on reservoir stage-discharge relationships. A 1-day time step was considered appropriate for the site water balance model.

The site water balance model does not depend on the results of the regional water balance model, and all inputs into the regional water balance model from the site water balance model are transfers into Lac du Sauvage or Lac de Gras. In these large reservoirs, where water level changes from daily site water transfers are small, inputs based on a one day time step were determined to be appropriate.

Information Request Number: DAR-MVEIRB-IR-52

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Effects of Construction

DAR Section(s): 8.5.3.2

Preamble (MVEIRB):

The numbers presented in Figure 8.5-8 do not appear to match the values reported in Table 8D5-47. The values for the 1 in 100 yr peak event indicate a 5.5% increase in the peak flow rate from Lac Ac35.

Request (MVEIRB):

Please confirm the values in Figure 8.5-8.

Response:

The values used to create Developer's Assessment Report (DAR) Figure 8.5-8 - *Effects on Lake Ac35 Outlet Discharges – Project Infrastructure and Dike Construction* (reproduced below as Figure 52-1) are from DAR Table 8D5-47 - *Derived Representative Discharges at Lake Ac35 Outlet – Construction* (also reproduced below as Table 52-1) (Appendix 8D of the DAR). These are shown below as reported in the Jay Project DAR without modification.

Figure 52-1 Effects on Lake Ac35 Outlet Discharges – Project Infrastructure and Dike Construction (DAR Figure 8.5-8)

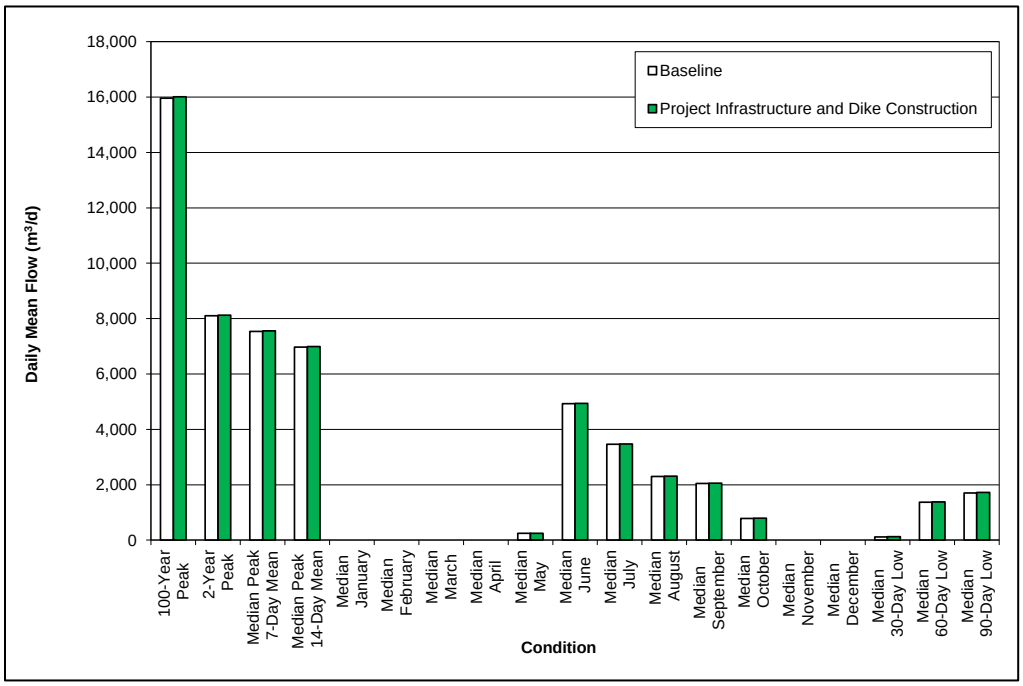


Table 52-1 Derived Representative Discharges at Lake Ac35 Outlet – Construction (DAR Table 5D5-47)

Condition	Return Period (years)	Phase	Peak Daily Q (m^3/s)	7-Day Mean Peak Q (m^3/d)	14-Day Mean Peak Q (m^3/d)	30-Day Low Flow Q (m^3/d)	60-Day Low Flow Q (m^3/d)	90-Day Low Flow Q (m^3/d)
Wet	100	Baseline	0.18	14,514	13,001	1,500	3,309	3,683
		Construction	0.19	14,556	13,039	1,508	3,330	3,710
	10	Baseline	0.14	10,904	9,926	709	2,223	2,561
		Construction	0.14	10,935	9,954	713	2,238	2,579
Median	2	Baseline	0.09	7,533	6,974	120	1,367	1,707
		Construction	0.09	7,554	6,993	121	1,377	1,719
Dry	10	Baseline	0.06	5,042	4,723	-	844	1,183
		Construction	0.06	5,057	4,737	-	850	1,192
	100	Baseline	0.04	3,501	3,291	-	571	887
		Construction	0.04	3,513	3,302	-	576	895

Q= discharge; m^3/s = cubic metres per second; m^3/d = cubic metres per day; - = zero discharge due to ice conditions.

Table 52-1 provides peak 1 in 100 year flows under wet conditions that are rounded to the nearest 0.01 cubic metres per second (m^3/s). In review of the calculated peak flows, the 1 in 100 year peak flows under wet conditions (with increased precision) were estimated as 0.1847 m^3/s (15,959 cubic metres per day [m^3/d]) for baseline conditions and 0.1853 m^3/s (16,006 m^3/d) for the construction phase. Rounding these values to 0.18 m^3/s (baseline) and 0.19 m^3/s (construction) would appear to indicate a 5.5 percent (%) increase in flow, but using the actual, un-rounded values indicates an increase from baseline conditions of just 0.30%. The un-rounded values, and the corresponding calculated increase in peak flows are consistent with those shown in Figure 52-1.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-53

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Effects of Construction

DAR Section(s): 8.5.3.2, Appendix 8D

Preamble (MVEIRB):

The narrows width does not consistently increase for the dewatering case relative to the baseline conditions. In addition, the peak width for Narrows the 1 in 100 yr event decreases while the average event has the width increasing.

Request (MVEIRB):

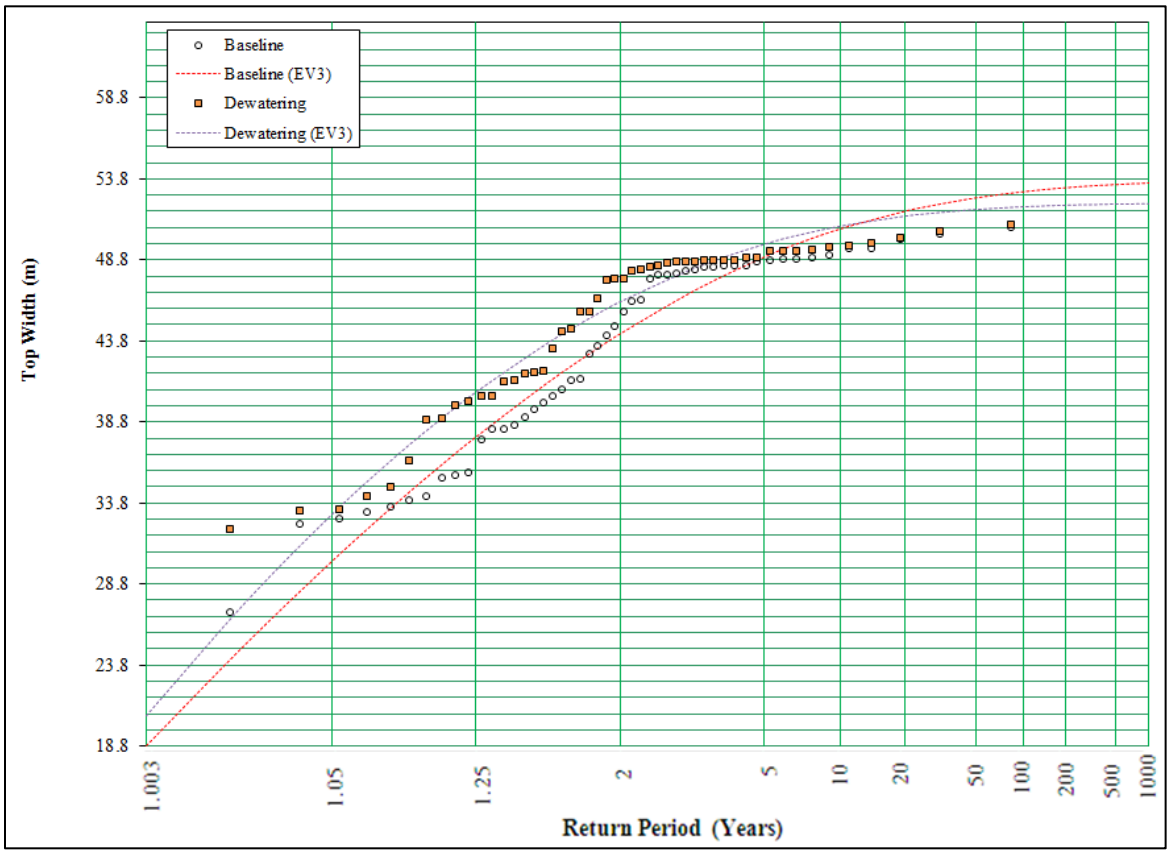
For the Narrows, why does the width not consistently increase for the dewatering case relative to the baseline? Why does the width of the narrows decrease for the larger (1 in 100 yr wet) event?

Response:

The channel top width of the Lac du Sauvage Narrows is expected to increase from baseline values during dewatering. The prediction of channel top width for the 1 in 100 wet year event is based on a frequency analysis using the general extreme value method (EV3 density distribution). The results of this analysis are presented in Figure 53-1, which shows the ranked annual maximum channel top widths corresponding to both baseline conditions and those expected for dewatering conditions. The dewatering case decrease for the 1 in 100 year wet event compared to baseline is a function of the distribution curve and statistical method used.

The statistically predicted effect on the channel top width at the Lac du Sauvage Narrows due to dewatering is small for the 1 in 100 year wet event. Furthermore, Figure 53-1 shows that during high return period events greater than 10 years, the calculated increase in channel top width due to dewatering above baseline is negligible

Figure 53-1 Statistical Comparison of Dewatering and Baseline Case for the Lac du Sauvage Narrows



m = metre; EV3 = extreme value method.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-55

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Fish and Aquatics - Environmental conditions

DAR Section(s): 9.2.1.2.2, 9.4.1.2.1

Preamble (MVEIRB):

Section 9.2.1.2.2. p. 9-16 Baseline water quality for Lac de Gras is taken from Ekati/Diavik AEMP reports from 2010 to 2012. These data therefore represent at least 10 years of mining activity, do not represent baseline conditions and are not adequate for assessment of cumulative effects. Although data from far field sites are used, DDMI AEMP reports show that TDS has increased at some sites. As the Ekati and Diavik mines are currently on the landscape as existing and approved projects, the 2014 baseline of existing conditions include the effects of these developments under the base case. “The Base Case represents a range of conditions over time …before application of the Project …environmental conditions before human development, which represent reference conditions, were considered…where possible.”

Request (MVEIRB):

Please explain why environmental conditions before human development, which represent reference conditions, were only considered …"where possible.” when baseline data on water quality and aquatic life are available from the Diavik EA process. The approach proposed does not allow assessment of cumulative effects from Diavik + Ekati+ Jay but only the effects of the Jay project on a baseline of alteration produced by Ekati and Diavik. Please provide true baseline data for Lac de Gras using EIS data for Ekati and DDMI. This should include water quality, sediment quality, zooplankton and phytoplankton.

Response:

A summary of the cumulative effects assessment completed for water quality in the Developer’s Assessment Report (DAR) and the pre-development condition (referred to as the Reference Condition; i.e., pre-Ekati discharge and pre-Diavik Mine) was provided in the adequacy review response DAR-MVERIB-17 (i.e., the response to adequacy review item 9.1 submitted to Mackenzie Valley Environmental Impact Review Board [MVEIRB] on January 19, 2015).

Water and sediment quality conditions in Lac du Sauvage, Lac de Gras, and other waterbodies in the study area under the Base Case (both Reference Condition and 2014 Baseline Condition) were presented in the DAR (Section 8.2.5.2), and in more detail in the baseline water quality and sediment quality report (DAR Annex XI, Appendix A, Sections A3 and A4). For Lac de Gras, water quality data collected prior to 2000 (DDMI 2001) were used to describe the Reference Condition, while data collected from 2010 to 2012 (DDMI 2011, 2012, 2013; ERM Rescan 2013; Rescan 2011, 2012) were used to describe the 2014 Baseline Condition. Although data are available for the period before 2010, the most recent data were used to reduce the variability in analytical detection limits, which changed over time.

Summaries of zooplankton and phytoplankton plankton community data for the Reference Condition and Baseline Condition were provided in Annex XII, Plankton Baseline Report for the Jay Project (Project).

Plankton data collected before 2000 were considered to be representative of the Reference Condition, while data collected in 2013 were used to describe Baseline Conditions. Although data collected from 2000 to 2012 are not considered true reference data, these data were considered important for characterizing the current and historical conditions and were therefore included in the historical review. The historical plankton data included in the review were obtained from the following sources:

- baseline and long-term Aquatic Effects Monitoring Program (AEMP) data from 1995 to 2012 for the Ekati Mine (Rescan 2012; ERM Rescan 2013);
- baseline data from the 2006 baseline program for the proposed development of the Jay pipe as part of the Ekati Mine (Rescan 2007); and,
- baseline and long-term AEMP data from 1997 to 2012 for the Diavik Mine (Golder 2011; DDMI 2012, 2013).

All of the relevant zooplankton and phytoplankton community data for the Reference Condition and Baseline Condition that we are aware of have been included in the historical review portion of the Plankton Baseline Report for the Project.

As indicated in Section 2.1 of the Plankton Baseline Report for the Project, data from sampling stations in areas exposed to treated effluent were excluded, regardless of whether mine-related effects have been observed (with some exceptions). There were two additional exclusionary criteria used to evaluate the historical data, they were:

1) Notable differences in field sampling methods or laboratory methods, rendering the results to be incomparable to the other datasets; or,
2) A station was sampled only once during the pre-development period, but no further sampling was conducted at this station, rendering the results to be of limited value due to the inability to track changes over time.

We are aware that phytoplankton and zooplankton data were collected in 1997, as part of the baseline sampling program for the Diavik Mine (Golder 1998; Golder 2011). 1997 data from stations WQ-05, WQ-06, and WQ-13 overlapped with existing stations (MF-3, NF, and FFA) currently monitored as part of the Diavik AEMP. However, two of these stations (WQ-05/MF-3 and WQ-06/NF) were considered exposure stations, and were therefore, excluded from the historical review for the Project. The third station (WQ-13/FFA) was included in the historical review for the Project. The remainder of the stations (WQ-10 and WQ-14) did not overlap with existing Diavik AEMP stations; therefore, no further sampling was conducted at these stations after 1997. As a result, 1997 data collected at stations WQ-10 and WQ-14 were considered to be of limited value and were excluded from the historical review for the Project.

References:

DDMI (Diavik Diamond Mines Inc.). 2001. 2000 Aquatic Effects Monitoring Program Technical Report. Yellowknife, NWT, Canada.

DDMI. 2011. Diavik Diamond Mine Aquatic Effects Monitoring Program 2010 Annual Report. Yellowknife, NWT, Canada.

DDMI. 2012. Diavik Diamond Mine Aquatic Effects Monitoring Program. 2011 Annual Report. Diavik Diamond Mines Inc. Yellowknife, NWT, Canada.

DDMI. 2013. Diavik Diamond Mine Aquatic Effects Monitoring Program. 2012 Annual Report. Diavik Diamond Mines Inc. Yellowknife, NWT, Canada.

ERM Rescan (ERM Rescan Environmental Services Ltd.). 2013. Ekati Diamond Mine 2012 Aquatic Effects Monitoring Program Annual Report. Prepared for BHP Billiton Canada Inc. Yellowknife, NWT, Canada.

Golder (Golder Associates Ltd.). 1998. 1997 Aquatic Resources Baseline Program Report. Prepared for Diavik Diamond Mines Inc. Yellowknife, NWT, Canada.

Golder. 2011. 2007 to 2010 AEMP Summary Report. Prepared for Diavik Diamond Mines Inc. Yellowknife, NWT, Canada. 251 pp.

Rescan (Rescan Environmental Services Ltd.). 2007. Ekati Diamond Mine 2006 Jay Pipe Aquatic Baseline. Prepared for BHP Billiton Canada Inc. Yellowknife, NWT, Canada.

Rescan. 2011. Ekati Diamond Mine 2011 Aquatics Effects Monitoring Program. Prepared for BHP Billiton Canada Inc. Yellowknife, NWT, Canada.

Rescan. 2012. Ekati Diamond Mine 2011 Aquatic Effects Monitoring Program Summary Report. Prepared for BHP Billiton Canada Inc. Yellowknife, NWT, Canada.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-56

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Fish and Aquatics

DAR Section(s): 9.3.2.1.3

Preamble (MVEIRB):

The DAR states that "the following maintenance activities will be considered for the life of the mine to further support the success of the diversion channel in providing fish passage: regular inspection and maintenance of outlet channels and culverts to remove accumulated sediment and soil/rock fall material; inspection of culvert inlets and outlets for ice and snow build-up before freshet, and removal of any accumulated ice and/or snow; and, repair of damaged channel linings immediately to limit the potential for erosion and breach of channels".

Request (MVEIRB):

Please provide a commitment to the actually carrying out the listed maintenance activities over the life of mine to ensure safe fish passage to the diversion channel, instead of just considering them in the future.

Response:

As described in Section 3.5.3.2 and Section 9.3.2.1.3 of the Developer's Assessment Report, the Sub-Basin B Diversion Channel will be designed to facilitate fish passage to upstream locations during operations and Dominion Diamond will conduct the necessary maintenance work on the channel that may be required to sustain this objective. The exact nature of the maintenance work that may be required cannot be known at this time, but is likely to include the following tasks, or other tasks identified at the time through monitoring and adaptive management:

- regular inspection and maintenance of outlet channels and culverts to remove accumulated sediment and soil/rock fall material;
- inspection of culvert inlets and outlets for ice and snow build-up prior to freshet, and removal any accumulated ice and/or snow; and,
- repairing damaged channel linings immediately to limit the potential for erosion and breach of the channels.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-59
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Fish and Fish Habitat – Definitions for Reference, Base Case, and Baseline conditions
DAR Section(s):	9.4.1

Preamble (MVEIRB):

This section states that: "The temporal scale includes natural and development-related changes from reference conditions (i.e., before any regional development) through application of the Project, and reasonably foreseeable developments (where applicable). Base Case conditions represent a range of temporal values on the landscape from reference (little or no development) to 2014 (current or existing) baseline conditions. Environmental conditions on the landscape before industrial development (i.e., reference conditions) are considered part of the baseline conditions. This is because the baseline represents a range of conditions over time, and not just a single point in time. Comparison to a reference condition may allow for a further understanding of the cumulative effects of increases in development on the VCs."

Request (MVEIRB):

Please clearly explain the difference between Reference Conditions, Base Case Conditions and Baseline conditions. Describe what time lines are encompassed by each definition and how this influences the assessment of cumulative effects.

Response:

To clarify, the approach to the analysis of cumulative effects used three assessment cases: Base Case, Application Case, and Reasonably Foreseeable Development (RFD) Case (Section 6.5.2.2 of the Developer's Assessment Report [DAR]). However, to provide a fuller understanding of cumulative effects, the Base Case contained two assessment periods that capture the range of baseline conditions from little or no development to previous and existing developments prior to the Jay Project (including approved but not yet constructed projects). Reference conditions represent the earliest assessment period (temporal snapshot) of the Base Case for which data and information are available for describing the environment prior to all industrial development. Thus, reference conditions provide the initial baseline for calculating the cumulative changes from development on the physical and biological measurement indicators of valued components.

For the assessment of available habitat for fish (Section 9.4.3.1), data on reference conditions pre-date the development of the Ekati and Diavik mines. The data were based on spatially-explicit lake and stream habitat features (e.g., polygons and polylines) defined by CanVec (NRC 2011), where CanVec is a digital vector reference product derived mainly from the Natural Topographic Data Base (NTDB) at a scale of 1:50,000. Prior to the application of CanVec data, all features in close proximity to the Ekati and Diavik mines were visually inspected in a Geographic Information System (GIS) to verify that the files represent pre-development conditions in the effects study area (ESA)

Cumulative effects were also considered for all assessment cases for evaluating potential effects on fish and other aquatic life through changes to surface hydrology and water quality (Section 8.5 of the DAR). As the Ekati and Diavik mines are currently on the landscape as existing and approved projects, the 2014 baseline or existing conditions for water quality and hydrology included the effects of these developments under the Base Case. Similarly, as the Application Case is the existing and approved projects plus the Jay Project (Project), this case also includes the cumulative effects of these developments. This is the same approach applied for calculating changes in lake area and stream length for fish habitat. Additional clarity on the assessment cases, including Reference Conditions, used in Section 8 are summarized in the Adequacy Review Response DAR-MVEIRB-17.

To provide further context for the Base Case, baseline field studies were completed to develop an understanding of the existing physical and biological conditions that may be influenced by the Project. Other sources of existing and historical information were also included (e.g., over 38 documents were reviewed in Annex XIV, Fish and Fish Habitat Baseline Report, such as earlier baselines and monitoring programs at the Ekati and Diavik mines). In the DAR, a second assessment period for the Base Case was selected to describe the existing or current baseline conditions prior to application of the Project (i.e., 2014 baseline conditions). Where possible, quantitative and qualitative analyses of changes in habitat-related measurement indicators from reference to 2014 baseline conditions were considered (e.g., quantitative changes in lake area measured in hectares, qualitative predictions for lower trophic organisms based on changes in water quality) to predict the cumulative effects from human-related environmental selection factors on valued components for the Base Case. Total estimated effects at the Base Case provides important context for evaluating the significance of the incremental and cumulative effects from the Project and other developments at the Application (Base Case plus Project) and RFD (Application plus future developments, if applicable) cases.

References:

NRC (Natural Resources Canada) 2011. CanVec Data Product Specifications, Edition 1.2. Natural Resources Canada, Sherbrooke, Quebec. 19 pp.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-60

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Fish and Aquatics

DAR Section(s): 9.4.2.3

Preamble (MVEIRB):

The DAR states that total phosphorus will exceed the CCME (2004) trigger range of 4-10 ug/L for oligotrophic lakes but will remain within the ranges characteristic of oligotrophic lakes (3-17.7 ug/L, Wetzel 2001). This statement is contradictory and a textbook reference should not supersede CCME as a reference point for oligotrophic status in Canada.

Request (MVEIRB):

Please conduct the nutrient assessment using the CCME guidelines to assess the magnitude of change.

Response:

The ranges of total phosphorus concentrations provided in Wetzel (2001) were based on analyses of over 200 waterbodies from data collected as part of an international eutrophication program and modified from Vollenweider (1979). These ranges were provided as context, to illustrate the variability in total phosphorus concentrations in lakes of similar trophic status, but did not form the basis of the assessment of effects on trophic status.

Evaluation of trophic status in the DAR considered predicted concentrations of total phosphorus and nitrogen, as well as phytoplankton biomass (as chlorophyll *a*), using the approach described in Section 9.4.2.2 of the DAR. Effects on lower trophic communities from changes in water quality were predicted using qualitative methods, including an assessment of trophic status based on nutrient concentrations (CCME 2004; Environment Canada 2004; Wetzel 2001). The assessment of trophic status using total phosphorus was based on trigger values defined by CCME (2004) as shown in Table 9.4-2 of the DAR; this table has been reproduced as Table 60-1 below, with additional notes identifying sources.

Table 60-1 A General Trophic Classification of Lakes (CCME 2004; Wetzel 2001)

Trophic Classification	Total Phosphorus[(a)] (TP; µg/L)	Total Nitrogen[(b)] (TN; µg/L)	Chlorophyll *a* [(b)] (µg/L)
Oligotrophic	4.0 – 10	307 – 1630	0.3 – 4.5
Mesotrophic	10 – 20	361 – 1387	3.0 – 11
Eutrophic	35 – 100	393 – 6100	3.0 – 78

a) Based on CCME (2004).
b) Based on Wetzel (2001).
µg/L = micrograms per litre.

References:

CCME (Canadian Council Of Ministers of the Environment). 2004. Canadian Water Quality Guidelines for the Protection of Aquatic Life: Phosphorus: Canadian Guidance Framework for the Management of Freshwater Systems. Canadian Environmental Quality Guidelines, 2004. Winnipeg, MB, Canada.

Environment Canada. 2004. Canadian Guidance Framework for the Management of Phosphorous in Freshwater Systems. Ecosystem Health: Science-based Solutions Report No. 1-8. National Guidelines and Standards Office, Water Policy and Coordination Directorate, Environment Canada, pp. 114.

Vollenweider RA. 1979. Das Nährstoffbelastungskonzept als Grundlage für den externen Eingriff in den Eutrophierungsprozess stehender Gewässer und Talsperren. Z. Wasser-u. Abwasser-Forschung. 12:46-56.

Wetzel RG. 2001. Limnology, 3rd Edition. Elsevier Science Academic Press, New York. 1,006 pp.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-62

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Fish and Aquatics

DAR Section(s): 9.4.3.1.2

Preamble (MVEIRB):

On page 9-189, it states: "Higher concentrations of TDS (in particular calcium) may stimulate growth of Daphnia species and potentially cause a shift in community structure towards larger-sized zooplankton. Calcium limitation may explain the observation that high TDS lakes are associated with higher zooplanton productivity".

Request (MVEIRB):

Please provide a reference for this (e.g. Snap Lake?) as was done for benthos on p. 9-190.

Response:

Although biotic factors (e.g., predation) are most commonly cited as influencing the size structure of zooplankton assemblages, several researchers have demonstrated that abiotic characteristics, such as water hardness, and calcium and total dissolved solids (TDS) concentrations, can also play an important role in influencing the size structure of zooplankton assemblages (Tessier and Horwitz 1990; Shuter et al. 1998; Hessen et al. 2000; Waevagen et al. 2002). Tessier and Horwitz (1990) observed a shift in size structure of zooplankton in response to changes in water hardness. In their study of 146 lakes in northeastern United States, decreasing water hardness resulted in a loss of large-bodied zooplankton and an increase in the abundance of smaller rotifers. Large-bodied zooplankton, including *Daphnia pulex, D. pulicaria, D. schodleri,* and *D. galeata mendotae,* were found to be notably absent from lakes with low water hardness (Tessier and Horwitz 1990). The distribution of *Daphnia* species is often related to the calcium concentration in lakes, as calcium is an essential element for zooplankton growth and the development of their carapace (Waevagen et al. 2002). Hessen et al. (2000) found increases in calcium concentrations to be associated with increased growth and egg production of *Daphnia magna*. Shuter et al. (1998) attributed increased growth of Lake Trout in high TDS lakes to higher zooplankton productivity at higher TDS levels, which may have contributed to greater food availability for Lake Trout (Shuter et al. 1998).

References:

Hessen DO, Alstan NEW, Skardal L. 2000. Calcium Limitation in *Daphnia magna.* J Plankton Res. 22(3): 553-568.

Shuter BJ, Jones ML, Korver RM, Lester NP. 1998. A general, life history based model for regional management of fish stocks: the inland lake trout (*Salvelinus namaycush*) fisheries of Ontario. Can J Fish Aquat Sci. 55: 2161–2177.

Tessier AJ, Horwitz RJ. 1990. Influence of water chemistry on size structure of zooplankton assemblages. Can J Fish Aquat Sci. 47: 1937–1943.

Waevagen SB, Rukke NA, Hessen DO. 2002. Calcium content of crustacean zooplankton and its potential role in species distribution. Freshwater Biol. 47: 1866-1878.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-64

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Lake Modelling

DAR Section(s): 2 (Page 2-6), 9 (Page 9-13 and Page 9-83)

Preamble (MVEIRB):

These sections variously describe the narrows between Lac de Sauvage and Lac de Gras as "it is expected that flow is maintained year round", "swift currents may keep waters open in the winter", "It is expected that year-round flows are maintained" and "open water remains in the narrows year round".

Request (MVEIRB):

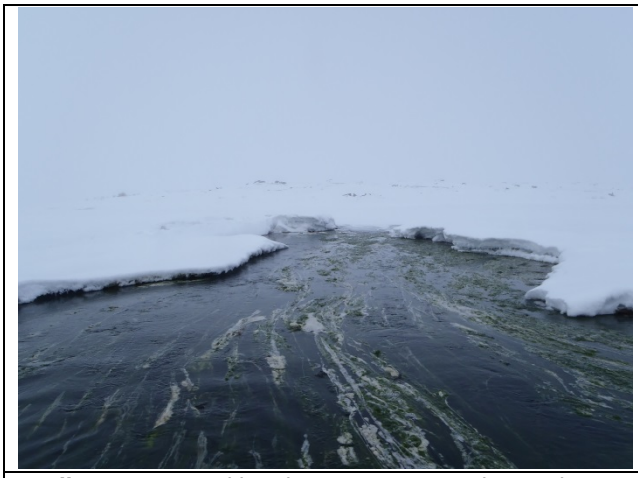
Please confirm if year round flow and open water has been confirmed and how this status is addressed in modelling. Were the lakes modelled assuming that there is year-round flow between the lakes?

Response:

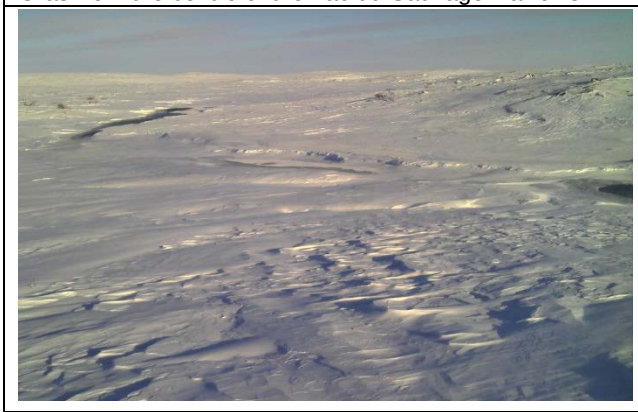
Traditional Knowledge regarding the Lac du Sauvage Narrows indicate that the surface of the Lac du Sauvage Narrows remains open due to swift currents present in areas of the channel (Weledeh Yellowknives Dene 1997). During recent winter season visits to the Lac du Sauvage Narrows, as part of the Jay hydrology baseline program (April 28, 2014) and a subsequent visit by Ekati Mine Site staff (February 25, 2015), partial open water has been observed over areas of the Lac du Sauvage Narrows. During these visits, the channel was constricted due to ice formation along channel banks and the lake ice also extended into portions of the Lac du Sauvage Narrows. Photos from the 2014 and 2015 winter field visits are provided in Table 64-1. The presence of open-water and flow throughout the Lac du Sauvage Narrows during these visits supports Traditional Knowledge regarding the Lac du Sauvage Narrows, and therefore, year-round flow and partial open-water are expected at the Lac du Sauvage Narrows.

Table 64-1 Winter Conditions at the Lac du Sauvage Narrows

	
April 28, 2014: Looking upstream towards Lac du Sauvage from the north side of the Lac du Sauvage Narrows	**April 28, 2014:** Looking upstream towards Lac du Sauvage from the north side of the Lac du Sauvage Narrows
	
April 28, 2014: Looking across the Lac du Sauvage Narrows to the left downstream bank from the right downstream bank	**April 28, 2014:** Looking upstream towards Lac du Sauvage from the centre of the Lac du Sauvage Narrows



April 28, 2014: Looking downstream towards Lac de Gras from the centre of the Lac du Sauvage Narrows



February 25, 2015: Looking upstream towards Lac du Sauvage from the north side of the Lac du Sauvage Narrows (ENE direction from 546695 E, 7159539 N)

February 25, 2015: Looking across the Lac du Sauvage Narrows to the left downstream bank from the right downstream bank (SE direction from 546695 E, 7159539 N)

Lac du Sauvage was modelled assuming year-round flow through the Lac du Sauvage Narrows into Lac de Gras. It was assumed that the formation of ice in winter constricts outflow channels and reduces lake discharge rates. In the regional water balance model, the Lac du Sauvage outlet flows were reduced during the period of ice cover due to increased boundary friction and the physical blocking of the channel from ice formation, by applying a reduction factor to the Lac du Sauvage open-water stage discharge rating curve. The detailed discussion of the modelling methods are included in the Developer's Assessment Report (DAR) Annex X, Appendix F, Section F3.1.3.2.2. Year-round flow through the Lac du Sauvage Narrows was considered in the assessment of fish and fish habitat (Section 9 of the DAR). The baseline description identified the Narrows as an important corridor for fish movement between the two lakes, in part, because open water can remain in the Narrows year-round (Section 9.2.4.1.1). The flow characteristics of the Narrows may provide productive areas for spawning, rearing, and forage habitats for fish valued components.

References:

Weledeh Yellowknives Dene. 1997. Weledeh Yellowknives Dene: A Traditional Knowledge Study of Ek'ati. Yellowknives Dene First Nation Council, Dettah, NWT, Canada.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-66
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Fish and Fish Habitat – Valued component selection
DAR Section(s):	9.1.3 and 9.2.5.4

Preamble (MVEIRB):

The species specific approach was used to choose VCs for the assessment of fish and fish habitat and p. 9-4 makes specific reference to "…species that support the fishery and "…the sustainability of the population(s) depends on the quantity and quality of the habitats required for each life history stage, and on interactions with other species." Section 9.2.5.4 states "Forage fish species are an important component of the diets of predatory fish species …the availability of forage fish species as a food source in lakes and rivers of the BSA is therefore essential in assessing aquatic health and viability of VC species populations." Why was a forage fish species not included in the choice of VCs? - lake whitefish are chosen to represent planktivores, arctic grayling for insects and plankton and lake trout for piscivores with explicit recognition that changes to forage fish will ultimately affect lake trout. Cisco or slimy sculpin would be good as they are already being used as sentinel/monitoring species in AEMP programs - for example p. 9-115 reports elevated Hg in Slimy sculpin related to mine activities in Lac de Gras. The Residual Effects Summary states "At closure, the Jay Pit represents a permanent loss of approximately 65 ha of lake bottom substrate habitat for benthic feeding or bottom dwelling species such as lake whitefish and forage species such as slimy sculpin …Thus the amount of permanent change to habitat in the ESA is expected to result in no measurable effects to ….Arctic Grayling, Lake Trout and Lake Whitefish " This approach essentially accepts permanent losses to habitat for forage species but accepts them because of no changes to habitat for the VC indicator species.

Request (MVEIRB):

Please include a forage fish species as a VC or provide a strong rationale for why this is not required.

Response:

The criteria for the selection of valued components (VCs) for fish and fish habitat are presented in Section 9.1.3 of the Developer's Assessment Report (DAR). All 11 species recorded during baseline studies (Annex XIV, Fish and Fish Habitat Baseline) have a role in the ecosystem, the purpose for limiting the assessment on VCs is to focus on those species that were identified as most valuable based on the following factors:

- cultural, social, or economic importance to traditional and non-traditional users;
- relative abundance in Lac du Sauvage;
- trophic position;
- unique life history requirements; and,
- territorial and federal listed species (e.g., COSEWIC 2014; NWT Infobase 2014).

The three fish species selected as VCs were Arctic Grayling, Lake Trout, and Lake Whitefish. These species represent important ecosystems processes (e.g., they are relatively abundant and occupy various trophic positions in their respective food web), and more importantly, they represent species of economic and cultural importance to traditional users in the NWT and Nunavut. The three species are considered part of a Commercial, Recreational, or Aboriginal (CRA) fishery, as defined by Fisheries and Oceans Canada (DFO) (Kenchington et al. 2013; DFO 2013). Furthermore, Arctic Grayling is classified as a sensitive species in the Northwest Territories (NWT) (NWT Infobase 2014), and therefore, inclusion in an environmental assessment is highly recommended.

Other species that support fisheries (e.g., forage species) are included in the assessment, which is explained in Section 9.1.3, page 9-6 of the DAR. Forage species were included as a measurement indicator for Arctic Grayling, Lake Trout, and Lake Whitefish, and tributaries that may support forage fish for VCs in Lac du Sauvage and Lac de Gras were included in the effects study area. Any measurable changes to the measurement indicator were then assessed for the VC species, if applicable (e.g., habitat for key prey species that the VC requires to complete its life cycle and contribute to the ongoing productivity of the fisheries). Analysis of fish and fish habitat VCs also captures effects to other species with similar habitat requirements and sensitivities that were not selected as VCs, such as Cisco and Slimy Sculpin. For example, both foraging Lake Trout and Cisco are commonly found in pelagic zones at depths from 10 m to 60 m throughout most of the year (see life history Sections 9.2.5.1.1 and 9.2.5.4.2). By evaluating the effects to available habitat at various depths (see methods in Section 9.4.2.1.1), the DAR provides information helpful for determining the potential effects of the Jay Project (Project) on both fish species. Another example of the robustness of the assessment approach includes the quantification of changes to coarse habitats in Lac du Sauvage (see methods in Section 9.4.2.1.1), which not only measured changes in habitat for spawning and rearing Lake Trout and Lake Whitefish, but also year-round habitat for Slimy Sculpin that can prey on the eggs and fry of Lake Trout and Lake Whitefish (see Section 9.2.5.4.3; also see Fitzsimons et al. 2007).

The use of fish species as VCs for fish and fish habitat was one of the two approaches considered in the DAR. Aquatic life other than fish was also selected as a VC (see Table 9.1-2 in Section 9.1.3 of the DAR). The measurement indicators for aquatic life other than fish included species composition, abundance and biomass of plankton and invertebrates, and any changes in these measurement indicators would be expected to have a direct effect on the ongoing support of fisheries productivity, which includes forage fish species.

Dominion Diamond Ekati Corporation is confident that by using a suite of VCs representing various components of the lake ecosystems, the DAR provides a reliable assessment of effects to fish and fish habitat, or more specifically, to the ongoing productivity of fisheries important to the Aboriginal groups in the region. In other words, the consideration of Cisco or Slimy Sculpin as a VC in the DAR would not change the outcome of the assessment. The magnitude and duration of residual impacts would not exceed current predictions, rather, impacts would be less than what is currently reported in the DAR given the species life history characteristics of forage species (e.g., they mature quicker and have shorter lifespans relative to the selected VCs).

As described in Appendix 9C of the DAR, it is recognized that an Aquatic Effects Monitoring Program (AEMP) and an associated Response Framework will be required of the Project through the Water Licence which will include monitoring for fish and ongoing assessment of results. The existing AEMP for

the Ekati Mine will be expanded to incorporate the Project area. The target fish species will be determined during the development of the AEMP and will take into account presence in the Project area, relevance for monitoring for potential Project-related effects, as well as use in other AEMPs.

References:

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2014. Wildlife Species Search. Available at: http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm. Accessed: May 23, 2014.

DFO (Fisheries and Oceans Canada). 2013. Fisheries Protection Policy Statement. Published by Ecosystem Programs Policy, Fisheries and Oceans Canada. Ottawa, ON, Canada.

Fitzsimons JD, Jonas JL, Claramunt RM, Williston B, Marsden JE, Ellrott BJ, Honeyfield DC. 2007. Influence of egg predation and physical disturbance on lake trout Salvelinus namaycush egg mortality and implications for life-history theory. J Fish Biol 71:1–16.

Kenchington E, Duplisea DE, Curtis JMR, Rice JC, Bundy A, Koen-Alonso M, Doka SE. 2013. Identification of species and habitats that support commercial, recreational or aboriginal fisheries in Canada. DFO Can Sci Advis Sec Res Doc. 2012/110. iv + 68 p.

NWT Infobase. 2012. NWT Species Monitoring Infobase. Available at: http://nwtspeciesatrisk.ca/tiki/tiki-index.php?page=Infobase. Accessed: August 23, 2014.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-67

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Fish and Aquatics

DAR Section(s): 9.2.3.3

Preamble (MVEIRB):

Map 9-2.6 appears to show a lake trout spawning shoal S2 in the footprint of the North end of horseshoe dike - is this identified later as map does not show dike outline?

Request (MVEIRB):

Please provide explicit consideration of loss of this spawning shoal as the effects assessment does not appear to include loss of lake trout spawning shoals.

Response:

Residual effects to potential spawning shoals for Lake Trout and Lake Whitefish, and forage species, such as Cisco and Round Whitefish, were assessed in Section 9.4.3.1.1 of the Developer's Assessment Report (DAR). The assessment compared known shoal locations relative to the location of the dike and dewatered area in Section 9.4.3.1.1 of the DAR and by quantifying potential spawning habitat within the diked area relative to available habitat in the Effects Study Area (ESA) (DAR Table 9.4-3). Habitat information collected from 2013 baseline field studies and other sources of existing and historical information (e.g., over 38 documents were reviewed in Annex XIV, such as earlier baseline and monitoring programs at the Ekati and Diavik mines) were used to develop an understanding of potential effects from the Jay Project (Project). Existing baseline fish habitat conditions in Lac du Sauvage, including spawning habitat, are provided in Section 9.2.4.1.1 in the DAR and Annex XIV (Fish and Fish Habitat Baseline Report). Shoal locations were provided in Map 9.4-2 in the DAR, and in Maps 2.2-1 to 2.2-3 in Annex XIV (Fish and Fish Habitat Baseline Report). A modified version of Map 9.4-2 was also created to assist with this Information Request and this new map is provided below (Map 67-1).

Generally, shoals in Lac du Sauvage are not as deep or numerous, and have been found to provide less potential spawning habitat of good to fair quality for Lake Trout, Cisco, and Round Whitefish relative to shoal habitat in Lac de Gras (Golder 1997a; DDMI 1998). Most of the high-quality shoal habitats in the ESA are located in Lac de Gras (Golder 1997a,b,c). Rescan (2007) concluded that less than 5 percent of all shoals examined along 61 transects in the Jay Pipe area were 'good' habitat for spawning activity by Lake Trout, Lake Whitefish, and Round Whitefish. All but one (shoal S2) of the 21 shoals previously identified by Golder (1997a) in Lac du Sauvage fall outside of the proposed diked area. Shoal S2 is located adjacent to the dike, but is classified as an unsuitable shoal for spawning by Lake Trout, Cisco, and Round Whitefish based on substrate (primarily silt/clay with some gravel) characteristics. Map 9.4-2 in the DAR shows the location of shoal S2 relative to the Jay Project dike and dewatered area (also see Map 67-1 provided in this response). The next closest spawning shoal in proximity to the dike is shoal S4, a fair quality shoal for Lake Trout and Cisco that is approximately 315 metres (m) northeast of the edge of

the dike. Other known suitable shoals for spawning in Lac du Sauvage are over 1,500 m from the edge of the dike location.

The results of the 2013 baseline habitat survey in Lac du Sauvage were consistent with previous studies (Golder 1997a; Rescan 2007) that identified limited, mostly low quality or unsuitable spawning habitat for the fish Valued Component (VC) species, based on water depths and substrate in the proposed diked area (Annex XIV, Section 3.2.3 and Section 4). The amount of cumulative change to spawning shoal habitat for the Application Case is expected to result in no measurable effect to population abundance and distribution for fish VCs. Effects, if any, would be limited to a negligible change in the distribution of fish with no effects on the ongoing productivity of fisheries. Losses to fish habitat associated with the dike will be included in the final offsetting plan (based on the Conceptual Offsetting Plan in the DAR) submitted with the application for a *Fisheries Act* Authorization during the regulatory phase of the Project.

538000 540000 542000 544000

7168000 7166000 7164000

Ad Ac Ab

Lake Ad4 Lake Ad3 Lake Ad1 Lake C16 Lake C1 Lake C15 Lake C14 Lake C13 Lake C12 Lake C9 Lake C17 Lake C10 Lake C11 Lake Ac10 Lake Ac11 Lake C8 Lake Ac9 Lake Ac8 Lake Ac7 Lake Ac6 Lake Ac5 Lake Ac13 Lake Ac4 Lake Ac12 Lake Ac14 Lake B19 Lake B22 Lake Ac15 Lake B21 Lake B20 Lake Ac16 Lake B28 Lake B15 Lake B0 Lake B1 (Christine Lake) Lake B29 Lake B24 Lake B2 Lake B14 Lake B3 Lake B13 Lake B4 (Cujo Lake) Lake B25 Lake Ac36 Lake Ac35 Lake Ac2 Lake Ac3 Lake Ab7 Lake Ab1 Lac du Sauvage Lake Ac1

Cisco: Unsuitable
Lake Trout: Unsuitable
Round Whitefish: Unsuitable
S3

Cisco: Unsuitable
Lake Trout: Unsuitable
Round Whitefish: Unsuitable
S5

Cisco: Fair
Lake Trout: Fair
Round Whitefish: Poor
S4

Cisco: Unsuitable
Lake Trout: Unsuitable
Round Whitefish: Unsuitable
S2

Cisco: Fair
Lake Trout: Fair
Round Whitefish: Fair
S7

Cisco: Good
Lake Trout: Good
Round Whitefish: Fair
S8

Proposed Jay Dike Alignment
Drawdown Area
Proposed Jay Waste Rock Storage Area
Proposed Laydown
Proposed Jay Pit
Proposed Misery Discharge Diffuser Location
Proposed Jay Project Magazine
Proposed Mine Inflows Pumping System
Proposed Runoff Pumping System
Proposed Sub-basin B Diversion Channel
Proposed Ore Transfer Pad
Proposed Jay Road, Pipeline and Power Line

N

LEGEND

- WATERCOURSE
- WATERBODY
- BATHYMETRY CONTOUR (5 M INTERVAL)
- ELEVATION CONTOUR (10 M INTERVAL)
- INTERNAL BASIN DIVIDE
- SPAWNING HABITAT

SPAWNING SHOALS (S)

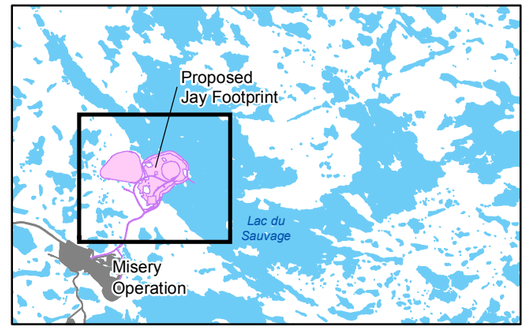
- *CISCO: SUITABILITY*
- *LAKE TROUT: SUITABILITY*
- *ROUND WHITEFISH: SUITABILITY*

JAY PROJECT FOOTPRINT

- EXISTING SHORELINE OF DEWATERED AREA
- POWER LINE
- PROPOSED JAY PROJECT INFRASTRUCTURE
- PROPOSED JAY ROAD NORTH (HAUL ROAD)
- PROPOSED JAY ROAD (HAUL ROAD, PIPELINE AND POWER LINE)
- PROPOSED OPERATION ROADS

SUBSTRATE TYPE (0-5 METRES)

- BO/CO - BOULDER/COBBLE
- BO/FI - BOULDER/FINES
- BR - BEDROCK
- FI - FINES
- FI/BO - FINES/BOULDER
- FI/CO - FINES/COBBLE



REFERENCE

1. GOLDER. 1997. TECHNICAL MEMORANDUM #12-2, SHOAL HABITAT SURVEY, LAC DE GRAS AND LAC DU SAUVAGE, SUMMER 1996. ENVIRONMENTAL BASELINE PROGRAM. SUBMITTED TO DIAVIK DIAMOND MINES INC. YELLOWKNIFE, NWT, CANADA. DOC NO. TM12-2.
2. CANVEC © NATURAL RESOURCES CANADA, 2012
3. NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
4. BATHYMETRIC DATA OBTAINED FROM AURORA, 2013

DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

DAR-MVEIRB-IR-67

500 0 500
SCALE 1:25,000 METRES

PROJECT
DOMINION DIAMOND™
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
SHORELINE HABITAT AND SPAWNING SHOALS NEAR THE PROPOSED JAY PROJECT IN LAC DU SAUVAGE

Golder Associates

PROJECT		1419751	FILE No. POSTDAR_IR_Aqua_001_GIS	
DESIGN	CS	10/03/15	SCALE AS SHOWN	REV 0
GIS	ANK	11/03/15		
CHECK	CS	11/03/15	MAP 67-1	
REVIEW	KM	11/03/15		

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0041 Jay & Lynx EA\Aquatics\POST-DAR IRs\POSTDAR_IR_Aqua_001_GIS.mxd

References:

DDMI (Diavik Diamond Mines Inc.). 1998. Diavik Diamonds Project Environmental Assessment – Environmental Effects Report on Fish and Water Quality. Diavik CD-ROM series, second edition. Yellowknife, NWT, Canada.

Golder. 1997a. Technical Memorandum #12-2, Shoal Habitat Survey, Lac de Gras and Lac du Sauvage, Summer 1996. Environmental Baseline Program. Submitted to Diavik Diamond Mines Inc. Yellowknife, NWT, Canada. Doc No. TM12-2.

Golder. 1997b. Technical Memorandum #13-3, Inland Lake Survey Report. 1996 Environmental Baseline Program. Submitted to Diavik Diamond Mines Inc. Yellowknife, NWT, Canada. Doc No. TM13-3.

Golder. 1997c. Technical Memorandum #14-2, Intensive Shoreline Habitat Survey. 1996 Environmental Baseline Program. Submitted to Diavik Diamond Mines. Yellowknife, NWT, Canada. Doc No. TM14-2.

Rescan. 2007. Ekati Diamond Mine. 2006 Jay Pipe Aquatic Baseline. Prepared for BHP Billiton Diamonds Inc. Yellowknife, NWT, Canada, 325 pp.

Information Request Number: DAR-MVEIRB-IR-70

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Fish and Aquatics

DAR Section(s): 9.3.2.2.1

Preamble (MVEIRB):

One of the mitigation features provided to eliminate the pathway "back-flooding of the dewatered diked area of Lac du Sauvage may generate or release mercury, nutrients or other substances from flooded sediments and vegetation and may cause a change in water quality, affecting fish and aquatic health" is that ? the diked area will not be reconnected until the back-flooded area meets acceptable water quality criteria.

Request (MVEIRB):

Will Dominion commit to a monitoring of mercury in small fish (e.g. slimy sculpin) to confirm lack of mercury uptake prior to reconnecting the diked area ?

Response:

It is not necessary or useful for Dominion Diamond Ekati Corporation to monitor for mercury in small fish prior to reconnecting the diked area to Lac du Sauvage. As described in Section 3.2.1.1 of the Developer's Assessment Report (DAR), the isolated portion of Lac du Sauvage within the diked area will be fished out prior to dewatering. The isolated portion of Lac du Sauvage will then be dewatered to expose the lakebed overlying the Jay kimberlite pipe. Once the lakebed is exposed in the diked area, mining operations will begin and continue for an approximately 10 year operational period and no fish will remain behind the diked area.

At closure, the diked area will be back-flooded with water from Lac du Sauvage. The dike will be breached when water quality in the back-flooded area meets pre-determined acceptability criteria and is suitable for mixing with the lake. Fish will only be able to enter the diked area when the dike has been breached. Fish will be able to move in and out of the area and will not be restricted to the back-flooded habitats. As described in Section 9.4 of the DAR, in post-closure, the physical and chemical environment of the area will allow re-establishment of a healthy functioning aquatic ecosystem.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-87

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Barren-ground Caribou – Roads alternative assessment

DAR Section(s): 2.5.1.2.1

Preamble (MVEIRB):

In selecting the Jay road alternative, the number of caribou crossings for each route was assumed to be relative to the length of the road (p.2-43). This suggests that Dominion expects the number of road crossings to be uniform for any equal stretch of road.

Request (MVEIRB):

Are there any parts of the road that caribou are more likely to cross the road than others, considering, for example, currently known caribou movement routes? If so, has this been considered in the selection of the Jay road alternative, and if not, why?

Response:

There are areas on each Jay Road alternative that are more likely to be crossed by caribou and they were considered in the initial selection process, and will continue to be considered in the prefeasibility engineering design work. The sources of information on historical and existing caribou movements through the area that were and will be used in the Jay road alternatives analysis include:

- Traditional knowledge information about characteristics of roads relative to caribou travel. Łutselk'e Dene First Nation Elders identified potential barriers and hazards to caribou movement, including high ridges and sharp rocks along the edges of the roads (DAR Section 12.2.3.2). Inuit participants in the Wildlife Effects Monitoring Plan suggested that caribou crossings at the roads should be larger to facilitate caribou movement, especially if in the presence of predators (DAR Section 12.2.3.7).
- Available radio-collar location data for Bathurst herd caribou.
- Studies of caribou relative to existing roads at the Ekati Mine, including the Misery Road (DAR Sections 12.2.1.1.3, 12.2.1.1.4, and 12.2.1.1.6).
- An aerial survey to identify historical caribou trails in the Lac de Gras region completed as part of the 2013 Baseline Study for the Jay Project (DAR Section 12.2.1.5). Results appear in DAR Map 12.2-5.
- Ground-based surveys and high resolution orthophotos to identify high, medium and low occurrence of trails in the area of the Jay Project as part of 2014 baseline studies (Dominion Diamond 2014: Sable Addendum; Appendix I; Section I2.3, Map I-5).

Traditional Knowledge has provided important information for the assessment of road alternatives and for siting caribou crossings. The following information appears in the DAR:

From 2.2.2.1

> *"Based on Traditional Knowledge, the outlet of Lac du Sauvage into Lac de Gras and along the esker on the west side of Lac du Sauvage are known to be important caribou movement sites."*

From 2.5.1.2.3

> *"The main caribou migration route in the Project area runs northwest from the Narrows. The three road alternatives must run in an approximately east-west direction to connect the Jay Pit to the Misery Haul Road, and as such, will cross the main caribou migration path and are predicted to have similar effects on caribou movement. Areas requiring wildlife crossings will be identified and designed as part of the prefeasibility engineering design work. A combination of sources will be used to identify the wildlife crossings, including: collared caribou Global Positioning System tracking data, visible evidence of historical caribou tracks, vegetation and landform information, observations, and site experience of Ekati environmental staff, biologists, Traditional Knowledge (where available), and advice obtained from Elders and IBA community members. Each road alignment must cross the esker; however, the approach to crossing the esker differs and is considered in the evaluation."*

2.5.1.2.4 Social and Economic Considerations

> *"The esker has been identified as an important location for caribou hunting, trapping, and as a travel route in both the past and present. As such, it holds particular importance to the local Aboriginal communities and to the archaeological record. The three road alternatives must run in an approximately east-west direction to connect the Jay Pit to the Misery Haul road and will cross the esker, as such the potential to affect the esker does not differentiate between the alternatives. Input for the esker crossing design was obtained during community consultations (Section 2.5.1.2.3)."*

The needs and opportunities to create caribou crossings will respect knowledge of historical and existing crossing areas, and crossing characteristics along each alternative. The collection of knowledge to inform these decisions is ongoing and will continue through detailed design. The history of, and commitment to, this process is described in Section 4.4.4 of the DAR. For example, workshops were held with communities in March and June 2014, which included discussions on caribou migration and roads, and road design/caribou crossings. Site visits with community members were also held in summer 2014.

Environmental considerations for road alternative selection also appear in Table 2.5.1 of the DAR:

Environmental Considerations	*• Alternative 1 is longest and will require the most extensive mitigation to create caribou crossings.* *• The length of the esker crossing is shorter than Alternative 2, but longer than Alternative 3.* *• Alternatives 1 and 2 require large fills to cross the esker, which could result in an additional barrier to caribou.*	*• Alternative 2 requires more mitigation to create caribou crossings than Alternative 3 and less than Alternative 1.* *• Alternative 2 has the longest esker crossing.* *• Alternatives 1 and 2 require large fills to cross the esker, which could result in an additional barrier to caribou.*	*• Alternative 3 is the shortest and requires the least mitigation to create caribou crossings.* *• Alternative 3 has the shortest esker crossing.* *• Alternative 3 has a cut through the esker, which would result in less of a barrier to caribou movement near the esker than the large fills required to cross the esker for Alternatives 1 and 2.*

In regard to the preamble of this request, the three road alternatives have the following lengths:

- Jay Road Alternative 1 11.7 kilometres (km)
- Jay Road Alternative 2 10.6 km
- Jay Road Alternative 3 9.9 km

Consequently the difference between the longest alternative and the shortest alternative was 1.8 km or 18 percent. For technical feasibility purposes in the Alternatives Assessment, the number of crossings was assumed to increase proportionally to road length. As per Section 2.5.1.3, Jay Road Alternative 3, which is the most southern alignment, was considered the most viable option for the Project. Input regarding the design of the Jay Road esker crossing was obtained during community engagement and was used to conduct a more detailed assessment of the esker crossing for the Jay Road Alternative 3. Furthermore, as described above, the number and placement of crossings for the selected road alignment will be determined in prefeasibility engineering design work and will take into account input from community engagement.

References:

Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Jay Project Developer's Assessment Report Sable Addendum. Prepared by Golder Associates Ltd., December 2014. Yellowknife, NWT, Canada.

Information Request Number: DAR-MVEIRB-IR-88

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Risk Assessment

DAR Section(s): Appendix 3C

Preamble (MVEIRB):

On Table 7: Risk matrix, the Likelihood Table is set out in terms of events per year Indices of >1 to 1/1000. Normally, failure modes are assigned annual probabilities based on the experience of the panel team. In this case significant experience has been gained from the Meadowbank and Diavik Dikes. For instance, excessive seepage through the East Dike occurred in the deepest channel during dewatering. It is not apparent that this and other experience at Meadowbank and Diavik is properly accounted for in the likelihood assignments.

Request (MVEIRB):

Summarize the experience at the Meadowbank and Diavik dikes with respect to each failure mode and adjust likelihoods of occurrence as appropriate.

Response:

The likelihood category in Table 7 of the Risk Assessment for Accidents and Malfunctions for the Jay Project (Golder [2015]) was revised to reflect the annual probability of an event occurring over the life of the Project. The updated Risk Assessment for Accidents and Malfunctions was submitted to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) as part of the response to the Adequacy Review Item 10.2 (DAR-MVEIRB-25) on January 19, 2015. The likelihood category in the risk matrix has been modified as shown below in Table 88-1.

Table 88-1 Modified Likelihood Category in the Risk Matrix

Likelihood	Annual probability of exceedance during the life of the Project
Almost certain	> 99%
Likely to occur at least once over the life of the Project	50% to 99%
Unlikely to occur over the life of the Project	10% to 50%
Very unlikely to occur over the life of the Project	1% to 10%
Extremely unlikely to occur during the life of the Project	< 1%

% = percent; > = greater than; < = less than.

Probabilities are determined based on the following equation:

$$Probability = 1 - \left(1 - \frac{1}{T}\right)^{n}$$

Where:
T = Return period (defined as events per year)
n = Project life

Lessons learned and experience gained from dike construction and operation at the Meadowbank Mine (Esford et al. 2013; Bonin et al. 2013; Esford and Julien 2013) and Diavik Mine (Schwank and Bauer 2003) in addition to other projects and engineering experience, were utilized in the development of the conceptual design for the Jay Dike, and in the various field investigation programs being carried out to collect site specific characterization information. In short, the design of the Jay dike incorporates and mitigates those lessons-learned, and this is reflected in the Jay Dike risk-assessment.

As part of the mitigation of potential failure modes, the design has incorporated key geological and geotechnical findings, construction methodologies, including quality assurance and quality control measures, instrumentation, and monitoring in order to reduce the probability of occurrence. The risk assessment ratings provided for the Jay Dike are based on the pre-feasibility design for this dike, and are in accordance with the current understanding of the Jay Project.

References:

Bonin GR, Rombough VT, Julien MR. 2013. Part 2: Grouting Techniques Employed for Dike Construction, Meadowbank Gold Mine, Nunavut. Canadian Dam Association 2013 Annual Conference, Montreal, QC, Canada. October 5 – 10, 2013.

Esford F, Bonin GR, Julien MR. 2013. Part 1: Construction of the Dewatering Dikes, Meadowbank Gold Mine, Nunavut. Canadian Dam Association 2013 Annual Conference, Montreal, QC, Canada. October 5 – 10, 2013.

Esford F, Julien MR. 2013. Part 3: Performance Monitoring of Dikes – Dewatering and Operation, Meadowbank Gold Mine, Nunavut. Canadian Dam Association 2013 Annual Conference, Montreal, QC, Canada. October 5 – 10, 2013.

Golder (Golder Associates Ltd.) 2014. Jay Project Pre-feasibility Dike Design. 1313280041-E14069-R-Rev0-2020. December 8, 2014.

Golder. 2015. Dominion Diamond Jay Project - Risk Assessment for Accidents and malfunctions of the Jay Project. 1313280041-E14066-TM-Rev1-4060. January 16, 2015.

Schwank SK, Bauer Maschinen GmbH. Cutoff Walls for Diamond Mining in the Arctic. Deep Foundations Institute Conference Proceedings – 2003.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-89

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Barren-ground Caribou - Primary and Secondary Pathways

DAR Section(s): 12.3 (Table 12.3-1)

Preamble (MVEIRB):

In table 12.3-1, three pathways for caribou are rated as primary (and two of them were also rated as primary for Gahcho Kué mine). Dust on forage altering caribou distribution is listed as a secondary pathway for Jay but was a primary pathway for the Gahcho Kué mine assessment.

Request (MVEIRB):

Please revise dust on forage from a secondary to a primary pathway or provide reasons why the dust on forage for Gahcho Kué levels (primary effect) is not applicable to Jay and Misery road for the Jay Project.

Response:

A summary and comparison of the pathway analyses related to dust deposition and effects on barren-ground caribou for the Gahcho Kué Project and the Jay Project is provided below.

Gahcho Kué pathway analyses

In the pathway analysis for the Gahcho Kué Project (De Beers 2010, Table 7.4-1, page 7-52), the effects of dust deposition on barren-ground caribou were assessed through four separate pathways. The assessment results from the effects pathways analyses for the Gahcho Kué project were as follows:

No linkage pathway:

- Ingestion of soil, vegetation, and water, or inhalation of air that has been chemically altered by air emissions (including nitrogen oxides and potential acid input deposition) or dust deposition, may affect caribou survival and reproduction.

Secondary pathways:

- dust deposition may cover vegetation and decrease abundance of forage for caribou (i.e., habitat quantity); and,
- dust deposition and air emissions may change the amount of different quality habitats (through chemical changes in soil and vegetation), and alter caribou movement and behaviour.

Primary pathway:

- Dust deposition may cover vegetation and change the amount of different quality habitats, and alter caribou movement and behaviour.

Jay Project pathway analyses

In the pathway analysis for the Jay Project Developer's Assessment Report (DAR Table 12.3-1, pp. 12-49), the effects of dust deposition on barren-ground caribou were assessed through three separate pathways. The assessment results from the effects pathway analyses for the Jay Project were as follows:

No linkage pathway:

- Ingestion of water, soil, and vegetation, or inhalation of air that has been chemically altered by air emissions or dust deposition may affect wildlife health.

Secondary pathway:

- Air and dust emissions and subsequent deposition can change the quantity or quality of plant forage and alter caribou distribution and behaviour.

Primary pathway:

- Sensory disturbance (lights, smells, noise, dust, viewscape) and barriers to movement causes changes to caribou movement and behaviour, and changes to energetics and reproduction.

Comparison

Although the wording is different, the effect of dust is considered as a primary effect pathway for barren-ground caribou in the assessment of effects for both the Gahcho Kué and Jay projects. In the effects assessments of both projects, the effect of dust is considered through its ability to change habitat quality for caribou. The analyses for both projects employed zones of influence and disturbance coefficients to estimate changes in the amounts of different quality habitats and to reflect potential changes in the behaviour and occurrence of caribou (De Beers 2010, Section 7.5.3; DAR, Section 12.4.2.2). The effects of dust on caribou habitat quality have been appropriately assessed as a primary pathway in the DAR for the Jay Project.

References:

De Beers (De Beers Canada Inc.). 2010. Environmental Impact Statement for the Gahcho Kué Project. Volumes 1, 2, 3a, 3b, 4, 5, 6a, 6b, 7 and Annexes A through N. Submitted to Mackenzie Valley Environmental Impact Review Board. December 2010.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-92
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Barren-ground Caribou - Integrating information on local movements
DAR Section(s):	12.2.2.1 (Map 12.2-3)

Preamble (MVEIRB):

Mitigation requires detailed understanding of caribou movements as there are caribou distribution and behavior differences within the Ekati site (Rescan 2012). The North shore of Lac de Gras and neighbouring lakes funnel post-calving, summer and fall caribou movements. Dominion mapped trails (Map 12.2-3; Map 12.2-5) but the survey area was truncated at Jay Pit. Compilation of the historic trails and the collar trajectories such as the GPS collars within the Zone of Influence would be useful to increase the efficiency of mitigation and monitoring.

Request (MVEIRB):

a) Please integrate recent trail mapping to build a composite map of historic trails, traditional knowledge trails and trails relative to the collar trajectories within the Zone of Influence.

b) Please describe the methodology for trail mapping and commit to mapping the trails south-west of the proposed Jay Pit.

Response:

a) The map requested is provided as Map 92-1. It includes the historical caribou trail information from Developer's Assessment Report (DAR) Map 12.2-5 and traditional knowledge based caribou paths from DAR Map 12.4-3. Radio-collared caribou point-to-point movements from 1996 to 2013 data are also shown on Map 92-1. Though not mapped in the DAR, these were the data used to delineate seasonal ranges for the Bathurst herd.

There was additional work on caribou trails conducted as part of the 2014 Wildlife Baseline Study. This additional information on the density of caribou trails was included in Appendix I of the Sable Addendum (Dominion Diamond 2014); Attachment 1 (Dominion Diamond Map I-4) shows locations of caribou trails observed during 2014 field work and Attachment 2 (Dominion Diamond Map I-5) shows densities of trails in the vicinity of the Jay Project (Project). These data are additional to the information shown in Map 92-1.

LEGEND

- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- ESKER
- WATERCOURSE
- WATERBODY
- HISTORICAL CARIBOU TRAIL
- RADIO-COLLARED CARIBOU MOVEMENTS (1996 TO 2013 DATA)
- TRADITIONAL KNOWLEDGE BASED CARIBOU PATH
- REASONABLY FORESEEABLE DEVELOPMENT 15 KM ZONE OF INFLUENCE

NOTES

1. CARIBOU PATHS DERIVED FROM COLLAR DATA, JUNE 15 TO OCTOBER 31 FOR EACH YEAR SHOWN

REFERENCE

NATIONAL TOPOGRAPHIC BASE DATA (NTDB) 1:250,000
CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

MVEIRB-IR-92

5 0 5
SCALE 1:300,000 KM

PROJECT
DOMINION DIAMOND™
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
HISTORICAL CARIBOU TRAILS, TRADITIONAL KNOWLEDGE BASED PATHS, AND RADIO-COLLARED CARIBOU MOVEMENTS

Golder Associates

PROJECT		1419751	FILE No. POSTDAR_IR_Wild_019_GIS	
DESIGN	JR	03/03/15	SCALE AS SHOWN	REV 0
GIS	LS/AK	18/03/15	MAP 92-1	
CHECK	JR	18/03/15		
REVIEW	JV	18/03/15		

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b) Map 92-1 shows historical trails already mapped in the area southwest of the Jay Project. Attachments 1 and 2 show locations and densities of caribou trails in the same area.

An aerial reconnaissance survey was conducted in 2013 as part of the baseline study for the Jay Project. Historical caribou trails observed during the survey were plotted (Map 92-1). In July 2014, the Wildlife Baseline Study included ground-based field studies and the use of orthophotos to map caribou trail densities in the area southwest of the Jay Project. The methodology for this work (Sable Addendum, Appendix I, page I-4) was to ground-truth caribou trails that were visible on high resolution orthophotos of the area. Trails identified on orthophotos were then verified by field crews on the ground. The orthophoto and field observations (Attachment 1) were used to assist in digitizing trails at a resolution of 1 hectare to classifying areas of low, medium, and high occurrence of trails around the Project. Low, medium, and high use trail occurrences were assigned classification values 1, 2, and 3, respectively. A low use trail area was an area that had five or fewer caribou trails, or trails that covered less than 25 percent (%) of the cell area. A medium trail area was classified as containing more than five trails but fewer than 15 trails, or trails that covered less than 50% of the cell area. A high use area had greater than 15 trails, or had trails that covered greater than 50% of the cell area. The results from this classification appear in Attachment 2.

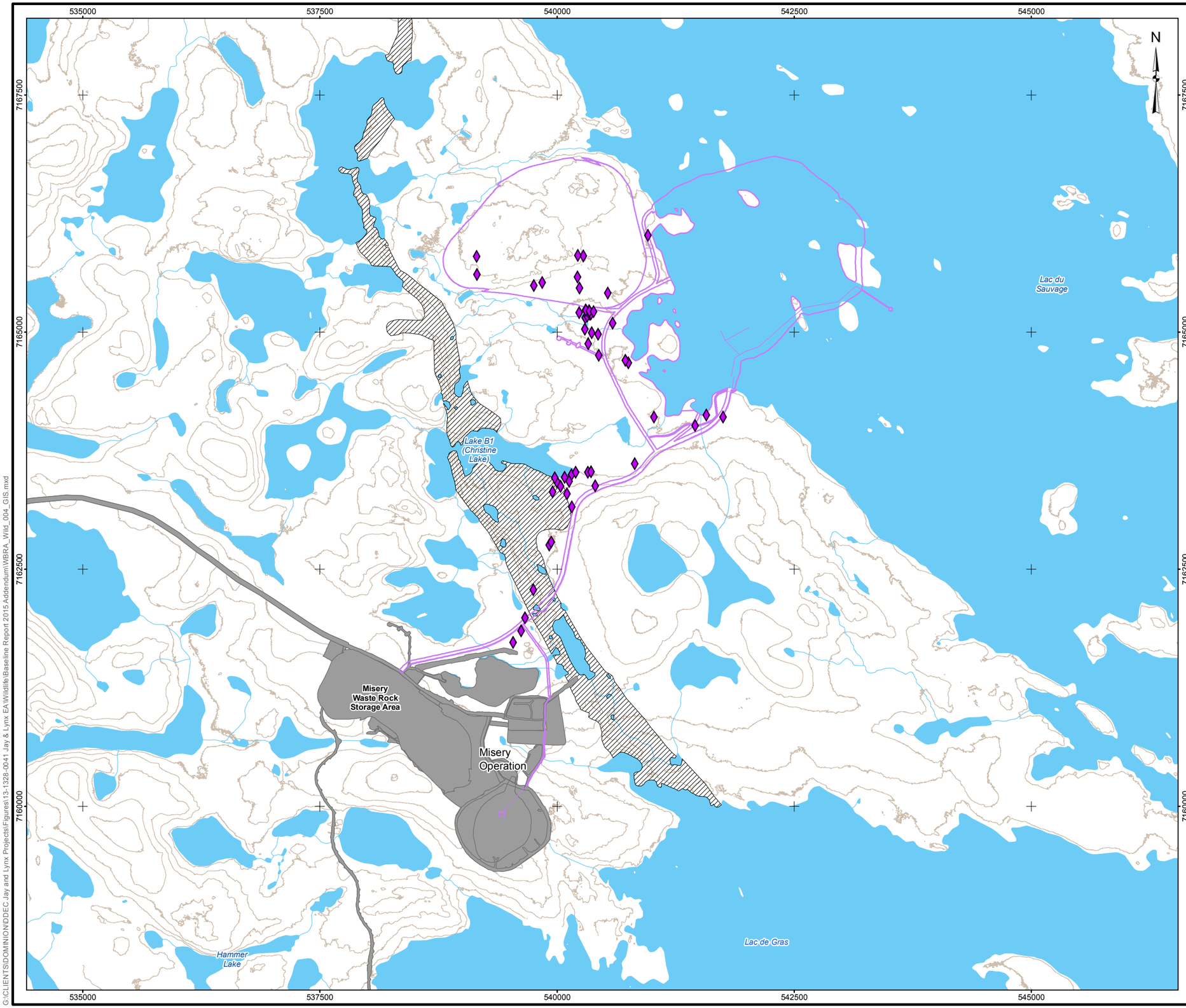
The 2015 field program workplan for the Jay Project includes expanding the 2014 area of orthophoto mapped historic caribou trails. As noted, the density and locations of trails in the area southwest of the proposed Jay Pit have been mapped and no further studies specific to this area are planned at this time.

References:

Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Jay Project Developer’s Assessment Report Sable Addendum. Prepared by Golder Associates Ltd., December 2014. Yellowknife, NWT, Canada.

Attachment 1

Caribou Trails Observed, 2014



LEGEND

- EKATI MINE FOOTPRINT (MISERY OPERATION)
- PROPOSED JAY PROJECT DEVELOPMENT AREA
- ELEVATION CONTOUR (10 m INTERVAL)
- WATERCOURSE
- WATERBODY
- ESKER
- CARIBOU TRAIL

NOTES

ROAD, PIPELINES, AND POWER LINE ARRANGEMENT TO BE DETAILED AS PART OF FURTHER PRE-FEASIBILITY DESIGN. APPROXIMATE CORRIDOR WIDTHS ARE SHOWN.

REFERENCE

JAY PROJECT CONCEPTUAL ENGINEERING REPORT, EKATI MINE, DOC#: 1313280041-E14037-R-REV0-4060, DATED: MAY 13, 2014
JAY PROJECT DESIGN BASIS MEMORANDUM FOR PRE-FEASIBILITY DESIGN OF PROJECT ROADS AND PIPELINE BENCHES, DOC#: 1313280041-E14031-TM-REVD-2020, DATED: AUGUST 1, 2014
LIDAR AND BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
WATER OBTAINED FROM CANVEC © NATURAL RESOURCES CANADA, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

WILDLIFE BASELINE REPORT: 2015 ADDENDUM

1 0 1
SCALE 1:40,000 KILOMETRES

PROJECT
DOMINION DIAMOND
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

CARIBOU TRAILS OBSERVED, 2014

Golder Associates

PROJECT		13-1328-0041	FILE No. WBRA_Wild_004_GIS	
DESIGN	EN	02/09/14	SCALE AS SHOWN	REV 0
GIS	UW	26/11/14		
CHECK	JV	26/11/14		
REVIEW	JV	26/11/14		

MAP I-4

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Attachment 2

Historic High, Medium, and Low Use Caribou Trail Cells Around the Proposed Jay Development Area

535000
537500
540000
542500
545000
7167500
7165000
7162500
7160000
N
Misery Operation

LEGEND

- EKATI MINE FOOTPRINT (MISERY OPERATION)
- PROPOSED JAY PROJECT DEVELOPMENT AREA
- ELEVATION CONTOUR (10 m INTERVAL)
- WATERCOURSE
- WATERBODY

CARIBOU TRAIL CLASSIFICATION

- NONE
- LOW
- MEDIUM
- HIGH

REFERENCE

JAY PROJECT CONCEPTUAL ENGINEERING REPORT, EKATI MINE, DOC#: 1313280041-E14037-R-REV0-4060, DATED: MAY 13, 2014
LIDAR AND BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
WATER OBTAINED FROM CANVEC © NATURAL RESOURCES CANADA, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

NOTES

ROAD, PIPELINES, AND POWER LINE ARRANGEMENT TO BE DETAILED AS PART OF PRE-FEASIBILITY DESIGN. APPROXIMATE CORRIDOR WIDTHS ARE SHOWN.

1 0 1
SCALE 1:40,000 KILOMETRES

PROJECT
DOMINION DIAMOND
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
HISTORIC HIGH, MEDIUM, AND LOW USE CARIBOU TRAIL CELLS AROUND THE PROPOSED JAY DEVELOPMENT AREA

Golder Associates

PROJECT		13-1328-0041	FILE No. WBRA_Wild_006_GIS
DESIGN	DP EN	01/08/14	SCALE AS SHOWN REV 0
GIS	UW	25/11/14	
CHECK	JV	25/11/14	MAP I-5
REVIEW	JV	25/11/14	

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DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-98

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Barren-ground Caribou - Low frequency noise

DAR Section(s): 13.4.2

Preamble (MVEIRB):

The sound frequency levels used in the disturbance coefficient for caribou 40-55 decibels) did not include Low Frequency sound (<20 decibels). Section 3.1.2 (Low Frequency Noise Results) concluded that low frequency noise was not present. There is no reference to measurements during blasting. Caribou have highly enervated hooves and aboriginal knowledge is that their feet are 'sensitive'.

Request (MVEIRB):

Please describe low frequency sound transmission potential during blasting and detection distances. Please describe how the modeled decibel ranges compare with the lower limit of caribou hearing with regard to sensory disturbance from the project.

Response:

In the Developer's Assessment Report (DAR) for the Jay Project (Project), steady-state noise associated with construction and operation activities was assessed separately from short-duration, highly-impulsive noise and vibration associated with blasting. The character of steady-state noise and blasting noise/vibration are sufficiently different that it was not possible to identify a single assessment approach or set of assessment criteria appropriate for both phenomena.

Because the Northwest Territories does not provide a legal framework or regulatory guidance for the assessment of noise and vibration, the DAR for the Project relied on widely-accepted noise and vibration assessment guidelines from other jurisdictions. In particular, the DAR:

- assessed steady-state noise associated with Project construction using guidance provided by Health Canada (Health Canada 2010);
- assessed steady-state noise associated with Project operation using guidance provided by the Alberta Energy Regulator (EUB 2007); and,
- assessed short-duration, highly-impulsive noise and vibration associated with blasting using guidance provided by the Ontario Ministry of Environment (OMOE 1978).

Steady-State Noise

In accordance with the Health Canada and Alberta Energy Regulator noise guidelines, the DAR modelled steady-state construction and operation noise using the widely-accepted International Organization for Standardization (ISO) propagation standard ISO 9613-2 (ISO 1996). As implemented in the DAR, the ISO 9613-2 standard breaks the spectra of noise sources down into nine octave-bands centred on

frequencies of 31.5 hertz (Hz), 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kilohertz (kHz), 2 kHz, 4 kHz, and 8 kHz. The specific octave-band frequencies identified by the ISO 9613-2 standard reflect the range of human frequency sensitivity.

Research into the range of caribou frequency sensitivity has found that caribou are less sensitive to low frequency noise than humans (Flydal et al. 2001). For example, the caribou hearing threshold at 63 Hz is approximately 30 decibels (dB) higher than the human hearing threshold at 63 Hz. Put another way, a human could be expected to detect a low frequency noise approximately 30 dB quieter than could be detected by a caribou.

Because human hearing is more sensitive to low frequencies than caribou hearing, using the human-centric ISO 9613-2 standard and human-centric Health Canada and Alberta Energy Regulator guidelines to assess steady-state low frequency noise effects from the Project on caribou can be considered conservative – i.e., tending to overestimate the magnitude of the effect. Based on the Alberta Energy Regulator guideline, Section 13B1.6.2.2 of the DAR concluded that there was no potential for steady-state low frequency noise issues at three relevant receptors (Rsouth, Rwest, and Rsouthwest), and only a small potential for low frequency noise issues at the fourth relevant receptor (Rnorth). Furthermore, the potential low frequency noise issue at Rnorth was very likely the result of conservatism in the modelling. These conclusions were based on a human-centric assessment of Project noise; however, because caribou are less sensitive to low frequency noise than humans, these conclusions about steady-state low frequency noise also apply to caribou.

As regards to detection distances and caribou hearing thresholds, it is important to note that the caribou hearing threshold established in a laboratory environment is not the same as the minimum noise level that a caribou could be expected to detect in the outdoor environment. For example, laboratory research suggests that caribou hearing is sensitive to noise levels lower than 10 dB in the frequency band between 1 kHz and 16 kHz (Flydal et al. 2001) but the presence of masking noises (e.g., wind, birds, insects) means that caribou are unlikely to detect noise levels as low as 10 dB in the outdoor environment.

Detectability of a given noise in the outdoor environment depends on physical characteristics of the noise itself and the background noise (i.e., noise level and spectral/temporal structure) and on physiological or psychological factors (i.e., the acuity of a given listener's hearing/auditory system and the amount of attention that a given listener is paying to the noise). As such, audibility is nearly impossible to predict or assess. Instead, regulations such as those provided by Health Canada and the Alberta Energy Regulator establish noise thresholds below which noise levels are considered to be acceptable. Based on these regulatory thresholds, the DAR concluded steady-state noise levels from the Project, including low frequency noise levels, are acceptable.

Section 12 of the DAR presents a caribou-specific assessment of sensory disturbance effects from the Project. The sensory disturbance assessment used results from the noise assessment (presented in Section 13B of the DAR) to establish Zones of Influence (ZOIs) around the Project. The established ZOIs were large enough to capture the extent of steady-state Project noise levels greater than 40 to 45 A-weighted decibels (dBA) for operation and 50 to 55 dBA for construction. As discussed above, because caribou hearing is less sensitive to low frequency noise than human hearing, using human-centric A-weighted noise level predictions to establish caribou ZOIs can be considered a conservative approach.

Blasting Noise and Vibration

In accordance with OMOE guidelines for the assessment of blasting, the DAR modelled blasting activities using a widely-accepted handbook published by the International Society of Explosives Engineers (ISEE 1998). In particular, blasting activities were characterized using two parameters:

- Peak Particle Velocity (PPV) expressed in millimetres per second (mm/s); and,
- Peak Pressure Level (PPL) expressed in linear decibels (dBL).

PPV is a measure of blasting-induced ground vibration and PPL is a measure of blasting-induced pressure changes in the atmosphere.

Much of the energy associated with blasting is very low frequency (i.e., distributed below 50 Hz). The ISEE approach used to estimate PPV and PPL associated with Project blasting accounts for all energy associated with blasting, including the very low frequency energy. Furthermore, the ISEE approach to estimating PPV and PPL treats the energy associated with blasting as a purely physical phenomena and does not apply any type of correction or weighting to reflect human perception. In particular, the PPV and PPL thresholds used in the DAR were established by the OMOE so as to prevent physical damage to buildings and other structures. As such, the results of the Project blasting assessment presented in Section 13B of the DAR are as applicable to caribou as they are to humans (or any other type of animal).

The Project blasting assessment concluded that PPV and PPL associated with Project blasting would drop below the relevant OMOE thresholds within 800 metres (m) of the blasting site. This does not mean that humans or caribou will not be able to detect blasting noise or ground vibration at distances beyond 800 m; it just means blasting effects will not physically damage buildings or other structures.

Research suggests that caribou hearing is less sensitive at low frequencies than human hearing (Flydal et al. 2001); therefore, it is likely that humans will be able to detect airborne PPL associated with blasting at larger distances than will caribou. In contrast, Aboriginal knowledge indicates that caribou feet are sensitive; therefore, it is likely that caribou will be able to detect ground-borne PPV associated with blasting at larger distances than humans. In the absence of research identifying specific vibration detection thresholds for caribou feet, it is not possible to estimate specific distances over which caribou will be able to detect ground vibration from Project blasting, although Reimers and Coleman (2001) noted that aerial bombing in military exercises did not typically elicit a visible behavioural response from reindeer at distances between 1.8 and 3.0 kilometres (km). That being said, Table 13B1.5-13 from the DAR indicates that PPV from Project blasting is predicted to drop to effectively 0 mm/s for distances of 5.2 km from the blasting site. As such, it seems reasonable to conclude that PPV associated with blasting would not be detectible by even the most sensitive caribou feet at distances beyond 5.2 km from the blasting site.

The preamble to DAR-MVEIRB-IR-98 correctly indicates that blasting was not measured as part of the baseline noise monitoring program. The purpose of the baseline noise monitoring program was to establish existing steady-state noise levels in the Project area to serve as inputs to the assessment of steady-state Project noise levels via the Health Canada Guidance. As such, short-duration/highly-impulsive noise and vibration levels associated with blasting were not measured. Instead, as indicated

above, PPV and PPL associated with Project blasting were predicted using a widely-accepted handbook from the ISEE.

References:

EUB (Alberta Energy and Utilities Board). 2007. Directive 038: Noise Control. Approved February 16, 2007.

Flydal K, Hermansen A, Enger PS, Riemers E. 2001. Hearing in reindeer (*Rangifer tarandus*). J. Comp. Physiol. A. 187: 265 – 269.

Health Canada. 2010. Useful Information for Environmental Assessments. H128-1/10-599E.

ISEE (International Society of Explosives Engineers). 1998. Blaster's Handbook of International Society of Explosives Engineers.

ISO (International Organization for Standardization). 1996. ISO 9613-2 Acoustics – attenuation of sound during propagation outdoors – Part 2: General method of calculation.

OMOE (Ontario Ministry of Environment). 1978. Model Municipal Noise Control By-Law – Final Report. Noise Pollution Control Publication 119. Issued August 1978.

Reimers E, Colman JE. 2001. Reindeer and caribou (*Rangifer tarandus*) response towards human activity. Rangifer 26:55-71.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-99

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Barren-ground Caribou - Energetics model assumptions and errors

DAR Section(s): 12.4.2.3

Preamble (MVEIRB):

Dominion analyzed Jay Project's effects on energy and protein balance of caribou during different seasons in Section 12.4.2.3. The approach estimated energy expended on behavioral costs added to costs of insect harassment and reduced body condition followed by lowered pregnancy rates. a) The energetic cost of a single disturbance event within the Zone of Influence around Ekati was extrapolated from the energetic cost of simulated seismic exploration on boreal caribou during late winter in a forest (Bradshaw et al. 1997). Disturbance intensity was high, and sample size was low with high annual variation in snow depth. The simulated disturbance was a 1 sec blast/1-2 min of a propane cannon for a 1- hour. In estimating energetic costs for Ekati, the assumption was a single disturbance event/day. b) The energetic cost of insect harassment (to add to the cost of responses to mine activities) was derived from reindeer calves (Weladji et al. 2003) and applied to Bathurst cows. There are two shortcomings with this approach. Firstly, caribou cows are buffered from some energetic stress from insect harassment as they reduce milk production. This was not included in the modeling. Secondly, the model has the following mistake in calculating the cost to the cow. Dominion multiplied the cost per insect day (37 g) for a 20 kg calf to a 100 kg cow by multiplying by 5 (185 g). However, the extrapolated cost for the cow was based on carcass weight of calves. Assuming carcass weight is about 50% of live weight, the cost of insect harassment/day is 92 g for a 100 kg cow, not 185 g, which appears to be a high over-estimate. The estimated body weight is extrapolated to pregnancy rate but based on a relationship derived for cows from the Central Arctic herd which may over-estimate pregnancy rates.

Request (MVEIRB):

a) Please list the assumptions and relevance to Ekati of basing the energy costs on a simulated disturbance response of boreal caribou. Re-examine the assumption of a single disturbance event/day within the Zone of Influence using the activity patterns measured at Ekati 2001-2009 and re-consider the conservatism of the assumptions.

b) Please re-calculate the cost of insect harassment for cows and pregnancy rates based on body mass for Bathurst cows to reduce the over-estimated effect of insect harassment on pregnancy rate.

Response:

As noted in Section 12.4.2.3.1 (page 12-102), the energetic model used in the Developer's Assessment Report (DAR) was based primarily on the energy costs determined by Boertje (1985) for female caribou in the Denali herd in Alaska, which is a barren-ground caribou herd. The fasting metabolic rate assumed in the DAR energetic model was also based on barren-ground caribou (McEwan 1970; Fancy 1986 [referenced in Bradshaw et al. 1998]). The only effect from boreal caribou used in the DAR was the movement distance of 2.11 kilometres (km) and was based on the experimental work by Bradshaw (1994

[referenced in Bradshaw et al. 1998]) and represents the best available information about how far caribou move following a disturbance event. In addition to this distance, the DAR also used longer distances related to absolute deflection around the Misery, Sable, and Jay Project roads, which monitoring has shown not to be the case. The deflection distances were derived from migration routes identified through Traditional Knowledge. The relationship between fall body mass loss and fecundity was based on the results of Cameron and Ver Hoeff (1994), which is also empirically derived from observations of barren-ground caribou from the Central Arctic herd.

The conservative assumptions for the energetic model are provided in Sections 12.4.2.3.1 and 12.5 of the DAR, including Table 12.5-1. The assumptions associated with the results of the energetic model used in the DAR and the associated implications to effects are summarized in Table 99-1.

Conservative assumptions were applied to maximize predicted effects and manage uncertainty. Relaxing these assumptions to produce less conservative and smaller estimates of cumulative effects will not change the impact classification and determination of significance. The relative difference between the effects from insects and development will be smaller, but the overall cumulative effect to calf recruitment will also decrease.

Table 99-1 Conservative Assumptions Implemented to Reduce Uncertainty and Improve Prediction Confidence for Barren-Ground Caribou

Effects Pathway	Conservative Assumption	Implication to Effect
Behaviour, Energy Balance, and Calf Production	A 15 km zone of influence applied to all active mineral developments	Overestimates the zone of influence recently determined by Boulanger et al. (2012) including for Snap Lake Mine. Increases the likelihood of encounter by increasing the cumulative range area indirectly disturbed.
	Exploration developments active for the entire permit period	Overestimates the temporal indirect disturbance as exploration activities typically occur for a few months in winter. This increases the likelihood of encounter by increasing the cumulative range area indirectly disturbed.
	Caribou do not habituate to disturbance effects	Overestimates the energetic costs of disturbance by maximizing the number of events that result in energy cost.
	Application of a linear relationship between number of disturbance encounters and subsequent body mass loss and decline in parturition	Overestimates the energetic costs of small numbers of encounters.
	Higher energetic cost associated with walking in snow	Overestimates the cost associated with walking in summer range.
	20% (20 kg) threshold of no parturition for energetics model	Smaller than usual margin of body mass loss for no parturition.
	Flight response to disturbance event plus 12-hour agitation period	Severe response overestimates energetic cost of a disturbance event. Estimated zones of influence have been shown to have a gradient effect; the assessment used binary approach (i.e., effect was equal regardless of how far caribou were from development).
	Caribou can tolerate lower levels of harassment	Under emphasizes the influence of insect harassment on body mass loss and parturition rates (i.e., mass loss from insect harassment begins at higher levels of harassment).
	Caribou cows as sensitive to insect harassment as demonstrated in caribou calves	Overestimates the amount of body mass loss in cows and associated decrease in fecundity from insect harassment.

Table 99-1 Conservative Assumptions Implemented to Reduce Uncertainty and Improve Prediction Confidence for Barren-Ground Caribou

Effects Pathway	Conservative Assumption	Implication to Effect
Behaviour, Energy Balance, and Calf Production	Caribou would not cross Misery or Jay roads	Severe response overestimates energetic cost of deflection movements.
	Equal effect on caribou body mass from encounters with zones of influence regardless of distance from development, even though estimated zones of influence have been shown to have a gradient effect on caribou distribution	Overestimates energetic cost of a disturbance event.
	Maximum mean annual disturbance events used to calculate energetic cost	Estimates energetic cost with a higher than average encounter rate
	No compensatory foraging outside of ZOIs	Mass loss from an encounter cannot be offset by supplemental foraging.

ZOI = zone of influence; km = kilometre.

References:

Boertje RD. 1985. An Energy Model for Adult Female Caribou of the Denali Herd, Alaska. J Range Manage 38: 468-173.

Boulanger J, Poole KG, Gunn A, Wierzchowski J. 2012. Estimating the Zone of Influence of Industrial Developments on Wildlife: a Migratory Caribou *Rangifer tarandus groenlandicus* and diamond mine case study. Wildlife Biol 18: 164-179.

Bradshaw CJA. 1994. An assessment of the effects from petroleum exploration on woodland caribou (*Rangifer tarandus caribou*) in northeastern Alberta. M.Sc. thesis, University of Alberta, Edmonton, AB, Canada.

Bradshaw CJA, Boutin S, Hebert DM. 1998. Energetic implications of disturbance caused by petroleum exploration to woodland caribou. Can J Zool 76:1319-1324.

Cameron RD, Ver Hoef JM. 1994. Predicting parturition rate of caribou from autumn body mass. J Wildlife Manage 58:674-679.

Fancy SG. 1986. Daily energy budgets of caribou: a simulation approach. Ph.D. thesis, University of Alaska, Fairbanks, AK, USA.

McEwan EH. 1970. Energy metabolism of barren ground caribou. Can J Zool 48:391-392.

DOMINION DIAMOND

Information Request Number: DAR-MVEIRB-IR-100

Source: MVEIRB Information Requests from Chuck Hubert

Subject: Barren-ground Caribou model

DAR Section(s): Adequacy Response DAR-MVEIRB-15

Preamble (MVEIRB):

a) The developer's population model is a 10-year projection of the trend in the size of the Bathurst herd starting from GNWT's 2012 estimated number of breeding females. The reason for not using much lower 2014 starting population based on a reconnaissance calving ground survey is (p. 2) is that vital rates estimated after 2012 were not available. However, Fig. 28 in Boulanger et al. (2014a) shows extrapolated numbers of breeding females plotted against adult survival rates. The 2014 estimate suggests a lower adult survival rate as explanatory power and could have been used in the Proponent's population viability analysis. The energetic model is used to modify fecundity and calf survival rates for development and weather scenarios in the population model. The energetic modelling predicted up to 13% reduction in pregnancy (uncorrected estimate) but it is not clear how energetic projections for fecundity and calf survival (the following year) were used to calculate the population model input. DAR Reference: Boulanger J, Croft B, Adamczewski J. 2014a. *An Estimate of Breeding Females and Analyses of Demographics For The Bathurst Herd of Barren-ground Caribou: 2012 Calving Ground Photographic Survey*. Integrated Ecological Research Unpublished File Report No. 142 for Environment and Natural Resources, GNWT. 81 pp.

Request (MVEIRB):

a) Please indicate if Dominion requested that GNWT provide updated vital rates since 2012 given the 2012-2014 decline.

b) Please consider whether using an extrapolated adult survival rate (0.68) from the 2012 report would change conclusions from the population model.

c) Please provide more detail to clarify how the fecundity and calf survival were calculated from the energetics model projections (revised) for body weight and pregnancy.

Response:

a) A request was made of the Government of Northwest Territories (GNWT) for Bathurst caribou herd vital rates based on the results of the 2014 calving ground reconnaissance survey. Calf:cow ratios were obtained from GNWT composition surveys conducted in October 2012 (2012 birth year, 24 calves:100 cows) and spring 2014 (2013 birth year, 32 calves:100 cows). However, adult female survival rates from the same period are important in the interpretation of recruitment from calf:cow ratios as they affect the denominator in the ratio. For example, if adult female survival in an interval is 50 percent (%) and calf survival is 100%, then the denominator is half of what it was at the start of the interval and the calf:cow ratio doubles even though the number of calves does not change. Data to confidently estimate adult female survival for 2012 to 2014 are not available. The approach to

estimating a set of vital rates for the Bathurst herd used in Boulanger et al. (2011, 2014) has not been applied to account for the apparent 2012 to 2014 decline. The vital rates provided following the 2012 calving ground photographic survey (Boulanger et al. 2011, 2014) are the most recent vital rates that have been calculated for the Bathurst herd that reconcile all available sources of information (Adamczewski 2015). The information required for the determination of vital rates (Boulanger et al. 2014) requires information not gathered in the 2014 reconnaissance survey.

b) The selection of an adult female survival rate of 0.68 noted in the request is unclear. Figure 28 in Boulanger et al. (2014) shows the relationship between different adult female survival rates and the population of adult female caribou in 2012, given historic starting populations and holding other productivity parameters constant (Boulanger et al. 2014, page 58). From the figure, an adult female survival rate of 0.68 from would coincide with an estimate of approximately 9,000 breeding females in 2012 with the assumed starting population and productivity level. The estimate of 15,935 breeding females in 2012 led Boulanger et al. (2014, page 61) to conclude that the actual annual adult female survival rate from 2009 to 2012 was 78%.

   As noted in the preamble, population modelling was completed in response to Mackenzie Valley Environmental Review Board Jay Project Adequacy Review Item 8.8 and presented in the response to DAR-MVEIRB-15 (hereafter referred to as “modelling report”). In the absence of empirical vital rates for the Bathurst herd for the 2012 to 2014 period, the modelling report (page 12) noted that adult survival rates between 51% and 62% were consistent with the 2014 Bathurst herd reconnaissance survey population estimate. Regardless of the specific vital rates that would fit the observed population data, the end result would be the same: an annual decline of 48% over a two-year period. The modelling report addressed adult female survival rates below the 68% value in this request, addressing more extreme mortality scenarios than requested.

   As noted in the modelling report (pages 12 to 13), the current low population of the Bathurst herd should allow more selective use of habitat. As there is no strong mechanism by which development reduces adult female survival, the negative trend in population growth associated with the current estimates of vital rates is predicted to be similar with and without the development-related cumulative changes in habitat quantity and quality, and caribou behaviour and energetics. Consequently, the use of a lower annual adult female survival rate will not change the conclusions of the modelling report.

c) Fecundity and calf survival rates from Boulanger et al. (2014) were used as the initial stage matrix rates for the Base Case simulations (modelling report, page 3 and Table 15-2). Changes in calf survival rates were determined as the percent changes from the Base Case for each scenario at low insect harassment levels (insect harassment was applied independently as a stochastic variable in the population modelling). As the population models were run for the female portion of the population only, the changes applied to fecundity were half of those applied to calf survival (i.e., an assumed 1:1 sex ratio at birth). Table 100-1 shows the sources of the modifier variables presented in Table 15-3 of the modelling report.

Table 100-1 Source and Magnitudes of Relative Changes in Parturition and Fecundity Applied in Bathurst Caribou Herd Population Models

Population Model Simulation	Source Table	Scenario (Assessment Case)	% Change in Calf Survival from DAR Base Case	% Change in Fecundity from DAR Base Case
Reference 1 Reference 2	DAR 12.4-27	Reference Condition	+3.6	+1.8
Application 1 Application 2	DAR 12.4-27	Application Case	-0.3	-0.2
RFD 1 RFD 2	Sable Addendum 4.2-17	RFD Case (with Sable Project)	-3.9	-2.0

Note: Percentage changes reflect difference between the Scenario (Assessment Case) noted and the Base Case, low IHI scenario presented in DAR Table 12.4-27.

DAR = Developer's Assessment Report; RFD = reasonably foreseeable development; IHI = insect harassment index; % = percent.

References:

Adamczewski J. 2015. Personal communication. Wildlife Biologist, Ungulates – Environment & Natural Resources, Wildlife Division, Government of the Northwest Territories. Phone call with J. Rettie, Golder Associates. March 2, 2015.

Boulanger J, Gunn A, Adamczewski J, Croft B. 2011. A Data-Driven Demographic Model to Explore the Decline of the Bathurst Caribou Herd. J Wildlife Manage 75: 883-896.

Boulanger J, Croft B, Adamczewski J. 2014. An Estimate of Breeding Females and Analyses of Demographics For The Bathurst Herd of Barren-ground Caribou: 2012 Calving Ground Photographic Survey. Integrated Ecological Research Unpublished File Report No. 142 for Environment and Natural Resources, GNWT. 81 pp.

DOMINION DIAMOND

Information Request Number:	DAR-MVEIRB-IR-102
Source:	MVEIRB Information Requests from Chuck Hubert
Subject:	Barren-ground Caribou
DAR Section(s):	Sable Addendum (Appendix I, Section 1.3)

Preamble (MVEIRB):

The Sable pit and road are north and west of Jay and Misery pits and may initially be encountered by caribou moving south through the corridor between Yamba and Pellet lakes. Higher numbers of caribou may possibly be involved. It is uncertain from the Sable Addendum what the distribution of caribou is relative to the habitat along Sable Road and pit, based on incidental sightings, remote camera sightings or aerial surveys. The approach used in 2014 for describing and mapping caribou trails in the vicinity of the Jay pit is excellent and a useful step toward designing mitigation.

Request (MVEIRB):

Please integrate annual and seasonal incidental sightings, aerial survey sightings and camera sightings to provide tables and maps of caribou distribution in the vicinity of the Sable pit and road. For the next field season, will Dominion commit to undertake a similar finescale track survey as was undertaken in 2014 for Jay to further reduce uncertainty?

Response:

The Sable open pit and road has already undergone Environmental Assessment (EA99-004) through the Mackenzie Valley Environmental Impact Review Board (MVEIRB 2001) and was fully permitted in 2002 as part of the Sable, Pigeon, and Beartooth Expansion Project. Land Use Permit No. W2008F0009 issued by the Wek'èezhìı Land and Water Board is in place to directly regulate construction and use of the Sable Road, should it be built in future. The Land Use Permit states:

> *28. The Permittee shall ensure that adequate Caribou crossings are constructed so as to allow caribou free access to the road.*

The Jay Project is not conditional on the development of the Sable project, which is a reasonably foreseeable development in the Developer's Assessment Report. As described in the Sable Addendum, (Dominion Diamond 2014) Dominion Diamond Ekati Corporation (Dominion Diamond) is conducting exploration work (bulk sample) at the Sable pipe in winter 2015 to gather additional geological information.

Should the Sable project proceed, Dominion Diamond would involve communities in identifying caribou crossings and other mitigation for the Sable project, and consider other field observation data. For example, a number of caribou monitoring programs related to the Sable project were completed from 1999 to 2003 and could be used for this purpose. This includes data on historical caribou trails detected in aerial photos in 1998 and 1999 and caribou snow tracks and focal behaviour of caribou groups from 1999 to 2003 (Rescan 1999; Golder 1999, 2001, 2002, 2004). At that time, the adequacy of information

would be reviewed and would be augmented if necessary to ensure that caribou crossings were adequately designed to meet the requirement of the Land Use Permit, as repeated above. It would be appropriate to develop any such additional information at that time so that it would be based on the most current knowledge.

References:

MVEIRB (Mackenzie Valley Environmental Impact Review Board). 2001. Report of Environmental Assessment on the proposed development of Sable, Pigeon and Beartooth Kimberlite pipes. Prepared by the Mackenzie Valley Environmental Impact Review Board, February 7, 2001. Yellowknife, NWT, Canada.

Dominion Diamond (Dominion Diamond Ekati Corporation). 2014. Jay Project Developer's Assessment Report – Sable Addendum. Prepared by Golder Associates Ltd., December 2014. Yellowknife, NWT, Canada.

Golder (Golder Associates Ltd.) 1999. 1998 Wildlife Effects Monitoring Program – construction phase. NWT Diamonds Project, BHP. Prepared by Golder Associated Ltd., Yellowknife, NWT, Canada.

Golder. 2001. Ekati Diamond Mine: 2001 Wildlife Effects Monitoring Program. Prepared for BHP Billiton by Golder Associates Ltd., Yellowknife, NWT, Canada.

Golder. 2002. Ekati Diamond Mine: 2001 Wildlife Effects Monitoring Program. Prepared for BHP Billiton by Golder Associates Ltd., Yellowknife, NWT, Canada.

Golder. 2004. Ekati Diamond Mine: 2003 Wildlife Effects Monitoring Program. Prepared for BHP Billiton by Golder Associates Ltd., Yellowknife, NWT, Canada.

Rescan (Rescan Environmental Services Ltd.). 1999. Ekati Diamond Mine: 1999 Wildlife Effects Monitoring Program. Prepared by Rescan Environmental Services Ltd., Yellowknife, NWT, Canada.

DOMINION DIAMOND

Information Request Number: DAR-NSMA-IR-01

Source: North Slave Metis Alliance: Shin Shiga

Subject: Pre-Screening Results

DAR Section(s): 2

Preamble (NSMA):

In Table 2.4-1, Project Economic Viability of Single Dike - Jay Only, DDEC states "[t]he Cardinal pipe cannot be mined with this approach"

Request (NSMA):

Please elaborate this statement. Does this mean:

a) Cardinal pipe cannot be mined by definition because of the scope of the assessment;

b) DDEC conducted an economic feasibility study of the a phased approach where Cardinal pipe will be developed after Jay pipe, and concluded such approach was not feasible; or

c) something else?

Response:

The Cardinal kimberlite pipe is not economically viable as a stand-alone project because it is a much smaller pipe than the Jay kimberlite pipe and does not support the high costs of a stand-alone dike and other capital costs associated with pit development. As such, a stand-alone dike for mining the Cardinal pipe was not included in the Project Alternatives (Section 2) of the Developer's Assessment Report (DAR). Extraction from the Cardinal pipe was considered for the diversion and drawdown alternative (Section 2.4.3 of the DAR) because the cost to construct the diversion and drawdown dikes that would allow for the development of both the Jay and Cardinal pipes may have been economically viable.

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Information Request Number:	DAR-NSMA-IR-03
Source:	North Slave Metis Alliance: Shin Shiga
Subject:	Project Alternatives
DAR Section(s):	2

Preamble (NSMA):

Contribution of Jay Project infrastructure investment towards Jay underground mining.

Request (NSMA):

Please summarize the infrastructure and other investments that will have been made for the Jay Project that could make the development of Jay underground mining option more viable. Please include in this summary relevant economic analyses.

Response:

As described in Section 3.2 of the Developer's Assessment Report (DAR), the Jay Project includes an approximately ten year period of open pit mining of the Jay kimberlite pipe. Underground mining is not part of the Project. Significant exploration would be required to adequately assess the feasibility of underground development. This would include, at a minimum, drilling to characterize the Jay kimberlite pipe at depth and analysis to demonstrate reasonable prospects of eventual economic extraction. None of this information exists at this time, and as a result, Dominion Diamond Ekati Corporation has not reported a Mineral Resource associated with underground mining at Jay, only exploration potential.

Infrastructure that will be developed to facilitate kimberlite extraction through the Jay open pit and that would benefit underground development could include: access roads, power supply, pipelines, waste rock storage area, dike, and mine infrastructure (e.g., camp, truck shop).

DOMINION DIAMOND

Information Request Number: DAR-NSMA-IR-04

Source: North Slave Metis Alliance: Shin Shiga

Subject: Project Alternatives

DAR Section(s): 2

Preamble (NSMA):

Phased approach to Jay pipe (open pit followed by underground mining), or Jay-Cardinal (single dyke mining of Jay, followed by mining of Cardinal) are not presented as options.

Request (NSMA):

Please provide DDEC's analyses of these approaches. If DDEC has not considered these options, please explain why. Please include in your explanation at least social and economic reasoning.

Response:

As explained in the response to Information Request DAR-NSMA-IR-03, additional data are required prior to being able to adequately assess the feasibility of underground development of the Jay kimberlite pipe (i.e., resource characterization, economic feasibility) as little information now exists.

Dominion Diamond made changes to the original Jay-Cardinal project to mine the Jay pipe only and remove the Cardinal pipe from the project entirely due to concerns heard during the engagement process with communities and stakeholders. As explained in the response to Information Request DAR-NSMA-IR-01, a Jay-Cardinal alternative involving stand-alone dikes for both Jay and Cardinal was not included in the Project mining method alternatives assessment (Section 2.4 of the DAR) because the Cardinal kimberlite pipe is not economically viable using a stand-alone dike.

DOMINION DIAMOND

Information Request Number: DAR-NSMA-IR-05

Source: North Slave Metis Alliance: Shin Shiga

Subject: Community Engagement

DAR Section(s): 4

Preamble (NSMA):

Previous to the DAR community and technical staff sessions in December 2014, it was communicated to DDEC that NSMA members often find it difficult to attend these meetings because they are held during week days, between 9am and 5pm. This happened again in February 2015, when DDEC organized another session to consult NSMA members regarding the Project.

Request (NSMA):

Please explain why DDEC consistently organizes community engagement sessions in these times when many working and full-time student members of the affected communities are unable to attend? Please plan and consult ahead of time when these meetings should be held to maximize attendance.

Response:

Dominion Diamond Ekati Corporation (Dominion Diamond) works with communities on the time and date of meetings to maximize attendance. In the past, Dominion Diamond has organized meetings with the North Slave Métis Alliance (NSMA) on weekends so more members can attend and at lunch times with the NSMA Board so that Board Members who work or go to school could attend.

However, in some instances where there are requirements for workshops that involve many communities and require sufficient time to allow for the presentation of materials and a full discussion, it is not practical to do so on weekends or in the evenings. For example, the December Information Sessions involved over 60 people over a four-day period. The February meeting with the NSMA was organized through the office of the President of the NSMA.

In the future, Dominion Diamond would be happy to work with NSMA if there are better times and ways to engage with their members on specific issues.

DOMINION DIAMOND

Information Request Number:	DAR-NSMA-IR-22
Source:	North Slave Metis Alliance: Shin Shiga
Subject:	Barren-Ground Caribou
DAR Section(s):	12.4.2.3.1 (Figure 12.4-6)

Preamble (NSMA):

The graph [Figure 12.4-6] includes meteorological data from Diavik Diamond Mine and Snap Lake Mine, duration of 1993-2013.

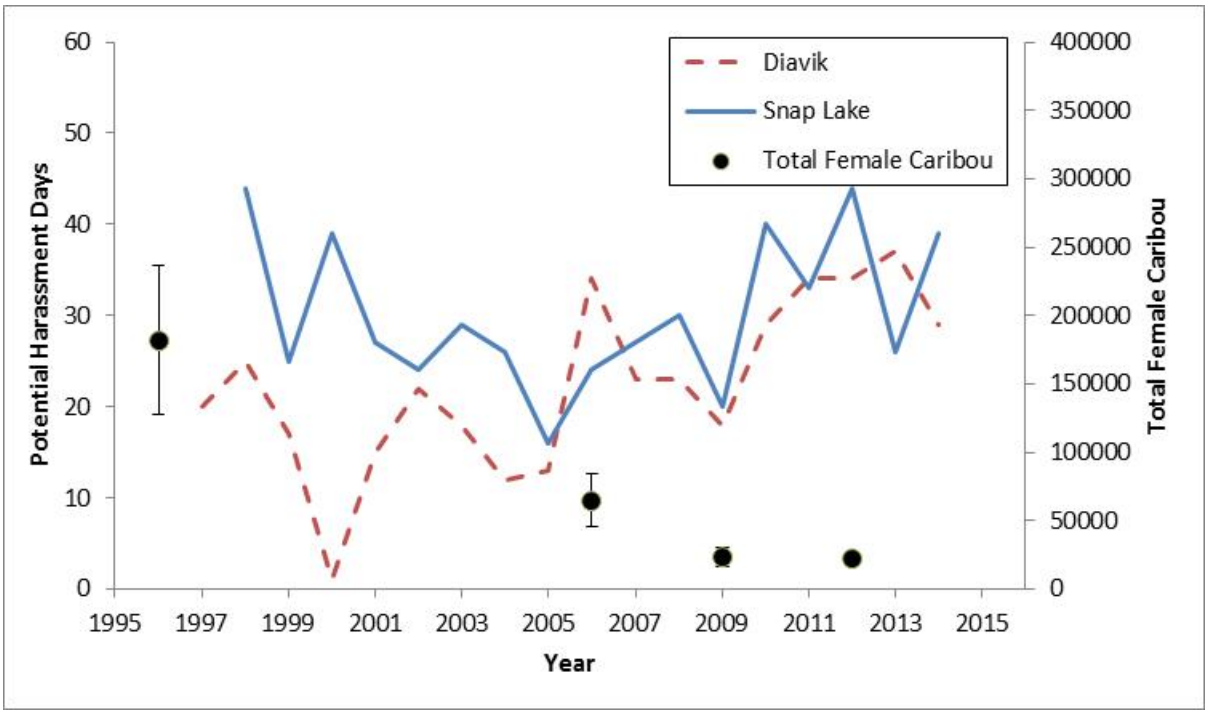
Request (NSMA):

Please superimpose on this data the Bathurst caribou population data for ease of comparison.

Response:

Section 12 of the DAR does not contain a Figure 12.4-6. The North Slave Métis Alliance clarified that the intended figure for this request was Figure 12.4-2 of the DAR. To meet this request, a secondary vertical axis was added in order to display the Bathurst population data on the total number of female caribou results shown in Figure 12.2-1 of the DAR (Figure 22-1). Bathurst population data on total female caribou were reported in the DAR, and therefore readily available to meet this request. The trend in total female caribou is consistent with the trend reported for the entire Bathurst herd (Adamczewski et al. 2009).

Figure 22-1 Insect Harassment Indices Defined as Potential Harassment Days and Estimates (± SD) of Total Female Bathurst Caribou



SD = standard deviation.

References:

Adamczewski JZ, Boulanger J, Croft B, Cluff D, Elkin B, Nishi J, Kelly A, D'Hont A, Nicholson C. 2009. Decline of the Bathurst Caribou Herd 2006-2009: A technical evaluation of field data and modeling. Draft technical report December 2009. GNWT.

DOMINION DIAMOND

Information Request Number: DAR-NSMA-IR-27

Source: North Slave Metis Alliance: Shin Shiga

Subject: Socio-Ec

DAR Section(s): Adequacy Review Responses 11.1 to 11.5

Preamble (NSMA):

In the table [4.1-1] DDEC provides one explanation why a subset of women in rural areas do not apply to work at mine sites.

Request (NSMA):

If there is not adequate data to conduct such analysis, please design community consultations specifically designed to improve female employment rate at DDEC.

Response:

Part 1)

This response provides further clarity to the point made in Table 4.2-1 of the Socio-Economic Supplemental Report response to Adequacy Review items (Dominion Diamond 2015). The Dominion Diamond Ekati Corporation (Dominion Diamond) head office is located in Yellowknife. It is here that positions associated with business operations (e.g., Human Resources, Community and Public Relations, accounting, finance, administration, procurement) are based. These types of positions typically work a Monday to Friday schedule, and are more easily altered (in terms of hours worked per day) to accommodate non-standard working hours (i.e., not 9-5). This schedule is more attractive to people that find rotational work challenging, such as those caring for children or other family members. Women in Yellowknife who are the primary care givers for young children may not face the same barriers to employment as those who live in rural communities, who do not have the opportunity to work at Dominion Diamond without moving to Yellowknife.

Rotational work at the Ekati Mine site is more accessible to residents of rural communities, given the less frequent commute schedule (i.e., travelling every two weeks for a 2:2 rotation), and the fact that these communities are fly points from which employees can be transferred to site via a charter. This presents a challenge, and a barrier, for women who are caring for young children in rural communities, and who would seek employment with Dominion Diamond. Rotational employment involves long periods away from your home community and family. This may not be viewed as feasible or even desirable for many women. As a result, some women in rural communities do not apply for positions.

Part 2)

The design of community consultations designed to improve the employment of women at the Ekati Mine is out of the scope of the Developer's Assessment Report for the Jay Project. However, Dominion Diamond is committed to ongoing engagement with communities, and will continue to seek input on

employment barriers, including those discussed above, and possible approaches to breaking down those barriers.

References:

Dominion Diamond (Dominion Diamond Ekati Corporation). 2015. Response to: Jay Project Adequacy Review Items 11.1, 11.2, 11.3, 11.4, and 11.5. Submitted to Mackenzie Valley Environmental Impact Review Board. Yellowknife. NWT. Canada. January 2015.

Information Request Number: DAR-NSMA-IR-28

Source: North Slave Metis Alliance: Shin Shiga

Subject: Socio-Ec

DAR Section(s): Annex XV

Preamble (NSMA):

See recommendation [request].

Request (NSMA):

Please define "traditional" and "non-traditional" roles for women at DDEC.

Response:

Section 14.6.2 of the Developer's Assessment Report (DAR) notes that Dominion Diamond Ekati Corporation (Dominion Diamond) "will continue to actively encourage the employment of women in non-traditional roles." As defined by Dominion Diamond, a woman who works outside the home in a job that is not historically categorized as a female occupation is considered to be working in a "non-traditional" occupation (Dominion Diamond Corporation 2013). Non-traditional occupation, as defined by Statistics Canada, refers to a population (e.g., women) representation of 25 percent (%) or less of an occupational group (House of Commons Canada 2010). Examples of non-traditional occupations for women include occupations in the fields related to primary industry (e.g., forestry operations, mining, oil and gas), construction trades, and in the fields of natural sciences, engineering and mathematics (Statistics Canada 2013). Traditional occupations for women are occupations in which women represent 75% or more of total employed (United States Department of Labor 2013). Examples of traditional occupational roles for women include teaching, nursing and related health fields, clerical or other administrative positions, and sales and service (Statistics Canada 2012).

References:

Dominion Diamond Corporation. 2013. Dominion Diamond's 2013 Socio-Economic Agreement Report.

House of Commons Canada. 2010. Building the Pipeline: Increasing the Participation of Women in Non-Traditional Occupations, Report of the Standing Committee on the Status of Women. Available at: http://www.parl.gc.ca/content/hoc/Committee/403/FEWO/Reports/RP4819341/feworp06/feworp06-e.pdf. Accessed March 13, 2015.

Statistics Canada. 2012. Women in Canada at a Glance Statistical Highlights. Available at: http://www.swc-cfc.gc.ca/rc-cr/stat/wic-fac-2012/sec7-eng.html. Accessed March 13, 2015.

Statistics Canada. 2013. Fact Sheet: Women in Non-Traditional Occupations. Available at: http://www.swc-cfc.gc.ca/initiatives/wesp-sepf/fs-fi/wnto-fetm-eng.html. Accessed March 13, 2015.

United States Department of Labor. 2013. Traditional and non-traditional occupations. Available at: http://www.dol.gov/wb/stats/nontra_traditional_occupations.htm. Accessed March 13, 2015.

Information Request Number:	DAR-NSMA-IR-30
Source:	North Slave Metis Alliance: Shin Shiga
Subject:	Socio-Ec
DAR Section(s):	3, Adequacy Review Responses 11.1 to 11.5

Preamble (NSMA):

See recommendation [request].

Request (NSMA):

Please provide data for northern aboriginal employment statistics; in particular, provide employment statistics of the IBA parties.

Response:

While historical human resources data for the Ekati Mine was not transferred to Dominion Diamond Corporation by BHP Billiton, publicly available copies of the mine's annual Socio-Economic Agreement reports provide some level of historical data on employment by hiring priority and gender. Table 30-1 provides a breakdown of employment at the Ekati Mine, by year and hiring priority, from 1999 to 2013. Information has been broken out by direct and contractor employment where available. Data from 2014 are currently under review by Dominion Diamond Ekati Corporation, and will be available at a later date in the form of the annual Socio-Economic Agreement report. Tables 30-2 and 30-3 provide information on employment by hiring priority at the Diavik and Snap Lake mines, respectively.

Employment by Impact Benefit Agreement (IBA) party is confidential, and cannot be provided publicly in this response.

DOMINION DIAMOND

Table 30-1 Employment By Priority, 1999 to 2013

Part A

Employment By Priority (Person Years)		1999	2000	2001	2002	2003	2004	2005	2006			2007			2008		
		Total	Total	Total	Total	Total	Total	Total	Direct	Contractor	Total	Direct	Contractor	Total	Direct	Contractor	Total
Aboriginal	#	235	312	357	401	399	410	429	222	115	336	250	168	418	287	121	408
	%	33	32	30	28	28	34	32	35	29	33	39	31	35	33	21	28
Other Northern	#	259	299	366	419	427	381	392	228	52	279	183	103	286	235	69	304
	%	37	31	31	30	30	32	29	36	13	27	28	19	24	27	12	21
Total Northern	**#**	**495**	**611**	**723**	**820**	**826**	**791**	**821**	**449**	**166**	**615**	**433**	**271**	**704**	**522**	**190**	**712**
	%	**70**	**64**	**62**	**58**	**58**	**65**	**61**	**71**	**42**	**60**	**67**	**50**	**59**	**60**	**33**	**49**
Other	#	214	350	452	592	598	419	517	188	231	418	215	274	489	345	385	730
	%	30	36	39	42	42	35	39	29	58	40	33	50	41	40	67	51
Total	#	709	961	1,174	1,412	1,424	1,209	1,337	637	397	1,034	648	545	1,193	867	575	1,442
	%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Part B

Employment By Priority (Person Years)		2009			2010			2011*			2012			2013		
		Direct	Contractor	Total	Direct	Contractor	Total	Direct	Contractor	Total	Direct	Contractor	Total	Direct	Contractor	Total
Aboriginal	#	255	156	411	240	86	326	243	74	317	267	117	384	272	105	377
	%	32	23	28	31	19	27	30	18	26	32	22	28	34	20	28
Other Northern	#	240	122	362	240	104	344	233	99	333	225	106	331	183	111	294
	%	30	18	25	31	23	51	29	24	27	27	20	24	23	21	22
Total Northern	**#**	**495**	**278**	**773**	**480**	**190**	**670**	**476**	**174**	**650**	**492**	**223**	**715**	**455**	**216**	**671**
	%	**63**	**42**	**53**	**62**	**41**	**54**	**59**	**42**	**54**	**58**	**43**	**52**	**57**	**41**	**50**
Other	#	293	391	684	292	267	559	325	238	563	353	299	652	348	317	665
	%	37	58	47	38	59	46	41	58	46	42	57	48	43	59	50
Total	#	788	669	1,457	772	457	1,229	801	412	1,213	845	522	1,367	803	533	1,336
	%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: BHP Billiton 2006 to 2011; Dominion Diamond Corporation 2012, 2013.

% - percent; # = number; Note: Some percent totals may not add to 100% due to rounding.

*Totals for the 2011 year have been adjusted since the date of original publication. For the purposes of this Information Request, the original numbers have been presented in order to show the breakdown of direct and contractor employment.

DOMINION DIAMOND

Table 30-2 Diavik Mine Employment by Priority Group, 2003 to 2013

Employment By Priority (Person Years)		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Aboriginal	#	221	259	256	245	257	273	269	269	313	238	202
	%	36	36	35	33	33	34	33	30	28	22	20
Other Northern	#	224	259	257	253	267	267	259	292	329	302	283
	%	37	36	35	34	34	33	32	32	29	28	28
Total Northern	**#**	**444**	**518**	**513**	**497**	**524**	**540**	**528**	**561**	**642**	**508**	**485**
	%	**73**	**72**	**71**	**68**	**67**	**67**	**65**	**62**	**56**	**47**	**49**
Other	#	167	202	214	238	261	268	282	346	495	563	512
	%	27	28	29	32	33	33	35	38	44	53	51
Total	**#**	611	720	727	735	785	808	810	907	1,137	1,071	997
	%	100	100	100	100	100	100	100	100	100	100	100

Source: Diavik 2003 to 2014.

Note: Employment is reported in total, including contractors and direct employees.

% - percent; # = number; Note: Some percent totals may not add to 100% due to rounding.

Table 30-3 Snap Lake Mine Employment by Priority Group, 2003 to 2013

Employment By Priority (Person Years)		2005	2006	2007	2008			2009			2010			2011			2012		
		Total	Total	Total	Direct	Contractor	Total	Direct	Contractor	Total	Direct	Contractor	Total	Direct	Contractor	Total	Direct	Contractor	Total
Aboriginal	#	39	93	126	52	87	139	45	47	92	65	58	123	75	70	145	82	67	149
	%	17	11	11	15	24	19	16	33	21	26	37	30	18	27	21	18	23	20
Other Northern	#	56	130	143	88	47	135	54	16	71	64	42	106	67	37	104	79	48	126
	%	24	16	13	25	13	19	19	11	16	26	27	26	16	14	15	17	16	17
Total Northern	**#**	**95**	**223**	**269**	**140**	**134**	**274**	**99**	**63**	**163**	**130**	**99**	**229**	**142**	**107**	**249**	**160**	**115**	**275**
	%	**41**	**27**	**24**	**39**	**36**	**38**	**34**	**44**	**38**	**53**	**63**	**56**	**34**	**41**	**37**	**34**	**40**	**36**
Other	#	137	614	875	218	237	454	188	81	269	247	158	406	273	156	429	305	176	482
	%	59	73	76	61	64	62	66	56	62	100	100	100	66	59	63	66	60	64
Total	**#**	231	838	1,144	358	370	729	287	144	431	247	158	406	415	263	678	466	291	757
	%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: De Beers 2008-2012.

% - percent; # = number; Note: Some percent totals may not add to 100% due to rounding.

References:

BHP Billiton. 2006. Ekati Mine. Annual Report on Northern Employment and Spending 2006 Operations Phase - EKATI Diamond Mine.

BHP Billiton. 2007. Ekati Mine. Annual Report on Northern Employment and Spending 2007 Operations Phase - EKATI Diamond Mine.

BHP Billiton. 2008. Ekati Mine. 2008 Sustainable Development Report Ekati Diamond Mine.

BHP Billiton. 2009. Ekati Mine. Ekati Diamond Mine 2009 Year in Review.

BHP Billiton. 2010. Ekati Mine. Ekati Diamond Mine 2010 Year in Review.

BHP Billiton. 2011. Ekati Mine. Ekati Diamond Mine 2011 Year in Review.

De Beers (De Beers Canada Inc.). 2008. Snap Lake Mine Socio-Economic Report 2008.

De Beers. 2009. Snap Lake Mine Socio-Economic Report 2009.

De Beers. 2010. Snap Lake Mine Socio-Economic Report 2010.

De Beers. 2011. Snap Lake Mine Socio-Economic Report 2011.

De Beers. 2012. Snap Lake Mine Socio-Economic Report 2012.

Dominion Diamond Corporation. 2012. Ekati Mine. Ekati Diamond Mine 2012 Year in Review.

Dominion Diamond Corporation. 2013. Dominion Diamond's 2013 Socio-Economic Agreement Report.

DDMI and Rio Tinto (Diavik Diamond Mines Inc. and Rio Tinto). 2003. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2004. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2005. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2006. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2007. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2008. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2009. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2010. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2011. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2012. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2013. Socio-economic Monitoring Report.

DDMI and Rio Tinto. 2014. Socio-economic Monitoring Report.

DOMINION DIAMOND

Information Request Number:	DAR-TC-IR-01
Source:	Transport Canada Information Request
Subject:	The dewatering of Lac Du Sauvage for the proposed Jay Pit
DAR Section(s):	General Comment

Preamble (TC):

With the changes from the Navigable Waters Protection Act 2009 to the Navigation Protection Act (NPA), proponents are not required to submit Notice of Works forms to the department for review on water bodies that are not listed in the Schedule under the NPA. Lac Du Sauvage along with the other water bodies impacted do not fall under the schedule, therefore no Notice of Works are required. This is only the case for the dewatering of a navigable water body, which this project falls. The proponent also has the right to have works that are in water bodies that fall outside of the schedule reviewed by the NPP. This is called “Opting-In”. Notice of Work forms may be submitted for project review for works that include water course crossings, water intakes and outfalls, pipelines etc. When this request is made, the NPP will start by conducting a navigational assessment of the water body to determine if it falls under the scope of the NPA. The NPP will need to conduct a navigability assessment on Lac Du Sauvage for the dewatering of the proposed Jay Pit. The information required to assist in this determination are the water depths of the area, distance/area, use of the area for potential recreational, commercial or subsistence use. An open water or spring flow timing site visit may be conducted to obtain all relevant information. Once the review is completed, construction methodology of the dewatering and dike as well as plan and profile views will be required.

Request (TC):

Transport Canada’s Navigation protection Program (NPP) will require the following: A Notice Of Work form that will list out the water body details along with the specific type of work that will impact the water body; TC will need to conduct a navigability assessment on Lac Du Sauvage for the dewatering of the proposed Jay Pit.

Response:

Dominion Diamond intends to “Opt-In” under the *Navigation Protection Act* (NPA) and submit a Notice of Work form for the dike and dewatering activities within Lac du Sauvage as part of the Jay Project. The Notice of Work form will be completed during the Jay Project permitting phase. The Notice of Work form, along with all supporting information requested above and the minimum information required in a Notice to the Minister, will be submitted to the Navigation Protection Program for a navigability assessment.

DOMINION DIAMOND

Information Request Number:	DAR-TC-IR-02
Source:	Transport Canada Information Request
Subject:	Diesel Spill on Misery Road
DAR Section(s):	1, 1.2.4.2

Preamble (TC):

Section 8.3 of the Transportation of Dangerous Goods Regulations (TDGR) requires that a person who has possession of the dangerous goods at the time of an accidental release, a "dangerous goods accident" or a "dangerous goods incident" must submit a follow-up report within 30 days after the occurrence.

Request (TC):

Transportation of Dangerous Goods would like to request a copy of the Spill Report for the incident which occurred on March 8th, 2014.

Response:

On March 8, 2014, a diesel fuel tanker truck operated by Ventures West went off the Misery Haul Road at kilometre 12 and spilled approximately 2,756 litres of diesel. Dominion Diamond conducted the emergency response and the spill was reported to the Northwest Territories (NWT) Spill Line (Spill #14-072) on March 8, 2014. Updates to the Spill Report were submitted on March 9, 2014 and March 11, 2014 and are attached. The Inspector visited the spill on March 11, 2014 and March 19, 2014 and Dominion Diamond submitted the Post Emergency Procedure and Remediation Plan in consultation with the Inspector on March 19,' 2014, which is posted on the Wek'èezhìi Land and Water Board registry here:

http://www.mvlwb.ca/Boards/WLWB/Registry/2013/W2013C0005/W2013C0005%20-%20Ekati%20Exploration%20-%20Notification%20of%20Spill%20Report%20and%20the%20Post%20Emergency%20Procedure%20-%20Mar%2019_14.pdf

Attachment 1

Spill Report

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR **March 8 2014**	REPORT TIME **22:45**	☒ ORIGINAL SPILL REPORT, OR	REPORT NUMBER **14 - 072**
B	OCCURRENCE DATE: MONTH – DAY – YEAR **March 8 2014**	OCCURRENCE TIME **19:00**	☐ UPDATE # TO THE ORIGINAL SPILL REPORT	
C	LAND USE PERMIT NUMBER (IF APPLICABLE) **NA**	WATER LICENCE NUMBER (IF APPLICABLE) **W2012L2-0001**		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION **Ekati Diamond Mine**	REGION ☒ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR		
E	LATITUDE DEGREES **64** MINUTES **38** SECONDS **34.6**	LONGITUDE DEGREES **110** MINUTES **26** SECONDS **24.4**		
F	RESPONSIBLE PARTY OR VESSEL NAME **Dominion Diamond Ekati Corporation**	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION **Ekati Diamond Mine**		
G	ANY CONTRACTOR INVOLVED **Winter Road Truck**	CONTRACTOR ADDRESS OR OFFICE LOCATION **NA**		
H	PRODUCT SPILLED **Diesel**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES **Estimated 15 - 20 L at this time**	U.N. NUMBER **NA**	
	SECOND PRODUCT SPILLED (IF APPLICABLE) **Engine Oil**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES **Estimnated 1-2 L at theis time**	U.N. NUMBER **NA**	
I	SPILL SOURCE **Tanker truck**	SPILL CAUSE **Truck over turned**	AREA OF CONTAMINATION IN SQUARE METRES **5**	
J	FACTORS AFFECTING SPILL OR RECOVERY **Currently trying to source a pumper truck**	DESCRIBE ANY ASSISTANCE REQUIRED **Noen at this time**	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT **Further leaks from tanker**	

K ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

At approximately 19:00rs a fuel tanker truck (b train) heading north into Misery camp left the Misery haul road and turned on its side at Approximately km 12 of the haul road. The truck and trailer are approximately 3 to 5 m off and parallel to the haul road, laying on its right side. The ERT extracted the driver and the ruptured fuel tank on the truck was sealed with leak stop; approximately 10 to 15 Litres was spilled on the ground before a spill pool was placed under the tank. Small drip leaks from the manhole access covers on the tanker cars are ongoing, but spill pads and or spill pools are placed under them. Currently a pumper truck is being sourced to allow the overturned trailer to be pumped dry of fuel before up righting the vehicle and trailers. The estimated volume of diesel in the trailers is 52, 200 L (taken from a similar truck at the scene). UTMs are 526754 / 7168780

L	REPORTED TO SPILL LINE BY **Richard Ehlert**	POSITION **Environment**	EMPLOYER **DDEC**	LOCATION CALLING FROM **Ekati Mine Site**	TELEPHONE **(867) 880-2157**
M	ANY ALTERNATE CONTACT **Jamie Steele**	POSITION **Environment Advisor**	EMPLOYER **DDEC**	ALTERNATE CONTACT LOCATION **Ekati Mine Site**	ALTERNATE TELEPHONE **(867) 880-2281**

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION **Station operator**	EMPLOYER	LOCATION CALLED **Yellowknife, NT**	REPORT LINE NUMBER **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR **March 9 2014**	REPORT TIME **17:45**	☐ ORIGINAL SPILL REPORT, OR	REPORT NUMBER **14 - 072**
B	OCCURRENCE DATE: MONTH – DAY – YEAR **March 8 2014**	OCCURRENCE TIME **19:00**	☒ UPDATE # **14-072** TO THE ORIGINAL SPILL REPORT	

C	LAND USE PERMIT NUMBER (IF APPLICABLE) **NA**	WATER LICENCE NUMBER (IF APPLICABLE) **W2012L2-0001**
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION **Ekati Diamond Mine**	REGION ☒ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR
E	LATITUDE DEGREES **64** MINUTES **38** SECONDS **34.6**	LONGITUDE DEGREES **110** MINUTES **26** SECONDS **24.4**
F	RESPONSIBLE PARTY OR VESSEL NAME **Dominion Diamond Ekati Corporation**	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION **Ekati Diamond Mine**
G	ANY CONTRACTOR INVOLVED **Winter Road Truck**	CONTRACTOR ADDRESS OR OFFICE LOCATION **NA**

H	PRODUCT SPILLED **Diesel**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES **Unknown - up to 511 Litres**	U.N. NUMBER **NA**
	SECOND PRODUCT SPILLED (IF APPLICABLE) **Engine Oil**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES **Unknown - esitmnated at 40 Litres**	U.N. NUMBER **NA**

I	SPILL SOURCE **Tanker truck**	SPILL CAUSE **Truck over turned**	AREA OF CONTAMINATION IN SQUARE METRES **5**
J	FACTORS AFFECTING SPILL OR RECOVERY **Currently trying to source a pumper truck**	DESCRIBE ANY ASSISTANCE REQUIRED **Noen at this time**	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT **Further leaks from tanker**

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

Diesel from the roll over is currently being off loaded to another tanker. At Approximately 16:30 the first trailer tank was emptied and the second near finished (last compartment). The tanks will be further emptied by accessing the tanks from the manhole covers on top of the tanks. Planning for the up-righting of the truck and trailers is set for 10th April 2014. A revision to the earlier spill report is that initially the fuel tanks on the truck were estimated at 100L, but it was confirmed from another truck that they would be approximately 511 Litres (135 gal). It is unknown as to how much of this tank leaked. In addition to the fuel, it's estimated that 40 Litres of engine oil and 20 – 30 Liters of radiator fluid were released from the truck.

L	REPORTED TO SPILL LINE BY **Richard Ehlert**	POSITION **Environment**	EMPLOYER **DDEC**	LOCATION CALLING FROM **Ekati Mine Site**	TELEPHONE **(867) 880-2157**
M	ANY ALTERNATE CONTACT **Jamie Steele**	POSITION **Environment Advisor**	EMPLOYER **DDEC**	ALTERNATE CONTACT LOCATION **Ekati Mine Site**	ALTERNATE TELEPHONE **(867) 880-2281**

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION **Station operator**	EMPLOYER	LOCATION CALLED **Yellowknife, NT**	REPORT LINE NUMBER **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR **March 11 2014**	REPORT TIME **16:45**	☐ ORIGINAL SPILL REPORT, OR	REPORT NUMBER **14 - 072**
B	OCCURRENCE DATE: MONTH – DAY – YEAR **March 8 2014**	OCCURRENCE TIME **19:00**	☒ UPDATE # **14-072** TO THE ORIGINAL SPILL REPORT	

C	LAND USE PERMIT NUMBER (IF APPLICABLE) **NA**	WATER LICENCE NUMBER (IF APPLICABLE) **W2012L2-0001**
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION **Ekati Diamond Mine**	REGION ☒ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR
E	LATITUDE DEGREES **64** MINUTES **38** SECONDS **34.6**	LONGITUDE DEGREES **110** MINUTES **26** SECONDS **24.4**
F	RESPONSIBLE PARTY OR VESSEL NAME **Dominion Diamond Ekati Corporation**	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION **Ekati Diamond Mine**
G	ANY CONTRACTOR INVOLVED **Winter Road Truck**	CONTRACTOR ADDRESS OR OFFICE LOCATION **NA**

H	PRODUCT SPILLED **Diesel**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES **2,756 Litres**	U.N. NUMBER **NA**
	SECOND PRODUCT SPILLED (IF APPLICABLE) **Engine Oil and Radiator Fluid from truck**	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES **Unknown - est. at 40L oil & 20-30 L rad fluid**	U.N. NUMBER **NA**

I	SPILL SOURCE **Tanker truck**	SPILL CAUSE **Truck over turned**	AREA OF CONTAMINATION IN SQUARE METRES **estimated at 5**
J	FACTORS AFFECTING SPILL OR RECOVERY **Snow Cover**	DESCRIBE ANY ASSISTANCE REQUIRED **None at this time**	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT **N/A**

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

After the tractor and trailers were placed back on their wheels they were taken back to EKATI and the volumes of product remaining in the trailer tanks was verified. The total product loaded, Bill of Lading 53,376 liters, initial recovery 49,652 and 968 liters recovered at main camp for a total loss of product of 2,756 liters.

An initial load of contaminated snow has been removed, but the clean-up is continuing at this point.

L	REPORTED TO SPILL LINE BY **Richard Ehlert**	POSITION **Environment**	EMPLOYER **DDEC**	LOCATION CALLING FROM **Ekati Mine Site**	TELEPHONE **(867) 880-2157**
M	ANY ALTERNATE CONTACT **Jamie Steele**	POSITION **Environment Advisor**	EMPLOYER **DDEC**	ALTERNATE CONTACT LOCATION **Ekati Mine Site**	ALTERNATE TELEPHONE **(867) 880-2281**

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION **Station operator**	EMPLOYER	LOCATION CALLED **Yellowknife, NT**	REPORT LINE NUMBER **(867) 920-8130**

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC — SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN — FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

DOMINION DIAMOND

Information Request Number:	DAR-TC-IR-03
Source:	Transport Canada Information Request
Subject:	Diesel Spill on Misery Road
DAR Section(s):	1.2.4.2

Preamble (TC):

Risk Assessment for Accidents and Malfunctions of the Jay Project outlines the Risk Mitigations in Section 3. Emergency Response and Spill Contingency Plans and the Hazardous Waste Management Plans are listed as operational controls for risk

Request (TC):

Transportation of Dangerous Goods would like to request a copy of the Emergency Response and Spill Contingency Plans and Hazardous Waste Management Plans for this project for review.

Response:

The Spill Contingency Plan Version 8.1 was prepared by Dominion Diamond and submitted to the Wek'èezhìi Land and Water Board (WLWB) on January 30, 2014. The WLWB approval for the Spill Contingency Plan includes a public/regulatory review process. The WLWB approved the Version 8.1 of the Spill Contingency Plan on February 17, 2014. The Spill Contingency Plan is located on the WLWB registry here:

http://www.mvlwb.ca/Boards/WLWB/Registry/2012/W2012L2-0001/W2012L2-0001%20-%20Ekati%20-%20Spill%20Contingency%20Plan%20-%20Version%208.1%20-%20Jan%2030_14.pdf

The Hazardous Waste Management Plan was prepared by Dominion Diamond and submitted to the WLWB on May 7, 2014 as part of the Waste Management Plan. The WLWB approved the Waste Management Plan and the Hazardous Waste Management Plan on August 11, 2014. The Waste Management Plan is located on the WLWB registry here:

http://www.mvlwb.ca/Boards/WLWB/Registry/2012/W2012L2-0001/W2012L2-0001%20-%20Ekati%20-%20Waste%20Management%20Plan%20-%20May%207_14.pdf

As per Part B, Item 4 of Water Licence W2012L2-0001, the Spill Contingency Plan and the Waste Management Plan, where the Hazardous Materials Management Plan is located, are reviewed annually and updated if required. Both Plans are currently undergoing their annual reviews that will be completed in the summer of 2015.

DOMINION DIAMOND

Information Request Number: DAR-Tłı̨chǫ-IR-02

Source: Tłı̨chǫ Lands Protection Department: Sjoerd van der Wielen

Subject: Temporal Boundaries

DAR Section(s): 14

Preamble (Tłı̨chǫ):

The Jay Project DAR uses the temporal boundaries of 2014-2032 and the period from 1998-2014 as the baseline upon which the socio-economic assessment effects are to be measured. It is also stated that the socio-economic assessment may be "dated given the limitations of public [sic] available data" (p. 14-12). There is no indication of what limitations were encountered, for what kinds of data, and how the socio-economic assessment was compromised as a result.

Request (Tłı̨chǫ):

2.1) Please provide a rationale, if it is indeed the era in which large scale diamond mining began or otherwise, for the temporal boundaries chosen for the socio-economic assessment.

2.2) Please identify the limitations in data that were encountered and how the socio-economic assessment was compromised as a result.

Response:

2.1) Section 14 of the Developer's Assessment Report (DAR) uses the period of 1998-2014 to describe recent social and economic conditions and trends in the Northwest Territories and local study area communities prior to the development of the Jay Project (i.e., the existing environment). This period was chosen to reflect conditions in an environment where operational diamond mining activity was occurring. Using this temporal period allows the existing environment section to describe the influence of mining on socio-economic trends, where data are available, and correlation is appropriate (e.g., the impact of mining on employment, Gross Domestic Product). In the absence of data that clearly and defensibly links the mining industry to socio-economic indicators, no such correlation is made to avoid speculation. Overall, the existing environment describes conditions and trends against which the Jay Project's effects can be assessed.

The past data presented in the socio-economic existing environment section are used to describe trends leading up to and influencing the conditions in the baseline year (i.e., 2014). The assessment then uses the most recent publicly available information, paired with past data trends to describe the Base Case. The Base Case (2014-2032) describes what the socio-economic environment could be like in the future, without the Jay Project. The Assessment Case then adds the Jay Project to this same temporal period to determine how the Project would influence not only baseline conditions (i.e., the year in which the DAR was written), but also the socio-economic environment in the years beyond, for the life of the Project.

2.2) The “limitation of publicly available data” (DAR Section 14.1.2.5, p. 14-12) referenced in the preamble above refers to the fact that the territorial and federal censuses used in the description of baseline socio-economic conditions are not conducted on an annual basis. At the time of writing the DAR, the most recent publicly available census demographic, economic, and employment information was sourced from either the 2011 Statistics Canada Community Profiles and National Household Census, or the 2012 Government of the Northwest Territories Census. As a result, data in the socio-economic baseline (against which the Project effects are assessed) is not presented for the year of writing (i.e., 2013/2014), but rather for the most recent year in which publicly available census information exists.

While there is some limitation in the availability of public information contemporary to the date of writing the DAR, this does not necessarily imply a compromise of the integrity of the socio-economic assessment. While there have been meaningful changes in the territorial economy, population, and labour force over the period of 1998-2014, these changes have not, on an annual basis, been rapid or extreme. Rather, overall trends such as urbanization, economic growth, and population change have occurred gradually, and with discernable trends, as described in the socio-economic baseline. Therefore, it is reasonable and appropriate to use information on these topics from 2011/2012 as a proxy for baseline (i.e., 2013/2014) conditions, with additional consideration given to how past socio-economic trends in these areas will influence conditions in 2013/2014.

DOMINION DIAMOND

Information Request Number:	DAR-Tłı̨chǫ-IR-13
Source:	Tłı̨chǫ Lands Protection Department: Sjoerd van der Wielen
Subject:	Education
DAR Section(s):	14

Preamble (Tłı̨chǫ):

It is also puzzling why demand for mining-related education services should be an indicator of educational contributions by the Project. How is supporting education services that may no longer be relevant in the future (in light of declines in mining) beneficial?

Request (Tłı̨chǫ):

13.1 Please explain how demand for mining-related educational services is an appropriate indicator for educational contributions.

Response:

Sufficient demand for educational services in a region can both prompt development of new programs, and maintain the need for existing programs. One such example is the development of the Mine Training Society (MTS) in response to the demand of the mining industry for trained, Northern labour. Without sufficient demand for a program, the program is at risk of being cancelled.

As existing employees at the Ekati Mine transition to new roles, and as positions made available through attrition are filled by new applicants, the Project is expected to generate demand for trained, Northern labour, thereby maintaining some level of demand for education and training services offered by organizations like Aurora College and the MTS. As other mining activity in the region slows, the Jay Project's demand for educational services may contribute to a sustained need for the educational organizations that offer the programs.

Many of the education and training services gained in the mining industry, through organizations such as the MTS or Aurora College, are applicable to employment opportunities in other sectors. For example, building technical skills are transferrable to other industries (Alberta Oil 2012). Safety boot camps, cook and cook apprentice training, the heavy equipment operator program, and the general construction training program offered by the MTS (NWT & Nunavut Chamber of Mines 2014) are required for some mining positions, but can also be transferred to other industries in the future (e.g., construction, oil and gas, some aspects of tourism). The current support of the programs through demand from the mining industry builds long-term capacity in these areas, and can contribute to the ability of educational organizations to offer these programs in the long term to other industries that may advance as the mining industry wanes.

For additional reference, programs offered by the MTS and Aurora College are listed in Table 13-1 below.

Table 13-1 Programs Offered by Aurora College and the Mine Training Society

Programs Offered by Aurora College	Programs Offered by the Mine Training Society
Aboriginal Language and Cultural Instructor Program (ALCIP) II	Mineral Process Operating Technician
Apprenticeship Carpenter	Camp Cook*
Apprenticeship Electrician	Cook Apprenticeship
Apprenticeship Heavy Duty Equipment Technician	Heavy Equipment Operator*
Apprenticeship Housing Maintainer	Geoscience Field Assistant
Apprenticeship Plumber/Gasfitter Program	Introduction to Underground Mining*
Bachelor of Education Program	Underground Mining
Bachelor of Science in Nursing	General Construction
Business Administration	Safety Boot Camps
Business Administration Access	
Camp Cook	
Certificate in Adult Education	
Community Health Representative	
Developmental Studies (ABE)	
Early Childhood Development	
Environment and Natural Resources Technology Access	
Environment and Natural Resources Technology Program	
Environmental Monitor Training Program	
Heavy Equipment Operator Program	
Introduction to Underground Mining	
Literacy Outreach Centre	
Master of Nursing, Nurse Practitioner Primary Health Care Stream	
Nursing Access	
Observer/Communicator Training Program	
Office Administration	
Office Administration - Community Office Procedures Program	
Office Administration - Computers in the Workplace	
Office Administration - Office Administration Certificate Program	
Oil Burner Mechanic (TQ) Special	
Personal Support Worker	
Pre-Apprenticeship Carpentry	
Pre-Apprenticeship Heavy Equipment Technician	
Social Work	
Social Work Access	
Supply Management Training Diploma (SCMA)	
Teacher Education Access	
Trades Access	
Trades Access II	
Traditional Arts	
Underground Miner Training Program	

Source: Aurora College 2014; NWT & Nunavut Chamber of Mines 2014.

*In partnership with Aurora College.

References:

Alberta Oil. 2012. Arctic drilling review exposes gaps in northern training. Available at: http://www.albertaoilmagazine.com/2012/03/skills-competition/. Accessed March 10, 2015.

Aurora College. 2014. Credit Programs by Department. Available at: http://www.auroracollege.nt.ca/_live/pages/wpPages/ProgramsByDepartment.aspx. Accessed March 9, 2015.

NWT & Nunavut Chamber of Mines. 2014. Measuring Success 2014: NWT Diamond Mines Continue to Create Benefits. Available at: http://www.miningnorth.com/_rsc/site-content/library/publications/Measuring_Success_NWT_Diamond_Mining.pdf. Accessed March 9, 2015.

DOMINION DIAMOND

Information Request Number:	DAR-Tłı̨chǫ-IR-15
Source:	Tłı̨chǫ Lands Protection Department: Sjoerd van der Wielen
Subject:	Health and Well-being
DAR Section(s):	14.6

Preamble (Tłı̨chǫ):

Some information is provided regarding rising incomes however the disparity between the lowest and highest earning individuals, families, and communities is not provided.

Request (Tłı̨chǫ):

15.1 Please provide more comprehensive statistics on economic inequalities.

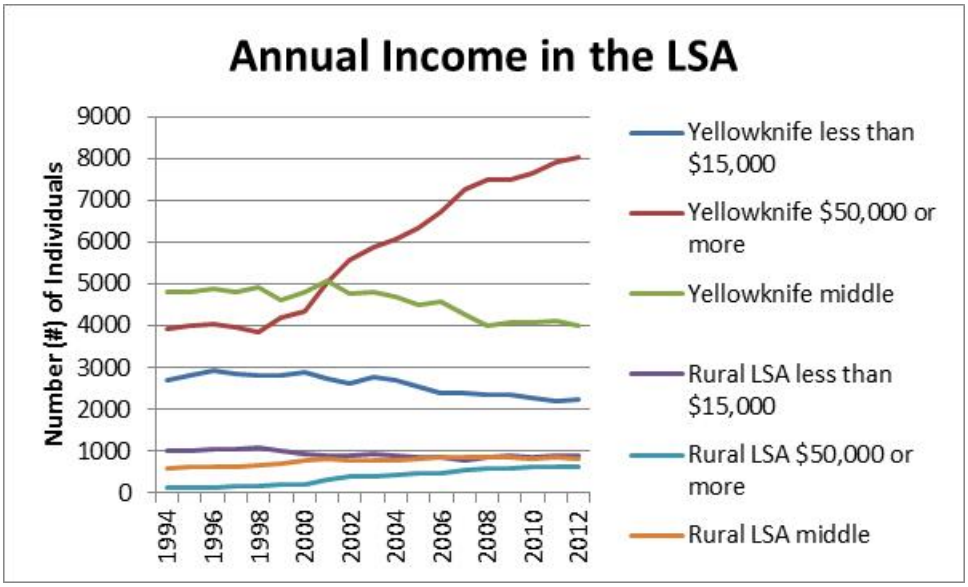
Response:

Overall Local Study Area – Level Trend

The gap between the number of lower, middle, and higher income earners in the rural local study area (LSA) communities has narrowed since 1994, while the number of middle and higher income earners is increasing (Figure 15-1). The number of lower income earners in rural LSA communities is also decreasing, but at a slower rate. In Yellowknife, the rate of increase in the number of higher income earners is much higher than that for middle and lower income earners. The number of higher income earners has been higher than the number of middle and lower income earners since 2002.

It should be noted that, throughout this response, dollars are presented at the value in the year in which they are reported (i.e., they are not constant, or chained). As a result, inflation and other factors (e.g., wage increases associated with re-negotiated contracts, or with raises) influence the trend of upward incomes. The number of individuals and families making less than the lower income thresholds (i.e., $15,000 and $30,000, respectively) would be expected to reduce over time as inflation drives wages up. Conversely, the number of individuals and families making more than the higher income thresholds (i.e., $50,000 and $75,000, respectively) would be expected to increase over time.

Figure 15-1 Annual Individual Income in the Local Study Area

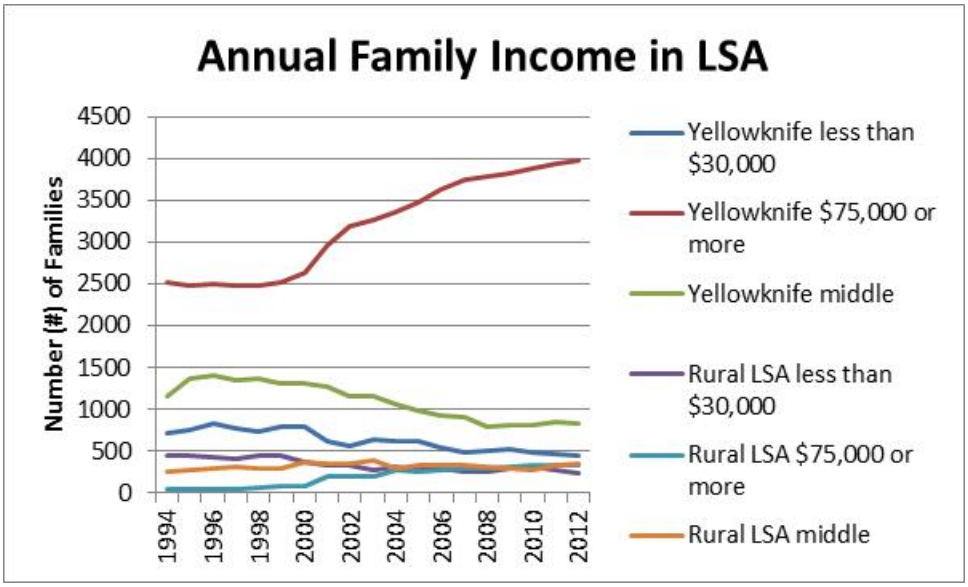


Source: NWT Bureau of Statistics 2015a.
LSA = local study area.

The gap between the number of rural LSA families with high incomes and the number with low incomes has closed over the past two decades (Figure 15-2). Overall, there were fewer families with incomes below $30,000 in 2011 than in 1994. In 1994, in rural LSA communities, 55 percent (%) to 73% of families had incomes under $30,000. By 2012, this number had decreased to 13% to 31%. The same pattern occurred in Yellowknife, where the number of families living with less than a $30,000 annual income decreased from 16% to 8%.

More families earned over $75,000 per year in all LSA communities in 2012 than in 1994. This increase has been most pronounced in rural LSA communities, where the number of families with over $75,000 in annual income increased from less than 20% in the 1990s to over 30% to 40% in 2012.

Figure 15-2 Annual Family Income in the Local Study Area



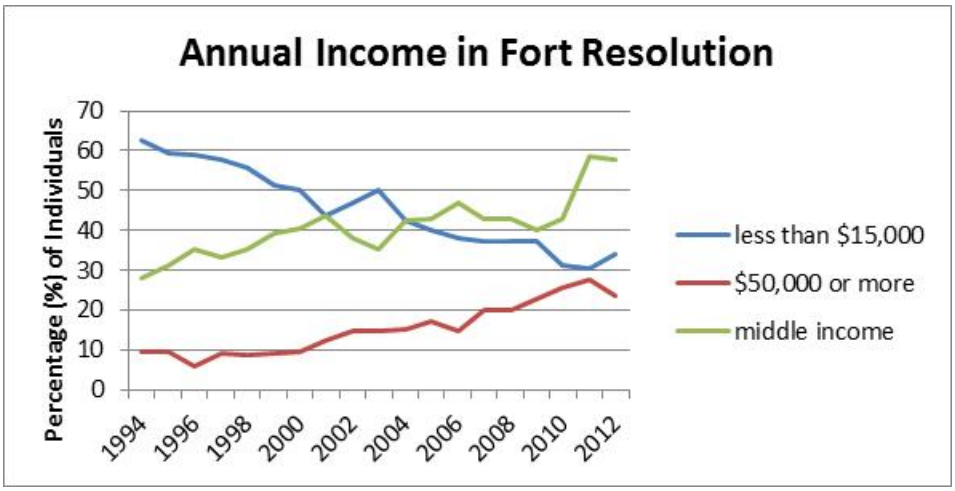
Source: NWT Bureau of Statistics. 2015b.
LSA = local study area.

Income Disparity between Individuals in the Local Study Area

Graphic representations of the trend in individual incomes are presented below by community for the years 1994-2012 (NWT Bureau of Statistics 2015a) and summarized by community.

Fort Resolution: The gap in the proportion of higher income (i.e., earning over $50,000 annually) and lower income (i.e., earning under $15,000 annually) tax filers in Fort Resolution is narrowing and there has been a decrease in the proportion of lower income earners since 1994 (Figure 15-3). There has also been an increase in the proportion of higher income earners since 2001. Lower income earners (34% or 130 tax filers) still represent a higher proportion of the population than higher income earners (23% or 90 tax filers). The proportion of middle income earners has also increased over this period and has been higher than lower income earners since 2005.

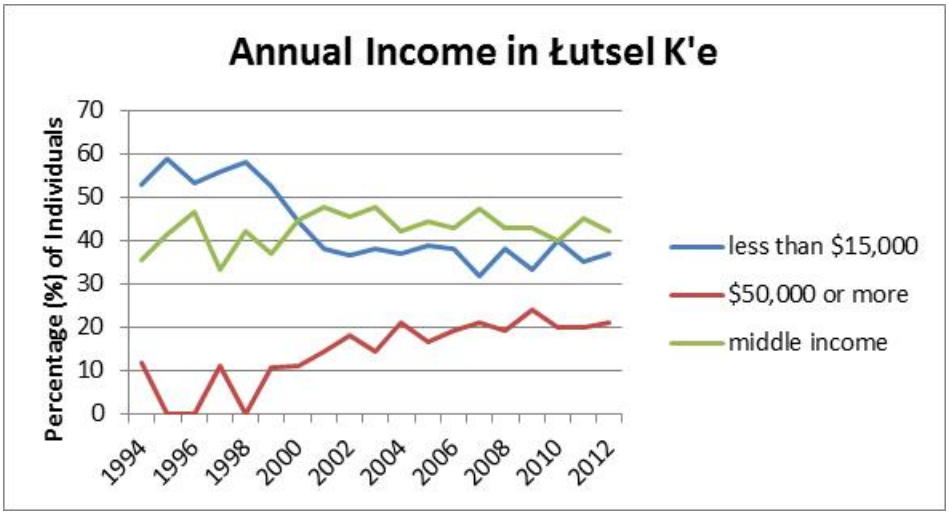
Figure 15-3 Annual Individual Income, Fort Resolution



Source: NWT Bureau of Statistics 2015a.

Lutsel K’e: The gap in the proportion of higher income and lower income tax filers in Lutsel K’e is narrowing and there has been a decrease in lower income earners since 1999 and an increase in higher income earners since 2001 (Figure 15-4). Lower income earners (37% or 70 tax filers) still represent a higher proportion of the population than higher income earners (21% or 40 tax filers). The proportion of middle income earners has also increased over this period and has been higher than lower income earners since 2000.

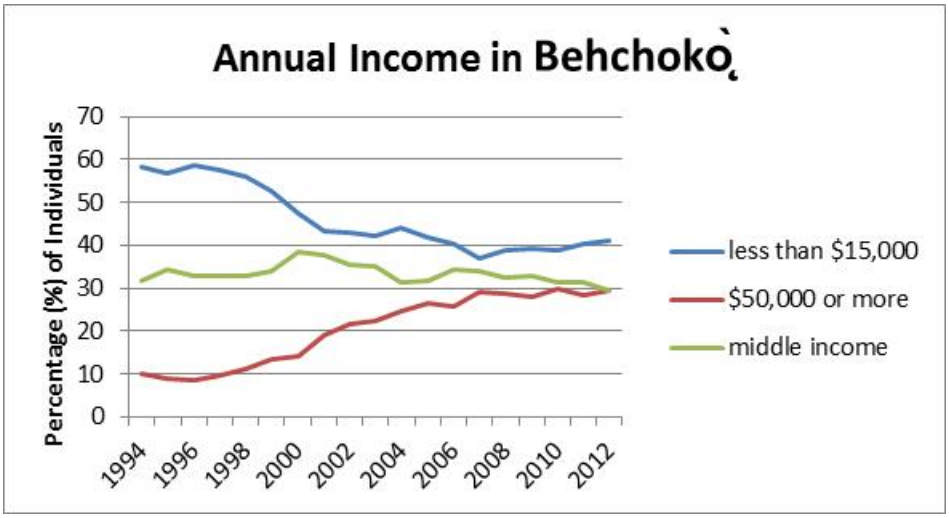
Figure 15-4 Annual Individual Income, Lutsel K’e



Source: NWT Bureau of Statistics 2015a.

Behchokǫ̀: The gap in the proportion of higher income and lower income tax filers in Behchokǫ̀ is narrowing and there has been a decrease in lower income earners since 1996 and an increase in higher income earners since 2001 (Figure 15-5). Lower income earners (41% or 530 tax filers) still represent a higher proportion of the population than higher income earners (30% or 380 tax filers). The proportion of middle income earners has remained stable compared to lower and higher income earners and is now equal to higher income earners.

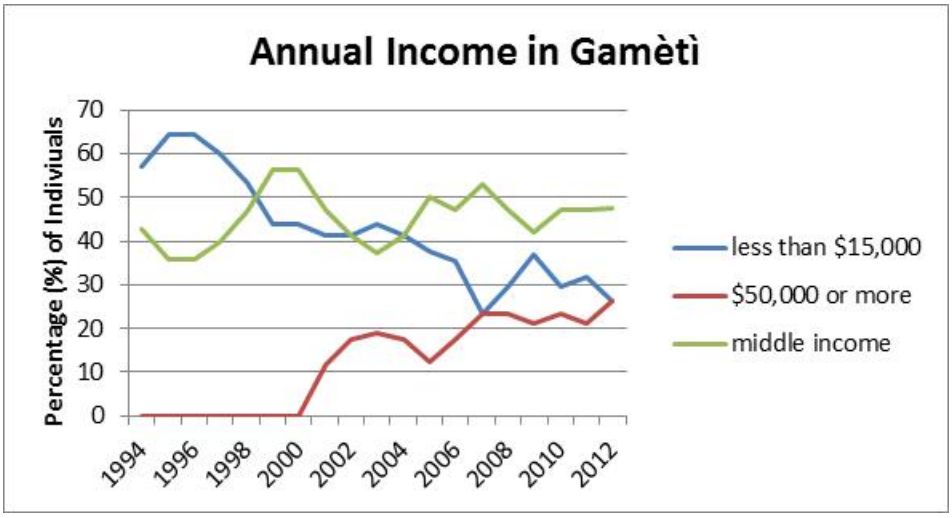
Figure 15-5 Annual Individual Income, Behchokǫ̀



Source: NWT Bureau of Statistics 2015a.

Gamètì: The gap in the proportion of higher income and lower income tax filers in Gamètì is narrowing and there has been a decrease in lower income earners since 1997 and an increase in higher income earners since 2001 (Figure 15-6). Lower income earners and higher income earners represent the same proportion of the population (26% or 50 tax filers for each category). The proportion of middle income earners has fluctuated but has remained stable overall compared to lower and higher income earners. Middle income earners have, proportionally been above the proportion of lower income earners since 2005.

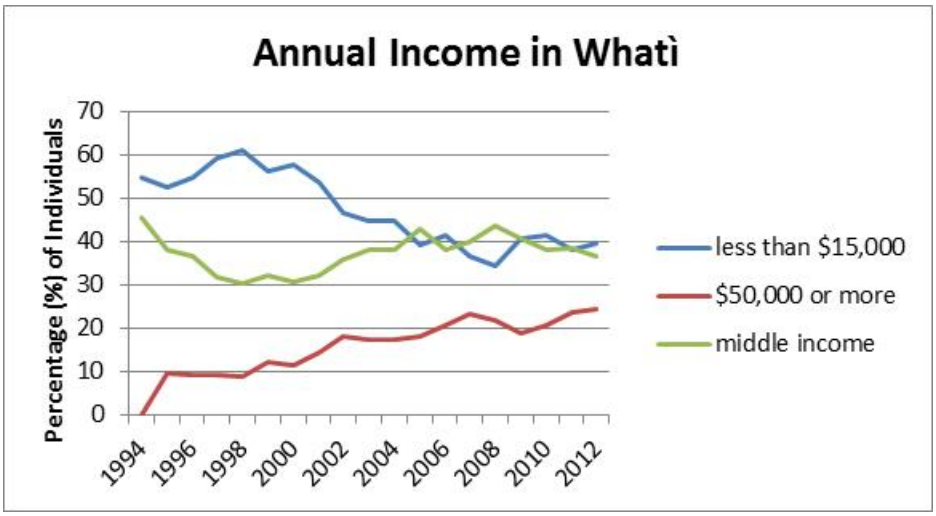
Figure 15-6 Annual Individual Income, Gamètì



Source: NWT Bureau of Statistics 2015a.

Whatì: The gap in the proportion of higher income and lower income tax filers in Whatì is narrowing and there has been a decrease in lower income earners and an increase in higher income earners since 1994 (Figure 15-7). Lower income earners (39% or 130 tax filers) still represent a higher proportion of the population than higher income earners (24% or 80 tax filers). The proportion of middle income earners has decreased overall and has closely matched the proportion of lower income earners since 2005.

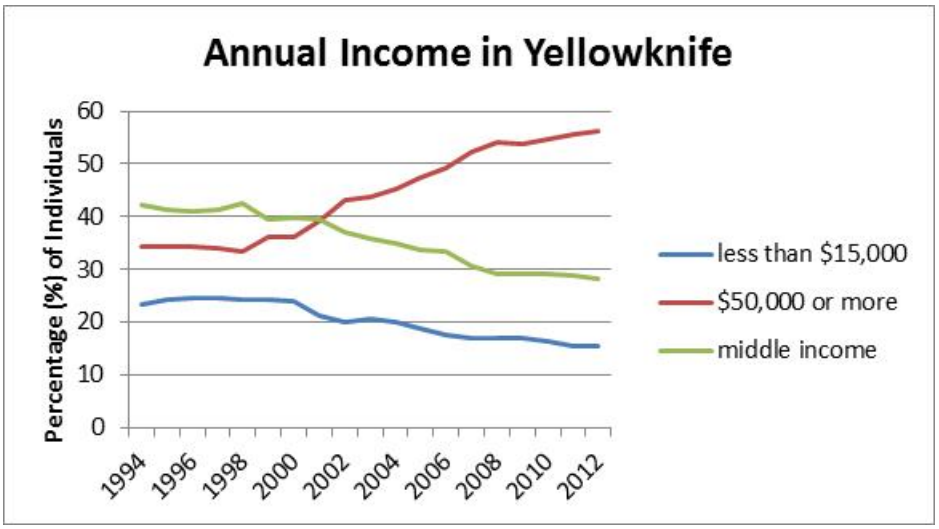
Figure 15-7 Annual Individual Income, Whatì



Source: NWT Bureau of Statistics 2015a.

Yellowknife: The gap in the proportion of higher income and lower income tax filers in Yellowknife is widening and there has been a decrease in lower income earners and an increase in higher income earners since 2001 (Figure 15-8). Higher income earners have represented a higher proportion of the population than lower and middle income earners since 2002. The proportion of middle income earners has decreased and has closely matched the trend for lower income earners.

Figure 15-8 Annual Individual Income, Yellowknife



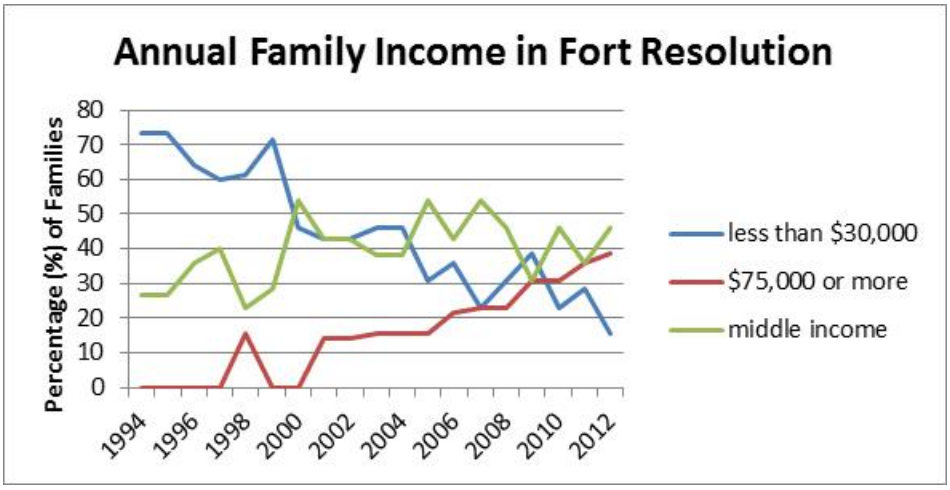
Source: NWT Bureau of Statistics 2015a.

Income Disparity between Families in the Local Study Area

Graphic representations of the trend in family incomes are presented below by community for the years 1994-2012 (NWT Bureau of Statistics 2015b) and summarized by community.

Fort Resolution: The gap in the proportion of higher income and lower income families in Fort Resolution is narrowing and there has been a decrease in lower income families since 2000 and an increase in higher income families since 2001 (Figure 15-9). Higher and middle income families have represented a higher proportion of the population than lower income families since 2010.

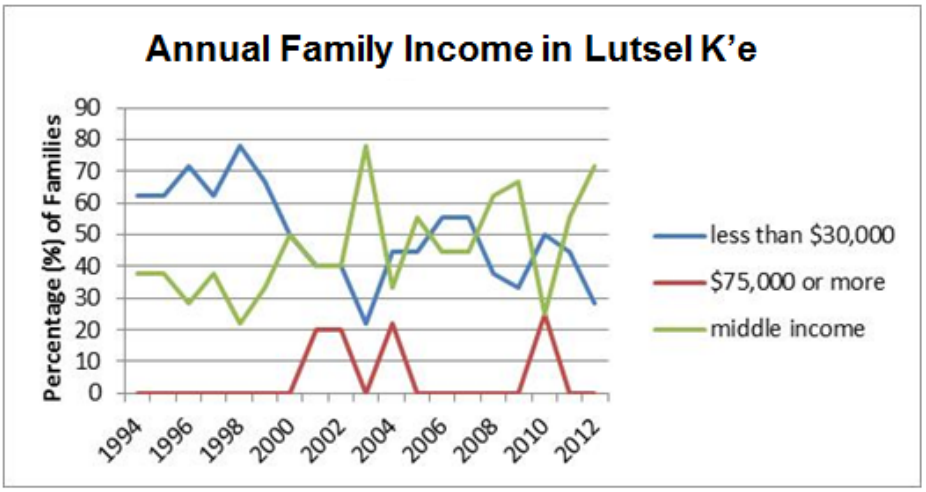
Figure 15-9 Annual Family Income, Fort Resolution



Source: NWT Bureau of Statistics 2015b.

Lutsel K'e: There are no evident trends in the gap between family income categories or in the proportion of higher income families. Overall, compared to the 1990s, there has been a higher proportion of middle income families than lower income families in the 2000s and 2010s (Figure 15-10).

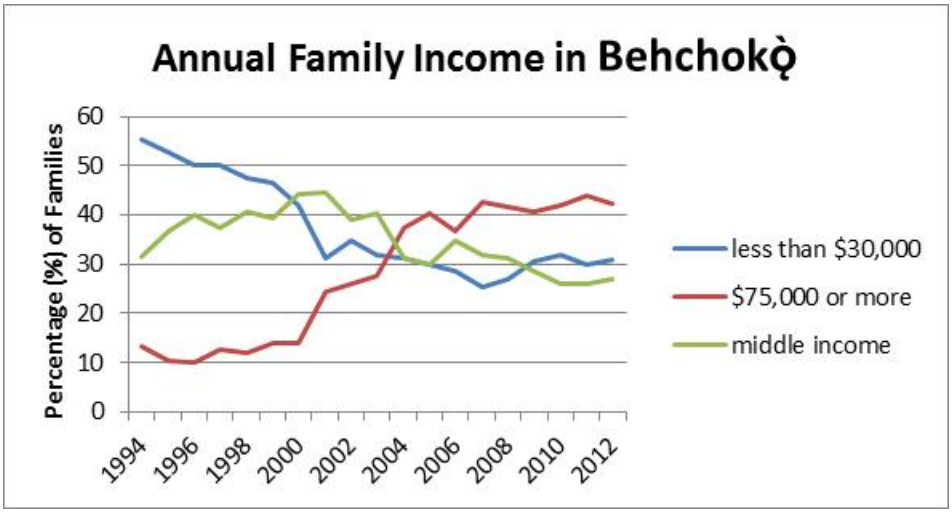
Figure 15-10 Annual Family Income, Lutsel K'e



Source: NWT Bureau of Statistics 2015b.

Behchokǫ̀: The gap in the proportion of higher income and lower income families in Behchokǫ̀ is narrowing and there has been an overall decrease in lower income families since 1994 and an increase in higher income families since 2001 (Figure 15-11). Since 2006, the number of low income families has begun to rise, while the number of middle income families has continued to fall. Higher income families have represented a higher proportion of the population than lower and middle income families since 2004. The proportion of middle income families has remained stable compared to lower and higher income families and has more recently dropped below lower income families (27% or 140 families compared to 31% or 160 families).

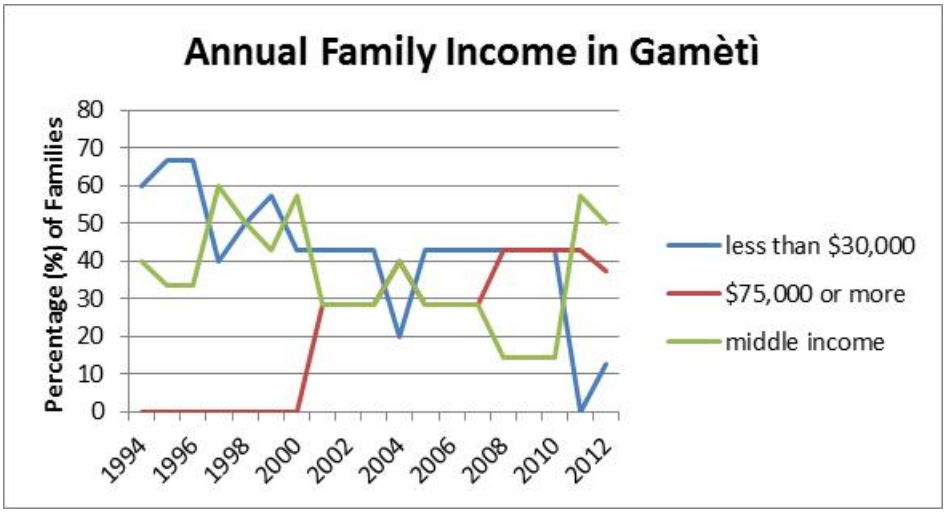
Figure 15-11 Annual Family Income, Behchokǫ̀



Source: NWT Bureau of Statistics 2015b.

Gamètì: The proportion of higher income families has been increasing since 2001 and the proportion of lower income families has decreased since 1999. Middle (50% or 40 families) and higher income families (38% or 30 families) now represent a larger proportion of the population than lower income families (13% or 10 families) (Figure 15-12).

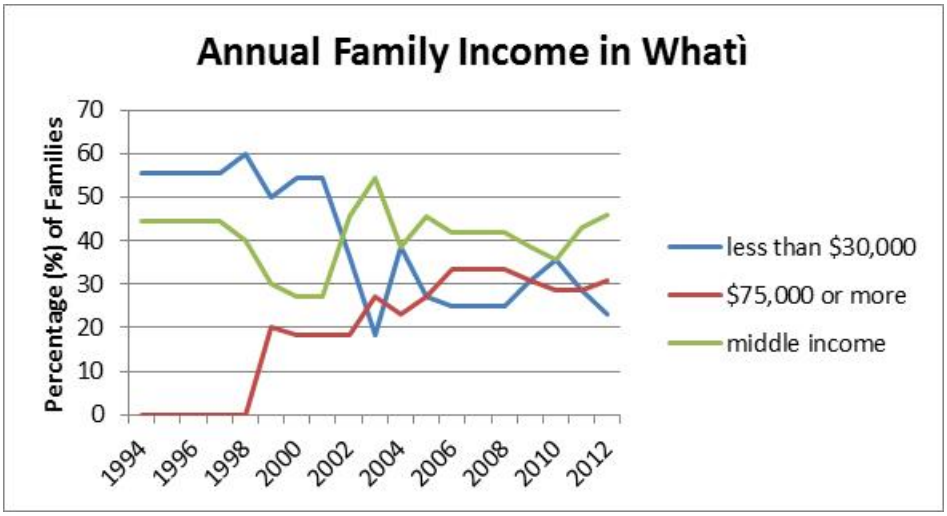
Figure 15-12 Annual Family Income, Gamètì



Source: NWT Bureau of Statistics 2015b.

Whatì: The gap in the proportion of higher income and lower income families in Whatì is narrowing and there has been a decrease in lower income families since 2001 and an increase in higher income families since 2003 (Figure 15-13). Higher and middle income families (77% or 100 families) represented a higher proportion of families in 2012, reversing the trend between 1994 and the early 2000s.

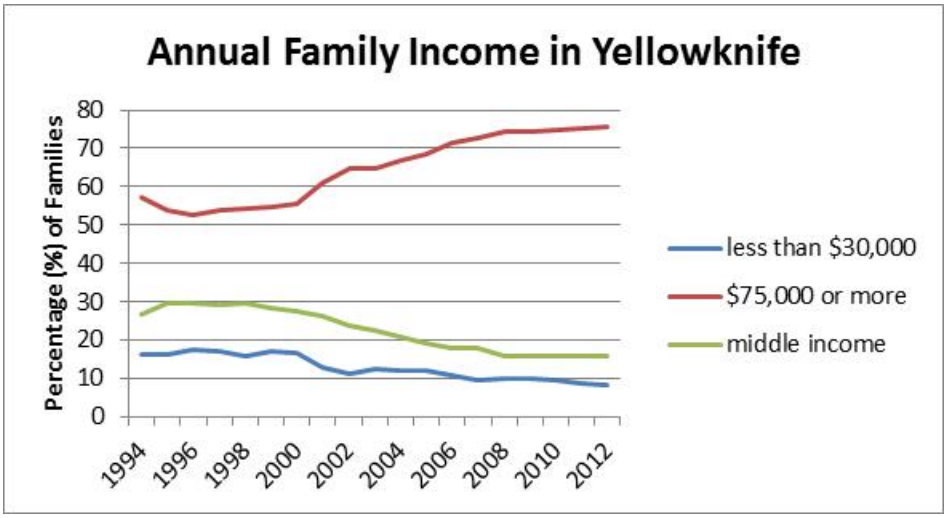
Figure 15-13 Annual Family Income, Whatì



Source: NWT Bureau of Statistics 2015b.

Yellowknife: The gap in the proportion of higher income and lower income families in Yellowknife is widening and there has been a decrease in lower income families and an increase in higher income families since 2001 (Figure 15-4). The proportion of middle income families has also decreased and has closely matched the trend for lower income families.

Figure 15-14 Annual Family Income, Yellowknife



Source: NWT Bureau of Statistics 2015b.

References:

NWT Bureau of Statistics. 2015a. Persons with Incomes Less than $15,000 or $50,000 or More: 1994-2012. Available at: http://www.statsnwt.ca/labour-income/income/index.html. Accessed March 2015.

NWT Bureau of Statistics. 2015b. Families with Income Less than $30,000 or $75,000 or More: 1994-2012. Available at: http://www.statsnwt.ca/labour-income/income/index.html. Accessed March 2015.

Information Request Number: DAR-Tłı̨chǫ-IR-23

Source: Tłı̨chǫ Lands Protection Department: Sjoerd van der Wielen

Subject: Aquatic Effects Monitoring Program

DAR Section(s): 18

Preamble (Tłı̨chǫ):

The Ekati Mine Aquatic Effects Monitoring Program will be expanded to monitor Project effects to the aquatic environment related to changes in surface hydrology, water quality, sediment quality, aquatic life other than fish (plankton and benthic invertebrates), and fish (fish health, fish tissue chemistry). The accompanying Ekati Mine Aquatic Response Framework will also be expanded to provide pre-defined 'early-warning' levels that will prompt adaptive management responses if necessary.

Request (Tłı̨chǫ):

23.1 Please clarify whether Aboriginal traditional knowledge will be integrated into the Aquatic Effects Monitoring program.

Response:

As described in Section 9C2.1 of the Conceptual Aquatic Effects Monitoring Program (AEMP) (Appendix 9C of the Developer's Assessment Report, the AEMP will integrate traditional knowledge where appropriate. In addition, Special Studies, which are not core components of the AEMP, but rather studies proposed with the intent to supplement the AEMP components, may be also conducted for this purpose. It is expected that traditional knowledge will be incorporated in a manner consistent with current practice at the Ekati Mine established over 15 years of mine operations and environmental monitoring, and other AEMP programs in the area (De Beers 2013; Golder 2014). There will also be opportunity for community engagement and comment on the conceptual design of the AEMP during the water licensing phase of the Jay Project.

References:

De Beers (De Beers Canada Inc.). 2013. 2013 Aquatics Effects Monitoring Program Design Plan in Support of Water Licence (MV2011L2-0004), Snap Lake Project. Snap Lake Project. Submitted to the Mackenzie Valley Land and Water Board. Yellowknife, NWT, Canada.

Golder (Golder Associates Ltd.). 2014. Diavik Diamond Mines Inc. – Aquatic Effects Monitoring Program – Study Design Version 3.5. Prepared for Diavik Diamond Mines (2012) Inc. (DDMI). Yellowknife, NWT, Canada. May 2014.

DOMINION DIAMOND

Information Request Number: DAR-Tłı̨chǫ-IR-25

Source: Tłı̨chǫ Lands Protection Department: Sjoerd van der Wielen

Subject: Project Effects on Caribou

DAR Section(s): 12

Preamble (Tłı̨chǫ):

b) Only Bathurst cows (not bulls) are being collared on range use patterns and timing, the implications of this are not considered;

c) The DAR does not appear to address the implications of the apparent extreme collapse in Bathurst herd numbers in 2014 (Boulanger et al. 2014b), and likely lower resilience to development impacts.

Request (Tłı̨chǫ):

25.1 DDEC should re-examine these sources of uncertainty and reconsider how they would affect the conclusions of the DAR with regard to predicted effects on caribou.

Response:

b) The Developer's Assessment Report (DAR) implicitly considers the implications of only female Bathurst herd caribou being collared for the spatial and temporal analysis of range use patterns. The assessment of the effects of the Project is based on the best available data, which are limited to cows only. Overall changes in ungulate population sizes are generally accepted to depend upon combinations of adult female survival rates and calf recruitment rates (Gaillard et al. 1998). Both of these rates can be robustly assessed with female animals alone.

c) Population modelling was completed in response to Mackenzie Valley Environmental Review Board (MVEIRB) Jay Project Adequacy Review Item 8.8 and presented in the response to DAR-MVEIRB-15 (hereafter "modelling report"). Modelling the apparent continued decline of the Bathurst herd between 2012 and 2014 (Boulanger 2014b) would require demographic vital rates different from those used for the core population modelling presented in the modelling report, which was identified in the report (page 12).

Specifically, for the 2012 to 2014 period, calf:cow ratios were obtained from Government of the Northwest Territories composition surveys completed in October 2012 (2012 birth year, 24 calves:100 cows) and spring 2014 (2013 birth year, 32 calves:100 cows). However, adult female survival rates from the same period are important in the interpretation of recruitment from calf:cow ratios as they affect the denominator in the ratio. For example, if adult female survival in an interval is 50% and calf survival is 100%, then the denominator is half of what is was at the start of the interval and the calf:cow ratio doubles even though the number of calves does not change. Data to confidently estimate adult female survival for 2012 to 2014 are not available. The approach to estimating a set of vital rates for the Bathurst herd used in Boulanger et al. (2011, 2014a) has not been applied to account for the apparent 2012 to 2014 decline. The vital rates

provided following the 2012 calving ground photographic survey (Boulanger et al. 2011, 2014a) are the most recent vital rates that have been calculated for the Bathurst herd that reconcile all available sources of information (Adamczewski 2015). The information required for the determination of vital rates (Boulanger et al. 2014a) requires information not gathered in the 2014 reconnaissance survey.

In the absence of empirical vital rates for the Bathurst herd for the 2012 to 2014 period, the modelling report (page 12) identified that adult survival rates between 51% and 62% were consistent with the 2014 Bathurst herd reconnaissance survey population estimate. Regardless of the specific vital rates that would fit the observed population data, the end result would be the same: an annual decline of 48% over a two-year period.

The absence of information from adult male caribou was implicitly considered in the determination of significance in the DAR and is not considered to be a source of uncertainty that reduces confidence in the impact predictions and determination of significance. As noted in the modelling report (pages 12-13), the current low population of the Bathurst herd should allow more selective use of habitat. As there is no strong mechanism by which development reduces adult female survival, the negative trend in population growth associated with the current estimates of vital rates is predicted to be similar with and without the development-related cumulative changes in habitat quantity and quality, and caribou behaviour and energetics. Consequently, the use of a lower annual adult female survival rate (e.g., consistent with a decline as indicated by results of the 2014 reconnaissance survey) will not change the conclusions regarding the classification of impacts and determination of significance on caribou.

References:

Adamczewski J. 2015. Wildlife Biologist, Ungulates – Environment & Natural Resources, Wildlife Division, Government of the Northwest Territories. Phone call with J. Rettie, Golder Associates. March 2, 2015.

Boulanger J, Croft B, Adamczewski J. 2014a. An Estimate of Breeding Females and Analyses of Demographics For The Bathurst Herd of Barren-ground Caribou: 2012 Calving Ground Photographic Survey. Integrated Ecological Research Unpublished File Report No. 142 for Environment and Natural Resources, GNWT. 81 pp.

Boulanger J, Croft B, Cluff D. 2014b. Trends in size of the Bathurst caribou herd from the 2014 calving ground reconnaissance survey. Integrated Ecological Research. July 31, 2014.

Boulanger J, Gunn A, Adamczewski J, Croft B. 2011. A Data-Driven Demographic Model to Explore the Decline of the Bathurst Caribou Herd. J Wildlife Manage 75: 883-896.

Gaillard JM, Festa-Bianchet M, Yuccoz N. 1998 Population dynamics of large herbivores: variable recruitment with constant adult survival. Trends Ecol Evol 13:58-63.