

Government of the Northwest Territories
Technical Report for the
Dominion Diamond Ekati Corporation
Jay Project
EA1314-01

Submitted to:

Mackenzie Valley Environmental Impact Review Board

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Appendix: Jay Pipe Technical Report Review

Acronyms

AEMP	Aquatic Effects Monitoring Program
AMRP	Adaptive Management Response Plan
CCME	Canadian Council of Ministers of the Environment
CEAMMF	Cumulative Effects Assessment Monitoring and Management Framework
CRMP	Caribou Road Mitigation Plan
CWS	Canada-Wide Standards
DAR	Developer's Assessment Report
DDEC	Dominion Diamond Ekati Corporation
DDMI	Diavik Diamond Mines Inc.
EA	Environmental Assessment
EC	Environment Canada
ECE	Government of the Northwest Territories Department of Education, Culture and Employment
ENR	Government of the Northwest Territories Department of Environment and Natural Resources
EPZ	Enhanced Permeability Zone
ERM	ERM Rescan
ESA	Effects Study Area
GNWT	Government of the Northwest Territories
IBA	Impact and Benefit Agreement
ICRP	Interim Closure and Reclamation Plan
IEMA	Independent Environmental Monitoring Agency
IMP	Incineration Management Plan
IR	Information Request
LLCF	Long Lake Containment Facility
LSA	Local Study Area
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLWB	Mackenzie Valley Land and Water Board
MVRMA	<i>Mackenzie Valley Resource Management Act</i>

NWT	Northwest Territories
PK	Processed Kimberlite
REA	Report of Environmental Assessment
SEA	Socio-Economic Agreement
SNP	Surveillance Network Program
TDS	Total Dissolved Solids
TOR	Terms of Reference
TSP	Total Suspended Particulate
TSS	Total Suspended Solids
VC	Valued Component
WEMP	Wildlife Effects Monitoring Plan
WLWB	Wek'èezhìi Land and Water Board
WWHPP	Wildlife and Wildlife Habitat Protection Plan
YKDFN	Yellowknives Dene First Nation
ZOI	Zone Of Influence

1. Non-Technical Summary

The Government of the Northwest Territories (GNWT) is a party to the Dominion Diamond Ekati Corporation (DDEC) Jay Project (Project) environmental assessment (EA) being conducted by the Mackenzie Valley Environmental Impact Review Board (MVEIRB). GNWT has developed this Technical Report after active EA involvement and review of the Developer's Assessment Report (DAR), Information Requests (IRs) and other materials on the public registry.

Air Quality - The GNWT supports DDEC's commitment to annual reporting and adaptive management and requests that it improve its system for identifying and correcting poor air quality. MVEIRB should require DDEC to regularly test incinerator emissions and act promptly to address any concerns that the tests identify.

Water Quality - The GNWT has concerns about how DDEC assessed potential impacts to water quality in Lac du Sauvage and recommends that DDEC be required to minimize the impacts of its activities on this lake. GNWT has concerns that the mine water may cause adverse impacts to water quality and fish and fish habitat in Lac du Sauvage while the mine is operating and after the mine closes. MVEIRB should require DDEC to address these concerns by changing how it will manage mine water and effluent. GNWT is concerned that the Jay Project may reduce DDEC's ability to meet its current objectives for closure of other parts of the Ekati Mine Site, namely the Panda and Koala Pits. MVEIRB should require DDEC to study this question and adjust its plans based on the results.

Wildlife – Overall, based on DDEC's information and commitments to date, the GNWT supports DDEC's conclusions about impacts on wildlife. GNWT recommends ways that DDEC could support GNWT's regional programs to improve the state of the Bathurst caribou herd. GNWT requests that DDEC make several improvements to its Wildlife Effects Monitoring Plan and that DDEC provide a revised plan as soon as possible.

Socio-economics - Overall, as the Project relates to socio-economics, the GNWT agrees with DDEC's conclusions. The Ekati Socio-Economic Agreement provides for a collaborative monitoring and mitigation approach to socio-economic impacts with the goal of maximizing benefits to NWT residents, and is applicable to the Jay Project. DDEC's continued support and collaboration with the GNWT on health, wellness and training programs, including reports and regular meetings, is expected to provide opportunities for Northern residents and foster discussion with communities.

Heritage resources - The GNWT agrees with DDEC's conclusions and has no outstanding concerns about the Jay Project's impacts on heritage resources and archaeological sites.

2. Introduction

As set out in the Land Use and Sustainability Framework, the Government of the Northwest Territories (GNWT) is committed to making balanced land management decisions in the context of sound environmental stewardship, with consideration of ecological, social, cultural, and economic values to ensure maximum benefits to current and future generations. This responsibility is shared with Aboriginal, federal, territorial and municipal governments, boards and agencies and every resident of the Northwest Territories (NWT).

This technical report summarizes the GNWT's conclusions with respect to the Mackenzie Valley Environmental Impact Review Board (MVEIRB's) environmental assessment (EA) of Dominion Diamond Ekati Corporation's (DDEC) proposed Jay Project (Project), MVEIRB file number EA1314-01. GNWT has reviewed the Developer's Assessment Report (DAR) and participated actively in all phases of the EA to date, including submitting and responding to Information Requests (IRs), participating in technical sessions, and reviewing the developer's commitments. The GNWT has also met with DDEC on multiple occasions to clarify information and discuss commitments that will mitigate possible impacts of the Project. Summaries of these discussions and agreed-upon developer's commitments are on the public registry for this EA. This submission takes into consideration all of the documents posted to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) public registry as of 5 pm July 29, 2015.

GNWT departments including the departments of Lands; Environment and Natural Resources; Industry, Tourism and Investment; Health and Social Services; Education, Culture and Employment; and Justice have reviewed the developer's proposal in terms of their respective mandates and responsibilities related to the Project. This report provides context for specific issues that departments have considered and proposes mechanisms through which concerns may be resolved.

The report is organized as follows:

Section 1: Non-Technical Summary

Section 2: Introduction

Section 3: Air Quality

This section discusses ambient air quality adaptive management triggering criteria and incinerator stack testing reporting requirements, adaptive management response plans and re-testing after failure. GNWT requests a commitment from the developer and recommends that MVEIRB include certain measures in its Report of Environmental Assessment (REA).

Section 4: Water Quality

This section discusses water quality assessment endpoints and boundaries, effluent quality and site specific water quality objectives. It also includes considerations for post closure and proposed processed kimberlite storage in pits at the main Ekati site. GNWT recommends that MVEIRB include certain measures in its REA.

Section 5: Wildlife and Wildlife Habitat

This section discusses impacts to wildlife and wildlife habitat, the Conceptual Wildlife Effects Monitoring Plan and the Draft Caribou Road Mitigation Plan. GNWT recommends that the developer revise one of its existing commitments, recommends a new commitment from the developer, and recommends that the developer provide an update to its Wildlife Effects Monitoring Plan.

Section 6: Socio-economics

This section discusses the Socio-Economic Agreement, employment, training, health and wellness and policing and crime. GNWT confirms its commitment to continue to work with DDEC to ensure that the commitments in the Socio-Economic Agreement are achieved, and confirms that the GNWT has no outstanding concerns about potential adverse socio-economic impacts of the Project.

Section 7: Heritage resources

This section discusses impacts to heritage resources. GNWT confirms that it has no outstanding concerns about potential impacts to heritage resources.

Section 8: List of recommendations and key conclusions

Appendix: Jay Project Technical Review.

This Appendix is written by GNWT's retained expert, Zajdlik and Associates, and is provided to support the discussion in Section 4.

Recommendations and key conclusions are presented in bold text throughout the document and are listed in Section 8.

The GNWT appreciates the opportunity to express its views and provide recommendations to MVEIRB for this EA. GNWT representatives will attend the public and community hearings in Yellowknife, Behchokò, Łutsel K'e and Kugluktuk in September 2015.

Once MVEIRB completes its deliberations and issues its REA, the Minister of Lands will receive and distribute the REA as required under *Mackenzie Valley Resource Management Act* (MVRMA) paragraph 128(2)(a), will participate in and distribute decisions made under paragraphs 130(1)(a) and (b) and subsections 130(3), 130(4) and 130(4.01), and will have the power to extend time limits under subsections 128(2.2) and 130(4.03). Ministers of relevant GNWT departments will participate in the MVRMA section 130 EA decision process as responsible Ministers and will work with Aboriginal Affairs and Northern Development Canada and federal responsible Ministers as required.

3. Atmospheric Environment

3.1. Ambient Air Quality

The Terms of Reference (TOR) for this EA require the developer to assess the impact of emissions generated from operations on ambient air quality.

3.1.1 Developer's conclusions

The developer has committed to implementing an adaptive management response plan (AMRP) with associated trigger levels and annual reporting, to help ensure mitigative action is taken if air quality monitoring results demonstrate that concentrations are increasing significantly from year to year. DDEC has proposed an AMRP framework in its draft Conceptual Air Quality and Emission Monitoring and Management Plan for the Jay Project (DDEC, 2015a).

3.1.2 GNWT's conclusions

GNWT is supportive of DDEC's commitment to implement an AMRP and to conduct annual reporting, as the GNWT believes this is an important tool for ensuring increasing trends in air emissions are identified early and mitigated. However, upon review of the proposed draft AMRP, the GNWT has concluded that modifications to the ambient air quality trigger levels are required to ensure the response framework is effective and impacts to air quality are minimized.

3.1.3 Rationale and recommendation

In the DAR, DDEC predicts that the proposed development could cause NO₂, PM_{2.5} and Total Suspended Particulate (TSP) emissions to be released into the environment at levels which result in exceedances of NWT Ambient Air Quality Standards (DDEC, 2014a). The NWT Ambient Air Quality Standards were established at levels intended to protect human health and the environment. Developing and implementing an effective AMRP provides an important framework for mitigating impacts to the environment if air quality monitoring indicates air quality conditions are poor and/or are declining quickly.

DDEC has committed to implementing an AMRP and conducting annual reporting for the Jay Project, as well as incorporating this framework into its existing site-wide Air Quality Monitoring Program. GNWT commends DDEC for this commitment and finds the actions associated with the trigger levels to be satisfactory; however, the GNWT believes that the current triggering criteria requirements proposed for NO₂, PM_{2.5} and TSP emissions could result in additional or prolonged exceedances of the NWT Ambient Air Quality Standards, and associated adverse impacts to the receiving environment.

DDEC's current proposed triggering criteria in its draft AMRP use an "and" statement in each of the 3 action levels which could result in emissions gradually approaching and exceeding the applicable ambient air quality standard without triggering a response. Conversely, using an "or" statement makes for a more comprehensive trigger system, as it covers situations where annual averages are reaching higher levels (i.e. >80% of standard) or where emissions are steadily increasing year to year. The Air Management Threshold Values and Actions trigger thresholds of 80% and 90% (for an applicable standard), developed by the Canadian Council of Ministers of the Environment (CCME, 2012), provide a good reference for adaptive management and should be incorporated into DDEC's AMRP. Additionally, year to year change in concentration triggering criteria should cover early intervention in the 50%-80% range of the applicable standard, but avoid unnecessary action triggering at lower concentrations. The GNWT does not believe the recommended modifications will prove to be a significant burden for the developer, as similar AMRP triggering criteria have been proposed to, and accepted by, other industrial mining operators in the NWT.

Recommendation #1:

The GNWT requests that DDEC commit to adopt the AMRP triggering criteria outlined in the table below, and that MVEIRB recognize this commitment as one of the developer's commitments to be included in the scope of development for this EA. For clarity, the table displays DDEC's triggering criteria as proposed in its draft Conceptual Air Quality and Emission Monitoring and Management Plan for the Jay Project, as well as the GNWT's recommended triggering criteria for each associated action level.

Table 1: AMRP triggering criteria

Action Level	DDEC Proposed Triggering Criteria	GNWT Recommended Triggering Criteria
1 st Action Level	Concentrations less than 80% of the applicable ambient air quality standard AND less than +20% year to year change	1) Concentrations below 80% of the applicable air quality standard -OR- 2) Less than 10% year to year

		change in concentrations AND above 50% of the applicable air quality standard
2 nd Action Level	Concentrations less than 80% of the applicable ambient air quality standard AND +20% year to year change	1) Concentrations between 80% & 90% of the applicable air quality standard -OR- 2) 10% - 20% year to year change in concentrations AND above 50% of the applicable air quality standard
3 rd Action Level	Concentrations above 80% of the applicable ambient air quality standard AND more than +10% year to year change	1) Concentrations above 90% of the applicable air quality standard -OR- 2) More than 20% change year to year in concentrations AND above 50% of the applicable air quality standard

3.2. Waste Incineration Emissions

The TOR require the developer to assess the impact of waste incineration emissions on the receiving environment (land and water, via the air).

3.2.1 Developer's conclusions

The developer has suggested that its current waste management practices and commitment to test emissions (i.e. stack testing) from its waste incinerators every 3 years is sufficient to demonstrate compliance to air emission standards and to prevent significant adverse impacts to the environment. DDEC has concluded that further details on waste incineration operations (i.e. reporting, action planning, etc) can be determined during the regulatory permitting process (DDEC, 2015a).

3.2.2 GNWT's conclusions

In relation to potential impacts of the Jay Project associated with waste incineration emissions, it is the GNWT's position that meaningful details of the mitigative action planning, reporting, and timeframes must be finalized during the EA process. For example, the Mackenzie Valley Land and Water Board (MVLWB) recently stated in the De Beers – Gahcho Kué Land Use Permit and Water Licence Applications Reasons for Decision that "The Board does not have general authority over air quality, including monitoring, and has concerns about the limits of its jurisdiction in relation to air quality" (MVLWB, 2014).

The GNWT is supportive of DDEC's commitment to comprehensive waste management practices, as detailed in its Incineration Management Plan (IMP), and its agreement to stack test its waste incinerators every 3 years to demonstrate compliance to the Canada-Wide Standards (CWS) for dioxins and furans of 80pg I-TEQ/m³ and the CWS for mercury of 20 µg/Rm³. The CCME has slated dioxins and furans emissions for virtual elimination under the *Canadian Environmental Protection Act, 1999* (CEPA 1999) due to their "extraordinary environmental persistence and capacity to accumulate in biological tissues" (CCME, 2001). Therefore, the GNWT believes that follow up actions based on the results of a potentially failed stack test are an important component in the compliance process, and are necessary to ensure that impacts from toxic incinerator emissions are being mitigated. The GNWT maintains that monitoring is an important component of environmental stewardship. As discussed below, to date it is apparent that waste incineration at Ekati has had adverse impacts on the environment. At this stage in the life-of-mine for Ekati it is also apparent that in the absence of a formal protocol for developing and implementing mitigative action with associated timeframes and reporting requirements, there is an increased likelihood for further cumulative impact. In this light it is possible that efforts to meaningfully reduce these emissions (in the event of a failed stack test) below the CWS may be minimal or further delayed, leading to a significant adverse impact on the receiving environment.

3.2.3 Rationale and recommendation

As context for this section and the recommendation, GNWT notes that the GNWT Department of Environment and Natural Resources (ENR) and Environment Canada (EC) have historically worked together during EAs and other regulatory proceedings to identify and recommend methods to prevent impacts to the environment from atmospheric emissions from a developer's operations, which include waste incineration emissions. During the Jay EA, GNWT-ENR and EC have collaborated on the waste incineration emissions component of the Project and will continue to work together on this topic for the Ekati Mine in general.

Improper incineration of waste can lead to the formation and release of toxic contaminants to the air that are then deposited to land and water. These contaminants can bioaccumulate and are persistent in the environment. As such, dioxins and furans have been slated for virtual elimination under CEPA 1999, and are prioritized under the CWS for Dioxins and Furans, to which the GNWT is a signatory. Studies have linked air emissions from incineration to adverse environmental impacts to water quality, lake sediments, fish and wildlife (Webster & Mackay, 2007 and Wilson et al., 2011). Other studies have concluded dioxins and furans have similar toxicity properties as PCBs, where the major route of human exposure is through the food chain, which can lead to bioaccumulation in human tissues (DEFRA, 2002). A study conducted at the Ekati Mine in 2008 concluded that emissions from the camp's waste incinerator led to exceedances

of the CCME Canadian Sediment Quality Guidelines for dioxins and furans in nearby lakebed sediments. The GNWT believes that the waste incinerators proposed for the Jay Project could have significant impact to the environment (soil and sediment) if not properly managed and audited by the developer.

DDEC has implemented numerous waste management strategies which help remove potential catalysts of dioxins and furans from the waste stream when incinerated (i.e. plastics), has a fairly comprehensive Incineration Management Plan (IMP), and is in the process of installing an industrial composter that will reduce the quantity of waste requiring incineration. However, due to the toxicity of dioxins and furans, it is critical to verify via routine incinerator stack testing that the waste management practices currently in place are effective and that dioxin and furan levels remain below the CCME CWS of 80pg I-TEQ/m³ (CCME, 2001).

The GNWT commends DDEC for committing to conduct stack testing on its waste incinerators every 3 years; however, in the second round of IRs for this EA, the GNWT requested that the developer commit to specific reporting timeframes, response planning and re-stack testing if compliance with CWS was not achieved. The GNWT believes that the compliance testing process is incomplete and ultimately, ineffective at protecting the environment if comprehensive and timely mitigative actions are absent from the process. DDEC has refrained from making these commitments and has stated that “details on these operating procedures will be finalized during the regulatory permitting process” (DDEC, 2015a). The GNWT maintains that critical details surrounding stack testing reporting timeframes, associated mitigative actions and confirmation of their effectiveness if incinerators fail to comply with CWS, must be determined during the EA process, because the Land and Water Boards have stated that they do not have any authority relating to air emissions monitoring during the water licensing or land use permitting processes. GNWT is actively developing an air quality regulatory framework to ensure potential impacts from industrial air emissions are appropriately monitored and mitigated; however, until these legislative tools are in place, it is critical these issues are addressed during the EA process.

GNWT has concluded that formalizing strict timeframes for stack test reporting and response planning provides valued structure to the emissions monitoring and compliance process and helps ensure identified issues are remedied in a timely fashion. ENR submitted a letter during the Avalon Rare Earth Element Project EA which outlined why implementing adaptive management and restacking to confirm compliance to the CWS is an effective approach for reducing emissions of dioxins and furans (GNWT, 2013) and has filed this letter on the public registry for the Jay Project EA. Additionally, if an incinerator fails to comply with CWS, a second stack test must be required as the final measure to ensure mitigative actions were effective and emission compliance has been achieved. Exemptions for conducting a second stack test could occur based on

factors such as the degree of the original exceedance over the CWS, the confidence from the developer and GNWT/EC in having properly identified and addressed the cause(s) of the exceedance, and the availability of any other indicators to demonstrate the issue(s) has been rectified.

In the current proposed plan for monitoring emissions from the waste incinerators, there is no guarantee that any action will be undertaken if stack testing demonstrates that significant quantities of contaminants are being emitted from the incineration process. If adaptive management is not carried out in a timely fashion, a significant adverse impact to local soil and water quality is likely. Mandating clear timeframes for stack test reporting, response planning and verification of the effectiveness of any adaptive management undertaken (if required), will help mitigate the significant adverse impact to the receiving environment. The GNWT does not believe that implementation of the following measures as mitigation to prevent a likely significant adverse impact would prove to be a significant burden to the developer.

Recommendation #2:

The GNWT recommends that MVEIRB determine that a significant adverse impact to sediment and soil quality is likely from the incineration approach that the developer is proposing for the Jay Project, and that MVEIRB include the following as measures to prevent the likely significant adverse impact:

- ***DDEC must submit any waste incinerator stack test results to ENR and EC within 45 days of completing a stack test.***
- ***In the event of a failed stack test, DDEC must develop and submit to ENR and EC an Adaptive Management Response Plan (AMRP) within 90 days of the failed stack test. The AMRP should contain an assessment of the incinerator operations and management that would have contributed to the failed stack test, and methods to improve/rectify them. DDEC should implement these methods immediately upon submission of the AMRP.***
- ***DDEC will re-stack test the incinerators within 6 months of the initial failed stack test. The second stack test will verify the effectiveness of the adaptive management response measures and compliance to the CWS. All stack tests must be conducted in accordance with national standards, and include detailed documentation to demonstrate that representative composition and batch size of waste were used during the testing process. Exemptions for the second stack test may occur based on a review conducted by ENR, in consultation with EC.***

4. Water Quality

4.1 Water Quality Impact Assessments and Assessment Boundaries

4.1.1 Assessment Endpoints and Boundaries

The GNWT and other reviewers such as the Independent Environmental Monitoring Agency (IEMA) expressed concerns regarding assessment boundaries during the IR request phase of the review process as well as at the technical sessions.

4.1.2 Developer's conclusions

DDEC has expressed confidence that the assessment approach, described in Section 9.1.4.2 (and see Section 6.3.1 for the rationale for the boundary of the effects study area (ESA)) in the DAR, provides a reliable assessment of effects to the fish Valued Components (VCs). DDEC described in Section 9.1.4.2 of the DAR the selection of the boundary for the ESA was based on the physical and biological properties of VCs.

The assessment node identified as LDS-P1 on the maps is the grid cell within Lac du Sauvage that contains the diffuser (Section 8.5.4.1.2); DDEC has predicted that water quality at this location is representative of the expected water quality at the edge of the far-field mixing zone (Section 8.5.4.2.2). Based on the results of DDEC's hydrodynamic model (GEMSS), and as illustrated in Map 49-1c, DDEC predicts that effluent will mix throughout Lac du Sauvage and the lake area with the highest concentration of effluent will be the southwest portion. Concentrations are predicted by DDEC to remain well below the proposed benchmarks and aquatic life guidelines.

DDEC's position is that the extent of the mixing zone will be determined during the permitting phase of the Project (see response to DAR-MVEIRB-IR-43). DDEC also proposes that monitoring during the construction, operations, and closure phases of the Project will be conducted to track water quality throughout the mine site, within the water containment areas, and within the receiving environment through an updated Surveillance Network Program (SNP) and an updated Aquatic Effects Monitoring Program (AEMP). Adaptive management measures associated with the monitoring of water quality under an AEMP are expected to be consistent with those currently applied by the Ekati Mine. However, GNWT notes that Total Suspended Solids (TSS) monitoring is not part of the current Ekati AEMP.

4.1.3 GNWT's conclusions

As outlined below, DDEC's presentation of an effects assessment based upon a large regional boundary likely masks the actual extent of potential impacts to Lac du Sauvage and to VCs in Lac du Sauvage (e.g. water quality, fish and fish habitat) during construction, dewatering, operation and closure of the Jay Project. It is the GNWT's position that a robust project-specific effects assessment should also assess impacts using a smaller, more localized assessment boundary, (i.e. the mixing zone and Lac du Sauvage). It is the GNWT's position that restricting the significant adverse impact assessment to a large regional boundary underestimates the actual potential for impacts to Lac du Sauvage and its VCs. The GNWT notes that the DAR conducts the significant impact assessment using a scale more appropriate to a cumulative effects assessment than to a project-specific effects assessment. Cumulative effects include interactions with project impacts from the Diavik Diamond Mine operation as well as DDEC's own impacts from operations of the Ekati main site, which enter Lac de Gras via Leslie Lake through Slipper Lake watershed in the northwest arm of Lac de Gras.

4.1.4 Rationale and recommendation

To help describe this issue of assessing the significance of the project's potential impacts to the aquatic environment, GNWT presents the following case using fish as the VC of analysis. DDEC describes the baseline fish populations in both Lac de Gras and Lac du Sauvage in Table 9.2-7 of the DAR (DDEC, 2014a). However, using DDEC's larger project-specific effects assessment scale a 10% reduction in fish abundance in Lac du Sauvage only corresponds to less than a 1% reduction in fish abundance over the proposed baseline study area. Further, if fish abundance is reduced by 50% in Lac du Sauvage it corresponds to only a 5% reduction in the fish abundance in the baseline area. GNWT refers the MVEIRB to Appendix 1 of this report (Zajdlik & Associates Inc. review) for further information regarding the localized effects within Lac du Sauvage.

The GNWT is aware that an EA typically relies upon both local and regional assessments of impacts. However, the significance of localized impacts is just as important to consider when evaluating the potential impact of the project on the environment. Local impact zones would include the initial mixing zone as well as Lac du Sauvage. Local impact zone for the main site would be the pit lakes themselves as well as Kodiak Lake (i.e. the first receiving lake once Panda and Koala pit lakes are connected at closure).

Regarding the project specific impact to the aquatic environment from Jay-related Total Dissolved Solids (TDS) discharge, the GNWT has reviewed the responses to IRs and notes the following. Under the DAR assessment case, TDS is expected to reach as high as 2,925 mg/L at the end of pipe. DDEC anticipates that as much as 60% of this may be

chloride (e.g. 1,712 mg/L). This means that the aquatic environment within the mixing zone would experience exposure to high levels of chloride. The GNWT believes that it is likely that chloride at 1,712 mg/L would be toxic to freshwater aquatic species at end of pipe and notes that existing long term chronic exposure guidelines for the protection of aquatic life have chloride limits of 120 mg/L (CCME) and 230 mg/L (USEPA, 1999). The GNWT also understands that chloride toxicity is ameliorated by hardness but notes that hardness in Lac du Sauvage from the baseline sampling ranges from 3.9 mg/L to 9.5 mg/L, which will provide minimal amelioration.

Regarding other contaminants of concern during other project related activities (i.e. dike construction and dewatering), DDEC has not adequately described or characterized the impact of turbidity from the Jay Project on localized zones within Lac du Sauvage. High turbidity and total suspended solids during dewatering and dike construction can cause significant impacts to the aquatic environment. Thus, there could be impacts to water quality and fish and fish habitat (VCs) from suspended sediments and turbidity increases during these activities.

To be clear, the GNWT is not looking to redefine the assessment boundaries at this stage of the process. However, it must be recognized that there is a potential for significant impact within Lac du Sauvage from the proposed construction, dewatering, operation and closure activities associated with the Jay Project.

This is also true for the Ekati main site during operations and closure. Water from the Panda and Koala Pits is to be moved to the Long Lake Containment Facility (LLCF) which is released to Leslie Lake and the downstream environment. This water will continue to degrade over time and may result in significant impacts to these downstream waters. Further, DDEC proposes to reconnect the Panda and Koala Pit Lakes upon closure with Kodiak Lake. The water quality within the Panda and Koala Pit Lakes may cause significant impact to the aquatic Environment (i.e. water quality and fish) upon reconnection. It is the GNWT's position that a limited evaluation of the impacts from the Ekati main site on local and regional assessment boundaries is presented in the DAR. As such, it is the GNWT's opinion that measures are required to ensure that the activities on a *local scale* are conducted in a manner that protects the VCs.

Recommendation #3:

GNWT recommends that MVEIRB include a measure that minimizes impacts at localized scales from dike construction, dewatering, operation and closure of the Jay Project Site, and its associated project activities at the Ekati Mine Site, to the extent practical. These local boundaries should include the initial mixing zone, Lac du Sauvage, Leslie Lake, and Kodiak Lake.

4.2 Effects Assessment, Effluent Quality and Site Specific Water Quality Objectives

4.2.1 Effluent Quality and Site Specific Water Quality Objectives

The GNWT expressed concern regarding the potential effluent quality from Misery Pit during operations and water quality within the upper surface of Misery Pit Lake post closure. Water quality at the end-of-pipe and in the fresh water cap on Misery Pit Lake will be high in Total Dissolved Solids and chloride but also for other constituents such as nutrients and metals under the Updated Assessment Case and Reasonable Estimate Case.

4.2.2 Developer's conclusions

DDEC is of the opinion that water quality will remain suitable to provide functioning, healthy aquatic ecosystems and that water uses will be maintained for wildlife, human and traditional use. DDEC has utilized protection of aquatic life guidelines and aquatic health benchmarks including drinking water guidelines to evaluate what the predicted water quality would be and the risk of adverse environmental effects (MVEIRB 2015, p. 155 (April 22 Technical Session Transcripts)).

4.2.3 GNWT's conclusions

The GNWT concludes, as noted in the section above, that reliance upon larger than necessary effects assessment boundaries may mask significant localized impacts to VCs within Lac du Sauvage (e.g. water quality and fish and fish habitat) during dike construction, dewatering, operation and closure of the Jay Project site.

The GNWT concludes that the dike construction phase may have adverse local impacts on water quality and aquatic habitat through increased turbidity and increased TSS. DDEC has not proposed to implement mitigation (e.g. silt curtains, etc.) during winter dike construction. GNWT's concern is that sediment will be suspended when rock is placed under water to create the dike. Further, the construction proposed for the Jay Project dike does not include the removal of fine lake bed sediments. Thus the potential for high levels of suspended sediment under ice could cause impacts to VCs (i.e. water quality and fish and fish habitat) if not properly monitored and mitigated.

Increased levels of suspended sediment (i.e. TSS) can potentially impact fish through a number of mechanisms that can include clogging and abrasion of gills, behavioral effects, blanketing of spawning gravels, etc. CCME Guidelines (clear flow) recommend a maximum TSS increase of 25 mg/L from background levels for any short term period

(24 hours) and a maximum average increase of 5 mg/L for longer term exposures (24 hours to 30 days) to prevent effects to aquatic organisms.

Regarding the operational phase of the project and the closure phase, the GNWT concludes that water quality could be degraded as a result of effluent discharge to a degree that significant adverse effects could occur. Specific parameters of concern that could impact the VCs are TDS, chloride, nitrates, phosphorus and metals. Concentrations of these parameters of concern in the effluent, particularly later in the life of the Jay Project, if left unmitigated, could be high enough to potentially cause acute toxicity at the end-of-pipe and within the mixing zone. However, DDEC's current proposed discharge strategy (no discharge until Year 5, 2023) means that there will be limited available storage for mine water towards the end of mine life. The GNWT is not convinced that a viable contingency option has been proposed at this time to manage poor quality effluent at the end of mine life.

Further, at closure and into the post closure period, contaminants such as TDS and chloride are still of concern. The closure plan for Misery Pit is to place a 60 m cap of fresh water over the mine water that is stored within the pit during operations. Modeling conducted by DDEC has indicated that over time water quality within the cap will degrade. This degraded water will have a surface water quality that is worse than currently approved through the existing Interim Closure and Reclamation Plan (ICRP), as well as the water quality expected at the edge of the mixing zone in Lac du Sauvage during operations. Note that under the currently approved ICRP, Misery Pit Lake is to be connected to Lac de Gras at closure.

4.2.4 Rationale and recommendation

The GNWT has reviewed the Developer's Assessment Report Case, the Probable Case, the Revised Assessment Case, the Lower Bound Assessment Case and the recent Extreme Case provided by DDEC. The GNWT has also reviewed all responses to IRs, particularly those posed by the GNWT, MVEIRB and Environment Canada.

As stated above, the GNWT believes that there is a potential for significant adverse impacts from the operation if conditions at the end-of-pipe, within the mixing zone or within the fresh water cap in Misery Pit reach the maximum predicted levels identified in the Updated Assessment Case and Reasonable Estimate Case. However, the GNWT believes that there are reasonable mitigation options available to DDEC that would allay this potential for impacts and ensure water quality during operations and at closure is of the best quality possible. The GNWT presents these recommendations below and requests that MVEIRB include them as measures. Further rationale is provided below by topic.

Toxicity - acute and chronic

Table 1-1 and 1-2 from DDEC's response to DAR-EC-IR2-01 (provided below as Table 2) outline the predicted water quality at the end-of-pipe and at the edge of the mixing zone. Several of the parameters listed have the potential to cause adverse impacts the aquatic environment. Further, depending on the effectiveness of mixing, this zone of toxicity could extend for some distance from the diffuser string. The GNWT notes that experience with diffuser strings at other sites suggests that the effluent plume typically drops within the water column and follows the bathymetry of the lake, especially under ice (DDMI, 2005 (Plume Delineation Report)). Dependent on the specific effluent concentrations and the effectiveness of effluent mixing there may be a zone with a high degree of toxicity observed in the receiving environment during operations. It remains unclear at this point what the level of any potential toxicity will be. During the second round of IRs, multiple parties attempted to quantify the magnitude of toxicity that would be observed.

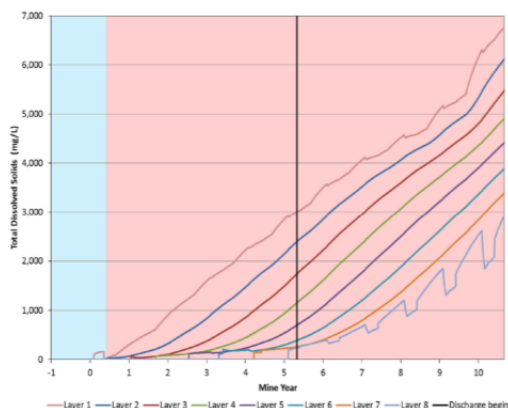
Upon review of the Updated Assessment Case, the GNWT is of the opinion that there will be toxicity observed at the end-of-pipe (potentially acute, likely high degree of chronic toxicity) with concentrations of 2,925 mg/L TDS and 1,712 mg/L chloride. This would extend an undefined distance into the mixing zone. The severity of toxicity would decrease with lower end-of-pipe concentrations such as those associated with the Reasonable Estimate Case. However, even with concentrations of 1,150 mg/L TDS and 605 mg/L chloride, there remains a potential for toxic effects to aquatic organisms.

Water Quality within Misery Pit and Discharge Timing

Following the dewatering phase, the project will move into the operational phase and minewater from the Jay Pit will require water management. During the first 5 years of operation, water from Jay Pit will be discharged into Misery Pit and contained (i.e. not released into the environment). As noted above, despite the isolation of lower quality water in the lower regions of the Misery Pit during operations, there is still a potential for impacts to the aquatic environment of Lac du Sauvage based on the anticipated water quality being discharged from the upper layer (see Updated Assessment Case and Reasonable Estimate Case, below). The proposed timing, concentration and duration of discharge from the Misery Pit is shown in Figure 1 and Figure 2, below.

Figure 1: Updated Assessment Case vs. Reasonable Estimate Case (DDEC, 2015b (Presentation – Modeling Workshop, July 6, 2015))

Updated Assessment Case



Reasonable Estimate Case

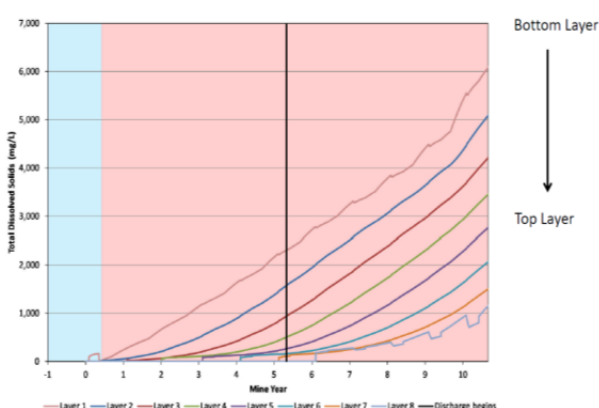
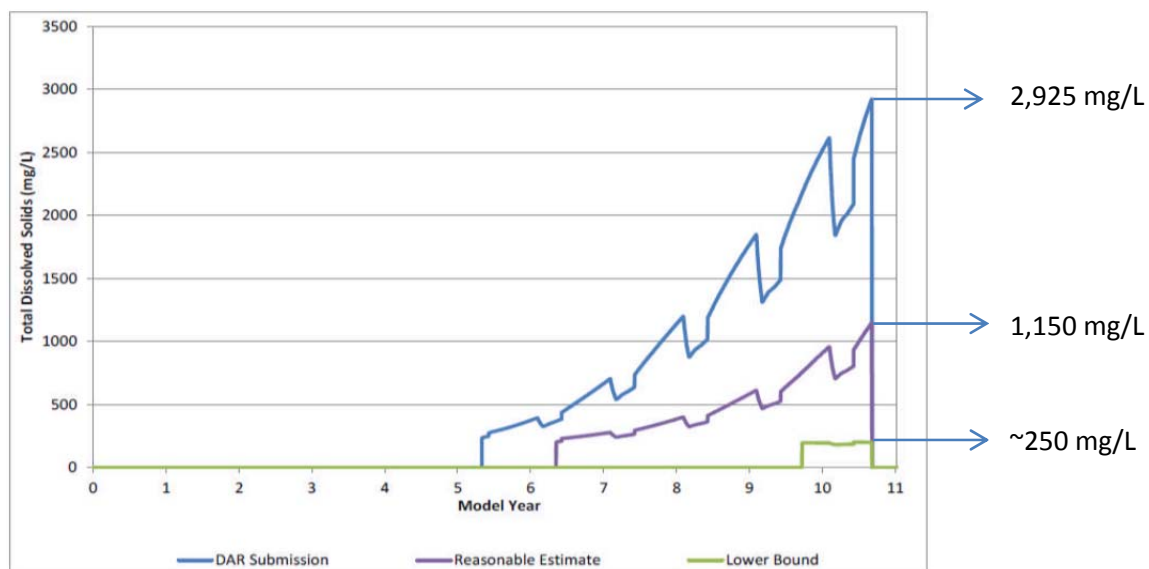


Figure 2: Misery Pit Water Discharge Quality (DDEC, 2015b (DDEC Presentation – Modeling Workshop, July 6, 2015))



The figures above show that over time concentrations of TDS in Misery Pit increase. This is consistent with the predicted concentration of TDS in the mine water inflow. The GNWT notes that the proportion of connate groundwater reporting to the Jay Pit increases as the depth of the pit increases. It is the connate groundwater that has the high TDS concentrations. The GNWT further notes that it is during the later years of the Jay Pit development, when the pit is at its greatest depth, that the worst quality water will accumulate.

However, during early years of mining, water from within Jay Pit that reports to the Misery Pit is generally predicted to be of better quality. This is likely due to a higher ratio of surface water reporting to the Jay Pit than connate water early in the mine life. As shown in Figure 2, concentrations of TDS gradually increase in Misery Pit with time, for example under the Reasonable Estimate Case TDS approaches 500 mg/L in Year 9. For the lower bound case, the increase in TDS is lessened and delayed. This is likely due to lower volumes of inflows as well as lower concentrations of TDS over time. It is Year 9 and Year 10 when inflows have the highest TDS concentrations (i.e. DAR Submission/Updated Assessment Case and Reasonable Estimate Case). These peaks correspond to the levels that contribute to concerns associated with toxicity, as described above. As such, the GNWT is of the opinion that a strategy whereby discharge is curtailed in Year 9 and Year 10 would help allay toxicity concerns at the discharge location in Lac du Sauvage. To accommodate this, Misery Pit would require drawdown sooner than Year 5 (2023) to increase storage in later years.

Commencing effluent discharge sooner in the mine life would increase storage potential for mine water from Jay Pit. For example, starting effluent discharge in the summer of Year 3 would provide additional storage volume later, in Year 9 and in Year 10. Effluent quality in Year 3 would also be better than Year 9 and Year 10, i.e. generally it should be much less than 500 mg/L TDS (see Figure 1). The GNWT notes that summer mixing seems to be more effective than in winter (Table 1). Starting effluent discharge in Year 3 would also provide a few years for the meromictic condition to establish in Misery Pit during active operations, as illustrated in Figure 1 above. The lower discharge concentrations and reduced volumes of discharge would reduce loadings to Lac du Sauvage. Discharge volumes would be lower in early years as the inflow rates would be less into Jay Pit early in the development. These inflow rates increase with time (as would the discharge volume) as the depth of the Jay Pit increases.

It is the GNWT's opinion that discharging water of better quality sooner than Year 5 should also reduce the concern expressed by DDEC about avoiding cumulative effects with downstream users, i.e. Diavik Diamond Mines Inc (DDMI).

DDEC is proposing to initiate effluent discharge in Year 5 (2023) to avoid potential cumulative impacts from effluent discharge at the Jay Project and effluent discharge at the Diavik Diamond Mine. DDEC is using the assumption in the current plan for closure of the Diavik Diamond Mine which includes only 3 years of water treatment post closure. However, the GNWT notes that there is a potential that DDMI could stop discharge sooner or continue discharge later than the expected end date of 2023. For example, there is no current closure criteria or a finalized closure option for the North Inlet at Diavik; depending upon what is ultimately required for the North Inlet, a longer closure discharge period may be required from DDMI. Further, DDMI has started to mine its last pipe via the A21 Open Pit. GNWT notes the A21 Pit also has an Enhanced Permeability

Zone (EPZ) similar to other open pits in the area including Jay Pit which could potentially be a conduit for deep connate groundwater. This may influence the quality of water that accumulates within the North Inlet and that is discharged from Diavik at closure and into the post closure period. Thus, the decision to restrict the timing of effluent release from the Jay Project should not be definitively determined based upon the expected cessation of discharge from Diavik because the precise timing of the cessation of discharge from Diavik has yet to be finalized. This is important as discharging earlier than Year 5 may mean that effluent quality from the Jay Project would be improved.

Further, the GNWT has reviewed the recent Information Request Response from DDEC (DAR-MVEIRB-IR2-32), submitted July 24, 2015, in which it states lasting effects of the DDML mine will contribute to cumulative effects with Jay discharge even under current water management plans. This highlights the fact that cumulative effects cannot be avoided by DDEC and that this is a potential concern regardless of whether effluent discharge is withheld until Year 5 (2023).

The GNWT is of the opinion that DDEC should conduct a functional review of discharge options in order to ensure the best quality water and the lowest loadings to Lac du Sauvage (and ultimately to Lac de Gras) are experienced during the life of mine. Again, the idea being that effluent discharge be curtailed to the extent possible in Year 9 and to the greatest degree in Year 10. Further, if discharge could also be completely curtailed in the winter during these years when mixing in Lac du Sauvage is the poorest; conditions within the mixing zone in Lac du Sauvage would also be improved (see Table 2 below).

Table 2: Predicted Effluent Concentrations for Under Ice and Open Water - Reasonable Estimate Case and Updated Assessment Case (DDEC's response to DAR-EC-IR2-01)

Table 1-1 Predicted Dilution and Maximum Concentrations for Select Constituents at the Edge of the Mixing Zone in Lac du Sauvage from the Near-field Mixing Study - Reasonable Estimate Case^(a)

Parameter	Maximum Lake Concentration ^(b) (mg/L)	Maximum Discharge Concentration ^(c) (mg/L)	Distance: 200 m	
			Minimum Dilution	Maximum Concentration (mg/L)
Under Ice				
Total Dissolved Solids	44	1,150	34	77
Chloride	16	605	34	33
Total Phosphorus (as P)	0.011	0.15	34	0.015
Nitrate (as N)	0.49	13	34	0.9
Strontium	0.58	4	34	0.68
Open Water				
Total Dissolved Solids	33	804	24	65
Chloride	9.2	395	24	25
Total Phosphorus (as P)	0.0094	0.11	24	0.014
Nitrate (as N)	0.41	11	24	0.9
Strontium	0.37	2.6	24	0.46

a) Based on CORMIX modelling results, assuming a 10 m port spacing.

b) Based on the reasonable estimate case/updated assessment case model predictions from the Lac du Sauvage model.

c) Based on the reasonable estimate case/updated assessment case model predictions from the site water quality model.

m = metre; mg/L = milligrams per litre; N = nitrogen; P = phosphorus; - = unitless.

Table 1-2 Predicted Dilution and Maximum Constituent Concentrations at the Edge of the Mixing Zone in Lac du Sauvage from the Near-field Mixing Study – Updated Assessment Case^(a)

Parameter	Maximum Lake Concentration ^(b) (mg/L)	Maximum Discharge Concentration ^(c) (mg/L)	Distance: 200 m	
			Minimum Dilution	Maximum Concentration (mg/L)
Under Ice				
Total Dissolved Solids	95	2,925	34	178
Chloride	49	1,712	34	98
Total Phosphorus (as P)	0.011	0.22	34	0.017
Nitrate (as N)	0.81	20	34	1.4
Strontium	0.34	11	34	0.65
Open Water				
Total Dissolved Solids	65	2,091	26	143
Chloride	33	1,196	26	78
Total Phosphorus (as P)	0.0075	0.16	26	0.013
Nitrate (as N)	0.57	16	26	1.2
Strontium	0.22	8	26	0.52

a) Based on CORMIX modelling results, assuming a 10 m port spacing.

b) Based on the reasonable estimate case/updated assessment case model predictions from the Lac du Sauvage model.

c) Based on the reasonable estimate case/updated assessment case model predictions from the site water quality model.

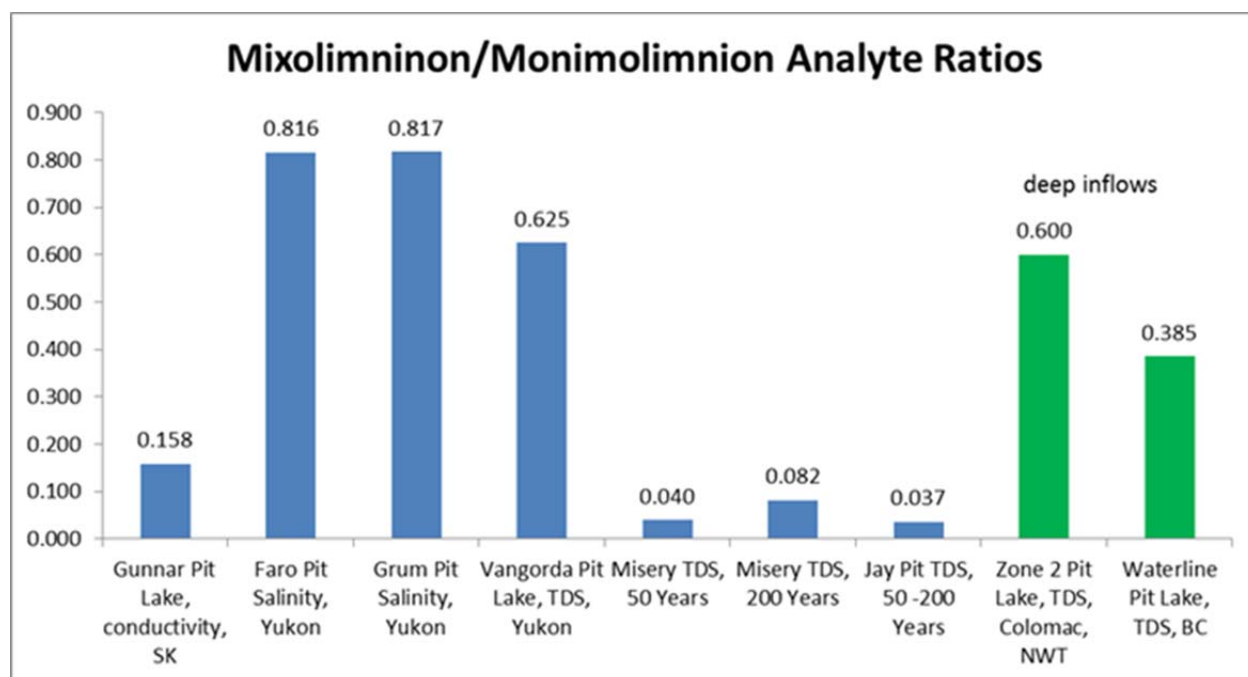
m = metre; mg/L = milligrams per litre; N = nitrogen; P = phosphorus; - = unitless.

Meromixis Evaluations

Starting effluent discharge from Misery Pit sooner in the life of the Jay Project (summer of Year 3) and curtailing effluent release later in the mine life (Year 9 and Year 10) provides an added benefit of helping facilitate more stable meromictic conditions in Misery and Jay Pit Lakes post closure. The GNWT notes that earlier discharge would increase storage of the worst quality of water in Misery Pit during the later years of operation. This would mean that a lower quality of water would reside in Misery Pit upon closure and would be pumped to the bottom of Jay Pit. This will provide a larger density difference between the minewater and freshwater cap layers when fresh water is added to fill the pit lakes to create a cover. Research into pit lakes has shown that a larger difference in the quality of water between the two layers results in a more stable meromixis (Pieters and Lawrence, 2014).

However, there remains some uncertainty as to the degree of difference that will evolve between the upper layer of the pit lake (mixolimnion) and the bottom layer of the pit lake (monimolimnion). The ratio of difference between these layers in the literature that DDEC presented as supporting evidence is an order of magnitude higher than the ratios that are proposed for the upper and lower layers in the Jay and Misery Pit Lakes (DDEC response to DAR-GNWT-IR2-08). For example, some of these pit lakes referenced by DDEC suggest as little as 200 mg/L difference between concentrations in the mixolimnion and monimolimnion (Faro Mine Yukon - Faro Pit Salinity 1250 mg/L monimolimnion and 1020 mg/L mixolimnion; Grum Pit Salinity 900 mg/L monimolimnion and 735 mg/L mixolimnion (Pieters and Lawrence, 2014)). Other ratios are expressed in Figure 3 below.

Figure 3: Mixolimnion and Monimolimnion Analyte Ratios for Conductivity (Zajdlík and Associates Inc, 2015)



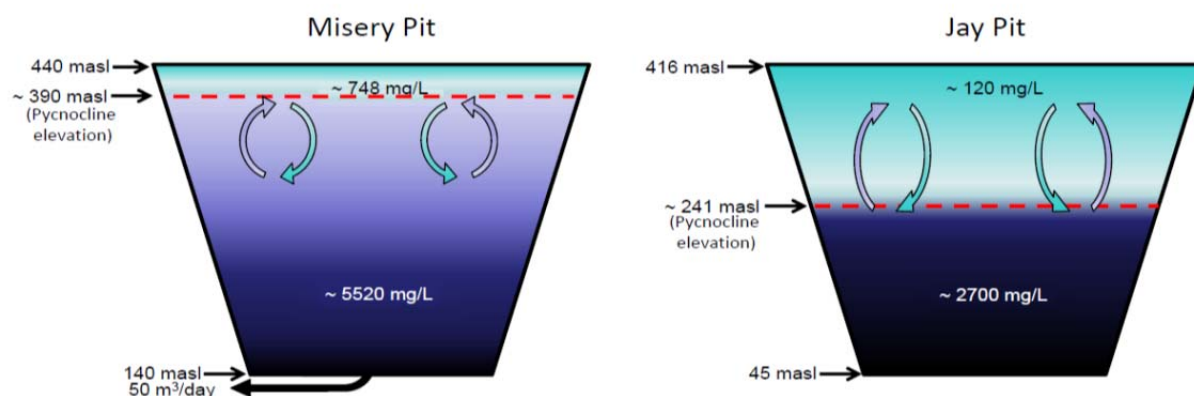
DDEC predicts drastic differences in salinity gradients between the upper and lower layers within Misery and Jay Pit Lake and GNWT is concerned that these differences may not persist in the Misery and Jay Pits. DDEC has relied upon modeling of the pit lakes in making these predictions. The GNWT would like to acknowledge DDEC and its consultants for the numerous meetings and teleconferences to discuss the issues and answer questions about the modeling. Meeting records have been submitted to MVEIRB and are posted to the registry. However, some outstanding concerns remain in this regard as there may be a few drivers that make the Misery and Jay Pit Lake unique, most notably the depth of the pits, their fetch and the initial salinity differences in the layers.

Misery Pit Lake Post Closure

The GNWT has expressed concern with water quality within the fresh water cap in the Misery Pit Lake over time. Figure 4 below illustrates the predicted quality of the surface layer in the Misery and Jay Pit over time (i.e. 200+ years). The GNWT concludes that surface water quality within the upper layer of the Misery Pit Lake at ~748 mg/L TDS would not be an acceptable closure strategy for the pit, as these concentrations are not consistent with naturally occurring conditions in the local ecosystem nor do they align with the current closure conditions approved in the Ekati ICRP. The GNWT notes that under the current approved ICRP, for Misery Pit, fresh water is to be pumped from Lac de Gras to completely fill the pit and create a self-sustaining ecosystem. This would result in water quality within Misery Pit Lake of similar quality as Lac de Gras, orders of magnitude better than that proposed for Misery under the Jay Project.

Upon questioning about the long term water quality in the surface layer of the Misery Pit Lake, DDEC indicated that it was conceivable that water quality within the fresh water cap post closure would improve if the depth of the fresh water cap was increased (DDEC, 2015c, response to the GNWT's IR2-6). The GNWT assumes that this means the depth of the water cap was increased to be greater than 60 m, as the current assessment case for the Misery Pit Lake is a 60 m fresh water cap. Further, DDEC agreed to monitor water quality within the pit during operations and modify the depth of the water cap to satisfy existing closure goals and objectives.

Figure 4: Predicted Water Quality at the Surface and at Depth in Misery and Jay Pit Lakes Post Closure (DDEC, 2015b - Presentation – Modeling Workshop, July 6, 2015)



The GNWT is pleased that DDEC is willing to look at options during operations but would like better assurances that they would create a deeper fresh water cap in Misery Pit at closure if conditions are expected to be similar to that described by the current water quality modeling within the fresh water cap (i.e. > 500 mg/L TDS). The GNWT

would like to ensure that water quality within the Misery Pit Lake at closure is as similar to water quality in other pit lakes currently approved in the ICRP. That said, the GNWT notes that the conditions in Misery Pit will be unique and because of this, monitoring during operations will be required so that the optimal depth of the fresh water cap can be determined.

GNWT's Conclusion

If water from Misery Pit during operations is discharged sooner than Year 5 (2023) of operations, the quality of that effluent from Misery Pit should be better than presented in the DAR cases. Further, the volume of water within Misery Pit would be drawn down over time meaning there would be more storage potential in Misery Pit during later years of mine life when TDS concentrations will be highest. As noted above, as the open pit reaches its deepest depths, the concentrations of TDS and chloride increase.

The GNWT's proposed mitigation strategy also provides the added potential of curtailing effluent discharge from Misery Pit in Year 9 and 10 to ensure it accumulates the worst quality water from the Jay Pit sump. This provides an added benefit for creating meromixis post closure as the greater the difference in water quality (i.e. conductivity, density, TDS, etc.) the more stable the meromictic conditions will be.

As discussed above, DDEC is proposing to delay discharge from Misery Pit to avoid any potential for cumulative effects from both Jay Project and Diavik Diamond Mine discharges (presumed to be Year 2023). However, there is no assurance at this time regarding the specific end date for effluent discharge from the Diavik Diamond Mine. The GNWT notes that this could be sooner or later than 2023. As indicated above, the Diavik Diamond Mine has recently initiated development of the A21 pit. It has also recently adjusted its operation and closure strategy for its Processed Kimberlite Containment Facility which may have implications for closure and water treatment. Either of these recent developments could influence final closure of the Diavik site. Again, there is no finalized closure option or criteria for the North Inlet at this time and as such there may be operational requirements at DDMI that end earlier or extend past 2023. The potential for discharge later than 2023 is the most important consideration for MVEIRB as it would mean that the potential for cumulative effects from the two discharges may be inevitable. In this circumstance it is better to manage the potential for cumulative effects and ensure that the two receiving bodies are protected to the greatest extent possible.

The GNWT would also like to note for the MVEIRB's consideration that these proposed mitigation options would reduce the likelihood of the Jay Project causing significant adverse effects, but also should not result in significant cost to DDEC. Finally, based on

the information filed by DDEC, this proposed strategy would result in a more stable meromictic condition post closure.

Recommendation #4:

GNWT recommends that in order to prevent the potential for significant environmental impact to VCs (i.e. water quality and fish and fish habitat) in Lac du Sauvage and Lac de Gras during operations and post closure:

- MVEIRB include a measure requiring that effluent discharge from Misery Pit be managed such that sufficient storage volume is available in later years to curtail effluent discharge volumes in Years 9 and 10. This should include an evaluation of discharging effluent in Year 3. The above evaluation of management action should focus on accumulating the worst quality mine water within the Misery Pit to reduce toxicity concerns and impacts to Lac du Sauvage and promote more stable meromictic conditions post closure.***
- MVEIRB include a measure requiring that additional volumes of Mine Water from Misery Pit be pumped to Jay Pit at closure and an increase to the proposed water cap over Misery Pit Lake to a depth greater than 60 m. Doing so would result in better water quality in the near surface waters of the Misery Pit Lake than predicted in this environmental assessment and result in better water quality post closure (i.e. goal for long term Mixolimnion concentrations ≤ 500 mg/L TDS).***

4.3 Processed Kimberlite Management and Pit Lake Closure at Main Site

4.3.1 Disposal of Processed Kimberlite into Panda and Koala Pits

The GNWT has raised concerns with the potential water quality within the Panda and Koala Pits post closure as processed kimberlite (PK) from the Jay Pit will be disposed into the pits during operations and only a shallow water cover is proposed (i.e. 30 m).

4.3.2 Developer's conclusions

DDEC proposes to store PK in the mined out Panda and Koala pits. At the cessation of mining, the PK will be covered with a shallow freshwater cap and subsequently drain to the Koala watershed via the Long Lake Containment Facility (LLCF) and subsequently to Lac de Gras. The freshwater cap overlying PK in Panda and Koala will be shallow, approximately 30 m thick (DAR, Section 8; and, response to MVEIRB DAR-MVEIRB-IR2-24).

Other aspects of reclamation of the Panda and Koala open pits would proceed as described in the approved ICRP. The closure work includes construction of an outflow channel between the Panda/Koala Pit Lake and the receiving environment (Kodiak Lake). Flow from the Panda/Koala Pit Lake into Kodiak Lake will be reconnected when water quality has been demonstrated to meet the closure water quality criteria.

4.3.3 GNWT's conclusions

The GNWT concludes that uncertainty remains in the plan to close the Panda and Koala Pits as PK can only be distributed to the pits via slurry. That is, the PK will be mixed with process water in order for it to be pumped to the pits. The technical memorandum provided by ERM (2015) suggests that PK slurry is typically 17% solids by volume. Thus, following the disposal of PK into the Panda and Koala Pits, the solids will settle and the processed water will rise within the pit as the depth of PK grows.

Over time the amount of process water that accumulates within the pits will grow. Process water is typically sourced from the LLCF and the GNWT notes that the quality of water within the LLCF is degrading over time. The GNWT expects this existing condition may persist as the various PK cells expel deep pore water from within the PK.

Process water will accumulate within the pits and the volume may be greater than that proposed for the water cover (30 m). Further, the disposal of PK slurry into the Panda and Koala Pits will occur in the winter months when freezing temperatures will cause icing and expulsions of contaminants from the ice as it forms. These processes may contribute to poorer water quality than expected within the pits during operations. DDEC is proposing to pump water to the LLCF (Cell D) at closure and during operations if the settling of PK is less than anticipated in the ERM model and the volume of the slurry water requires management. However, the GNWT notes that the interaction of residual process water within the pits (if its depth is greater than 30m) and/or expelled pore water from within the PK and the 30 m fresh water cap has not been completely described in the DAR. DDEC has indicated that it is not anticipating that meromixis will form within the surface water cap on Panda and Koala Pit Lakes.

The GNWT is concerned that the limited water cover at closure could result in surface water quality within the Panda and Koala Pits that do not meet the existing objectives approved in the ICRP for open pits. The GNWT is also concerned that alternate options for PK and slurry water within the Panda and Koala Pits have not been described, for contingency purposes. DDEC has stated that the connection of Panda and Koala Pit Lakes to Kodiak Lake will take place once the Panda and Koala Pit Lakes meet water quality licence criteria (BHP Billiton Canada Inc. 2011, pg. 5-40). It is not clear at this time whether the limited water cover will provide an appropriate buffer to ensure that

surface water quality will be acceptable and stable at closure and into the post closure period.

4.3.4 Rationale and recommendation

In DDEC's current ICRP, Version 2.4 (BHP Billiton Canada Inc. 2011), approved by the Wek'èezhii Land and Water Board (WLWB) in December 2011, DDEC committed to a comprehensive list of closure objectives and criteria for the open pits. The plan includes approval to facilitate surface drainage patterns in the Panda and Koala Pit lakes area. This will include connection through Upper Panda Lake down through the pit lakes to Kodiak Lake. DDEC has stated that the connection of Panda and Koala Pit Lakes to Kodiak Lake will take place once the Panda and Koala Pit Lakes meet water quality licence criteria (BHP Billiton Canada Inc. 2011, pg. 5-40). DDEC has committed to ensuring the water licence criteria are met for the surface water, as presented in Table 5.1-1a (Open Pits) in the approved ICRP Appendix 5.1-1:

Table 3: Closure Objectives and Criteria of for all Ekati Open Pit Lakes: Table adapted from Table 5.1-1a from Ekati 2011 ICRP Appendix 5.1-1 (BHP Billiton Canada Inc., 2011)

Open Pit Closure Objectives	Closure Criteria	Action/ Measurements
1. No significant impacts to source lake aquatic habitats.	a) Source lakes and connecting outlet streams water levels remain within natural fluctuations. b) Water quality and fish habitat in source lakes is maintained.	Routine AEMP monitoring and sampling.
2. Surface drainage patterns at pit lakes are established to ensure runoff is channeled through the watershed.	Stream flow occurring from pit lakes through outlet streams to downstream watershed.	Physical inspection.
3. Any permanent lake stratification caused by meromixis remains stable.	Water licence criteria are met.	Routine monitoring and sampling.
4. Pit lake water meets water licence criteria.	Water licence criteria are met.	Routine monitoring and sampling.
5. Facilitate the establishment of a self-sustaining aquatic ecosystem in the pit lakes.	Pit perimeters and any other features necessary to promote the objective are 'built as designed'.	Compliance with Design Report.
6. Pit Lakes are safe for fish passage.	The WLWB, through consultation with regulators and communities agrees that conditions are safe for fish before fish passage is allowed.	Compliance with water licence criteria.

It should be noted that the approved ICRP does not include the deposition or storage of PK in Panda and Koala Pits. DDEC's Ekati Mine Wastewater and Processed Kimberlite Management Plan (Version 4.1, DDEC, 2014b) acknowledges that neither the Panda nor Koala Pits are currently available for PK deposition, but could play a role in future deposition. However, the PK management plan does not provide details on the impacts to the environment from the PK deposition into the Panda and Koala Pits other than stating that the considerations would be similar to those for the Beartooth Pit.

Although DDEC is proposing to use these pits to deposit PK there is insufficient detail in the ERM Memorandum or the DAR regarding water quality and potential impacts if PK deposition occurs into Panda and Koala Pits. It is the GNWT's belief that this proposed management option warrants further investigation by DDEC. Reclamation Research conducted at the Ekati mine within the LLCF has suggested that pore water concentrations within the PK can be up to 8 times higher than surface water concentrations. The concern for the LLCF is the expulsion of this pore water over time following closure of the Ekati Mine. It is unclear if such conditions would develop in the Panda and Koala Pits, and to what degree pore water will degrade the water quality within Panda and Koala Pits during operations and closure. Nor how this expelled water would affect the fresh water cap over the PK in these pits.

At this point in time, the GNWT cannot evaluate the potential for significant impacts if PK and the associated slurry water (i.e. process water) are deposited into these pits. The deposition will result in elevated concentrations of TSS, TDS, chloride and metals in the expelled water. Further, it is not clear if the proposed deposition and water cover would meet the approved closure objectives in the ICRP, such as (BHP Billiton Canada Inc. 2011, pg.5-33 - 5-36):

- any permanent lake stratification caused by meromixis remains stable;
 - Concern - meromixis is not being proposed for Panda and Koala Pits
- pit lake water meets water licence criteria;
 - Concern - there is uncertainty in water quality within the 30 m cap
- facilitate the establishment of a self-sustaining aquatic ecosystem in the pit lakes;
 - Concern - only fresh water was to be pumped to the Panda and Koala Pits
- open pit mine component is left in a healthy state that supports continuation of human land use activities;
 - Concern - there is uncertainty in water quality within the 30 m cap
- community land use expectations and TK [traditional knowledge] have been considered in the closure planning
 - Concern - there is uncertainty in water quality within the 30 m cap

As discussed above, a technical memorandum prepared by ERM (ERM, 2015) concludes water quality of the LLCF will be similar to that presented in Rescan 2012 report. However, there is limited information on predictions for analyte concentrations or impacts to VCs upstream and downstream of Panda and Koala Pit Lake. Note that Upper Panda and Kodiak Lake will be connected to Panda and Koala Pit Lakes as part of the closure plan. Additional information is required from DDEC on the proposed water quality management plans for Koala and Panda pits with the addition of PK deposition, including specific details on how the protection of aquatic habitat (e.g. safe fish passage) will be implemented. The GNWT notes that fish passage will include movement upstream and downstream through the established pit lakes at closure but water quality between these lakes would be drastically different. Depending on the degree of difference in water quality there may be a potential for effects to fish.

In conclusion, the GNWT is concerned with DDEC's ability to meet its existing closure objectives for water quality and aquatic habitat, due to the proposed storage of PK in Panda and Koala Pit, and the accumulation of slurry water in the pits over 10 years. During the operational stage, DDEC should conduct studies to optimize the plans to store PK and slurry water in Panda and Koala Pits, in order to enhance its ability to meet existing closure objectives for the Panda and Koala Pit Lakes.

Recommendation #5:

GNWT recommends that in order to prevent the water quality within the water cap in Panda and Koala Pits from degrading over time and potentially affecting traditional use or Valued Components, MVEIRB include a measure requiring DDEC to conduct an optimization study regarding the storage of PK and slurry water in Panda and Koala Pits, during the operational stage. The outcomes of this study should be implemented to enhance DDEC's ability to meet existing closure objectives for the Panda and Koala Pit Lakes.

5. Wildlife and Wildlife Habitat

5.1.1 Review of Impacts

GNWT has conducted a detailed review of Sections 12 and 13 the DAR and engaged in all phases of the EA process to date in its evaluation of the potential impacts from the proposed project to barren-ground caribou, grizzly bear, wolverine, gray wolf, raptors and species at risk under territorial management (i.e. short-eared owl and rusty blackbird). While GNWT has provided some corrections, refinements and general

concerns related to the assessment of wildlife VCs in Section 13 of the DAR (GNWT-IRs 68, 69, 70, 71, 72, 73 and 74; GNWT response to Yellowknives Dene First Nation (YKDFN) IR-23), it is clear from GNWT's review and from the submissions made by all parties that the significance of the impacts to the Bathurst herd is one of the substantive issues in this review. Hence, in keeping with the level of attention recommended by MVEIRB for Key Lines of Inquiry, impacts to caribou have been the primary focus of GNWT's review of impacts to wildlife.

GNWT thanks MVEIRB and other reviewers for interesting and challenging questions directed at GNWT on caribou issues. GNWT believes that many of the substantive views related to the impacts to caribou that MVEIRB might seek from GNWT can be found in these responses, particularly to IRs IEMA 52, MVEIRB 77, IEMA 34. Furthermore, GNWT responses to IRs IEMA 52 (legislated protections and management plans), YKDFN 30 (determining causes of for zone of influence), MVEIRB 104 (wildlife plans), MVEIRB 105 (Bathurst Range Planning), YKDFN 23 (management and monitoring action) and YKDFN 18 (Tibbitt to Contwoyto Road monitoring), along with the Cumulative Effects Assessment, Monitoring and Management Framework (CEAMMF) filed by GNWT to the public registry for this EA (GNWT, 2015) together provide a comprehensive overview of the GNWT's caribou management approach and the co-management context for this assessment.

5.1.2 Developer's conclusions

In sum, DDEC has concluded that there will be no significant adverse impacts, incremental or cumulative, to caribou or any or any other wildlife VC as a result of the Jay project. GNWT generally supports the approach taken by DDEC to evaluate the impacts to wildlife, with some caveats that are most applicable to review of caribou impacts. GNWT concurs that the three primary pathways DDEC selected for caribou are those that have the greatest likelihood of affecting caribou. GNWT agrees with the choice of measurement endpoints to evaluate those pathways and appreciates that most analyses either in or supplemental to the DAR were appropriate to fulfill the requirements of the TOR and made use of the best available information and tools at the time of writing. GNWT appreciates DDEC's willingness to complete additional analyses such as, but not limited to, population modeling, traffic level assessments, and alternative cumulative effects scenarios. For reasons outlined in GNWT's responses to MVEIRB-IR-77 and IEMA-IR-52(4), GNWT has concerns that the choice of assessment endpoint (self-sustaining and ecologically effective caribou populations) has been problematic as a benchmark against which to measure changes in the measurement indicators and that there was not a clear enough methodology to link changes in the selected measurement indicators to the endpoint. GNWT recognizes that part of the difficulty in determining significance is the lack of identified quantitative thresholds against which to evaluate limits of acceptable change and that DDEC has relied on

conservatism, professional judgment and a “weight of evidence” approach. While one of the objectives of the Bathurst Range Planning process being led by GNWT is to develop thresholds for acceptable levels of change on the range of the Bathurst; this work is ongoing. While in the absence of these thresholds DDEC’s approach is generally sound, GNWT does not believe that all of DDEC’s conclusions necessarily follow from the analysis, particularly with respect to cumulative effects.

5.1.3 GNWT’s conclusions

Based on the information DDEC has filed on the EA registry to date and DDEC’s existing commitments to work with parties and the GNWT on development of its Wildlife Effects Monitoring Plan (WEMP) during and after the EA, GNWT supports DDEC’s conclusion outlined in Section 13 of the DAR that significant adverse impacts to wildlife species within GNWT’s mandate are unlikely. The next section of this report sets out specific requests to DDEC to strengthen its commitments and enhance all parties’ understanding of monitoring, managing and mitigating potential impacts to wildlife. For greater certainty, these recommendations do not affect GNWT’s support of DDEC’s conclusion.

With respect to caribou, GNWT does not dispute that the relative project-specific contribution of Jay, a project expansion in an already disturbed area that is known to be avoided by caribou, to cumulative effects on the Bathurst herd is likely to be small. However, GNWT wishes to emphasize that the extent to which the herd can sustain even minimal additional stress in its present vulnerable state is not clear. The potential for delayed recovery or continued decline of the Bathurst herd as a result of the cumulative effects of all current and proposed development on the Bathurst range cannot be dismissed. If the population is near a vital threshold, which at present is unknown, even small adverse impacts could tip the scales. As such, GNWT-ENR believes that actions that pose risk of further decline and delayed recovery need to be very carefully considered and that a precautionary approach is warranted.

GNWT-ENR generally advises that there are two key ways that developers can address the cumulative effects related to their individual projects. First, each individual developer can implement robust mitigation and monitoring plans within a context of adaptive management to minimize the adverse impacts of its project to the extent possible. It is for this reason that GNWT-ENR has requested DDEC to produce updated plans in sufficient detail for reviewers to be comfortable that the actions being taken by DDEC to avoid, minimize and mitigate the predicted impacts of the Jay Project are robust and that monitoring programs are designed to address predicted impacts of the project. The need for such a plan is further supported under the provisions under Section 95 of the new *Wildlife Act*, in force as of November 2014. GNWT continues work with DDEC and

other parties in developing these plans, and is providing further advice on this in the section to follow.

The second way that developers can address the cumulative effects associated with their projects is to contribute to the understanding of how all natural and anthropogenic factors interact to impact caribou and how those factors over which government, developer and others have some influence can be managed to reduce overall impacts. The GNWT believes that cumulative effects assessment, monitoring, and mitigation need to be approached in a collaborative manner with all users of the land. The GNWT's CEAMMF outlines some of the initiatives GNWT is undertaking and how these interact with other regulatory and co-management processes to provide a comprehensive approach to dealing cumulative effects on the Bathurst herd. GNWT is encouraged by the developer's statement in response to IEMA-IR-36 that it "will maintain its commitment throughout the life of the Jay Project to doing what it reasonably can to contribute to and support GNWT-led regional programs to improve the state of the Bathurst caribou herd." In GNWT's view, such actions include DDEC working with GNWT towards identifying and undertaking mutually acceptable actions that will support regional processes and programs such as those outlined in the CEAMMF, and revising its WEMP to include this commitment and resulting activities."

Recommendation #6:

GNWT requests that MVEIRB recognize the final statement made by DDEC in its response to IEMA-IR-36 as one of the developer's commitments to be included in the scope of development for this EA. This statement reads "DDEC will maintain its commitment throughout the life of the Jay Project to doing what it reasonably can to contribute to and support GNWT-led regional programs to improve the state of the Bathurst caribou herd."

Recommendation #7:

GNWT requests that DDEC revise its commitment as follows: "DDEC will maintain its commitment throughout the life of the Jay Project to doing what it reasonably can to contribute to and support GNWT-led regional programs to improve the state of the Bathurst caribou herd, including working with GNWT towards identifying and undertaking mutually acceptable actions that will support regional processes and programs such as those outlined in the CEAMMF, and revising its WEMP to include this commitment and resulting activities." GNWT recommends that MVEIRB recognize any such revised commitment as one of the developer's commitments to be included in the scope of development for this EA.

5.1.4 Conceptual Wildlife Effects Monitoring Plan (WEMP) & Draft Caribou Road Mitigation Plan (CRMP)

GNWT appreciates the effort DDEC has put into producing draft plans to support discussions on mitigation and monitoring of impacts to wildlife and wildlife habitat and for hosting workshops to provide feedback on these plans. The *Wildlife Act* (NWT) requires that a developer draft a plan that describes how impacts to wildlife will be mitigated and monitored. The GNWT will continue to work with DDEC on its wildlife plans throughout the remainder of the Jay Project environmental assessment and future regulatory processes. GNWT understands that the June 2015 version of the WEMP (including the CRMP) is conceptual in nature and that, should the Jay Project be approved to proceed to the regulatory phase, refinements can be made during the permitting phase and subsequent review cycles; however, GNWT believes that a sufficient level of detail on mitigations, monitoring approaches and adaptive management is necessary to be confirmed during the EA process to allow reviewers to be confident that impacts of the project can be mitigated and tracked. GNWT has reviewed the wildlife plans submitted by DDEC and provided feedback during both the May 22 workshop hosted to review the CRMP and the June 25 workshop to review Conceptual WEMP, which includes the CRMP (DDEC, 2105d). As it has not been identified when the next iteration of the WEMP will be available for parties to evaluate how DDEC has chosen to incorporate their feedback, GNWT would like to restate what it considers to be the key recommendations related to the WEMP at this stage.

GNWT's key recommended changes to the WEMP are in bold and are as follows:

- GNWT understands that the conceptual WEMP prepared by DDEC is intended to address the content of both a Wildlife and Wildlife Habitat Protection Plan (WWHPP) and the Wildlife Effects Monitoring Program (WEMP) as outlined in the draft WWHPP and WEMP Guidelines issued by GNWT (referred to in TOR Appendix B) within a single document. **GNWT supports this approach but recommends that, in order for the document to more fully address the objectives of the Guidelines and address reviewers' concerns about the effectiveness of actions, DDEC provide more detailed procedures for key mitigations and monitoring including: road surveys, how collaring information will be used, deterrence procedures, and wildlife encounters/incidents.**
- Currently the objectives of the document as stated in Section 1.4 are limited to monitoring of particular taxa, without the overarching statements about why that monitoring is important and why mitigation occurs. **GNWT recommends that**

DDEC revise the objectives of the document to provide a clearer framework for the contents of the plan.

- **To provide clarity on how the plan meets the requirements of various regulatory agencies, GNWT recommends that DDEC further develop the concordance table (Section 1.5) to link specific sections of the document with the various mandates and jurisdiction of the regulatory agencies.**
- Part of the purpose of a WEMP is to monitor effects at a regional scale and confirm predictions made during an environmental assessment. As one of the primary pathways identified by DDEC is related to changes to caribou distribution, GNWT is concerned that the current conceptual WEMP does not contain a monitoring program to measure the effect of the Jay project on the distribution of caribou. While GNWT acknowledges that changes in caribou distribution have been measured, and that in recent years monitoring has been suspended due to relatively low numbers of caribou entering the area, the Jay project represents a substantial alteration to the existing Ekati mine, and that further monitoring will be necessary to assess the extent to which this affects the zone of influence. In response to GNWT-IR-66, DDEC stated that it does not “anticipate a change in the magnitude (disturbance coefficient) or size (spatial extent) of the assumed zone of influence”, and GNWT maintains that this is a prediction that needs to be tested. Further to its response, DDEC stated that zone of influence (ZOI) monitoring at the Ekati mine “will be guided by the recommendations of the ZOI Task Group.” **GNWT recommends that DDEC revise the WEMP to include monitoring to address the prediction that the Jay project will not affect the size and magnitude of the area of caribou avoidance in accordance with the recommendations of the Zone of Influence Technical Task Group, including methods for measuring the Zone of Influence and potential alternate activities.** GNWT views this action as a means of testing an impact prediction and as a contribution to collective greater understanding of how cumulative disturbance on the landscape may affect the Bathurst herd, which in turn would directly support GNWT efforts to assess, monitor and manage cumulative effects on the Bathurst herd.
- GNWT is concerned by the lack of clarity in the WEMP regarding how the camera trapping will meet the stated objectives of the program, test the DAR conclusions about the barrier effect of the road or how the information will be used to link to mitigation. In response to GNWT IR # 67, DDEC stated that this method would be “appropriate to evaluate the DAR assumption that caribou would not cross the road (complete barrier to movement).” In response to IEMA-

IR-25, DDEC acknowledged that “the cameras recording caribou interaction along the roads at the Ekati Mine do not reflect deflection rates that may be occurring at a broader scale. **GNWT recommends that DDEC revise the WEMP to provide clearer objectives for the camera monitoring, including supporting methodology, and a section on “Past Scope and Improvements” which explains how the previous work informs the proposed new approach.**

- **GNWT recommends that DDEC develop a reliable way to monitor traffic levels and further detail on the approach to monitoring traffic levels be provided in the WEMP, and that traffic modification mitigations linked to those levels be stated (e.g. use of convoys).**
- GNWT continues to be concerned about DDEC’s proposal to rely on collaring data to trigger activation of different levels of mitigations in the CRMP. While GNWT has agreed to work with DDEC to look at ways location information can be made available more frequently at critical times, there is still a likelihood that caribou can enter the area (<14km) without being detected. Surveys from the road appear to be the only additional monitoring that is proposed, which at certain times (e.g. spring migration), may not provide enough time to implement effective mitigations. Detailed procedures on how road surveys will be implemented are not yet included in the WEMP, making it difficult to assess how effective these will be. **GNWT recommends that DDEC revise the WEMP to provide more details on procedures for monitoring approaching caribou, including road monitoring and use of collar data, and that they devise and include a method for monitoring approaching caribou at intermediate distances.**
- While GNWT appreciates that many of the mitigations in the CRMP can also be used to address impacts related to the road for other species, GNWT notes that triggers and approaches for minimizing the impact of the road on other wildlife VCs are not included in the WEMP. **GNWT recommends that DDEC revise the WEMP to include further detail regarding when and how mitigations for reducing the barrier effect of the road are applied for wildlife VCs other than caribou.**
- GNWT has noted that thresholds for applying mitigative actions in the context of adaptive management are not consistently applied throughout the document. While GNWT accepts that not all types of wildlife monitoring are conducive to selection of strict quantitative thresholds, in those instances where they apply,

they should be clearly stated. For example, Section 5.2.1 Landfill Monitoring does list action levels, but does not present actions related to those. Section 5.2.2 does not list action levels, and only a selection of potential actions. **GNWT recommends that DDEC revise the WEMP to ensure that appropriate action levels (whether quantitative or qualitative) with associated actions are applied wherever possible to support adaptive approaches to managing impacts to wildlife.**

Recommendation #8:

GNWT recommends that DDEC commit to revising its WEMP to include each of the following changes and that MVEIRB recognize any such commitment as one of the developer's commitments to be included in the scope of development for this EA.

- ***DDEC provide more detailed procedures for key mitigations and monitoring including: road surveys, how collaring information will be used, deterrence procedures, and wildlife encounters/ incidents.***
- ***DDEC revise the objectives of the document to provide a clearer framework for the contents of the plan.***
- ***DDEC further develop the concordance table (Section 1.5) to link specific sections of the document with the various mandates and jurisdiction of the regulatory agencies***
- ***DDEC revise the WEMP to include monitoring to address the prediction that the Jay project will not affect the size and magnitude of the area of caribou avoidance in accordance with the recommendations of the Zone of Influence Technical Task Group, including methods for measuring the Zone of Influence and potential alternate activities.***
- ***DDEC revise the WEMP to provide clearer objectives for the camera monitoring, including supporting methodology, and a section on "Past Scope and Improvements" which explains how the previous work informs the proposed new approach.***
- ***DDEC develop a reliable way to monitor traffic levels and further detail on the approach to monitoring traffic levels be provided in the WEMP, and that traffic modification mitigations linked to those levels be stated (e.g. use of convoys).***
- ***DDEC revise the WEMP to provide more details on procedures for monitoring approaching caribou, including road monitoring and use of collar data, and that they devise and include a method for monitoring approaching caribou at intermediate distances.***

- ***DDEC revise the WEMP to include further detail regarding when and how mitigations for reducing the barrier effect of the road are applied for wildlife VC's other than caribou.***
- ***DDEC revise the WEMP to ensure that appropriate action levels (whether quantitative or qualitative) with associated actions are applied wherever possible to support adaptive approaches to managing impacts to wildlife.***

Recommendation #9:

The GNWT requests that DDEC provide the next version of the WEMP as soon as possible, ideally prior to the closure of the public record for this EA.

6. Socio-Economics

Overall, as the Project relates to socio-economics, the GNWT agrees with the conclusions reached by the developer in the DAR. The Ekati Socio-Economic Agreement (SEA) is a contract between GNWT and DDEC which provides for a collaborative monitoring and mitigation approach to socio-economic impacts with the goal of maximizing benefits to NWT residents, and is applicable to the Jay Project (Government of the Northwest Territories and BHP Diamonds Inc. 1996). DDEC has agreed in writing that the Jay Project be considered to be in the Operations phase for the purposes of the SEA (GNWT and DDEC, 2015), thereby ensuring that the Agreement's maximum employment and procurement commitments benefiting Northerners will apply to the Project. DDEC's continued support and collaboration with the GNWT on health, wellness and training programs, including reports and regular (annual) meetings, is expected to provide opportunities for Northern residents and foster discussion with communities. GNWT has filed relevant information and documents about its programs and initiatives to the public registry for this EA. The GNWT acknowledges the socio-economic commitments made by DDEC during the EA, as listed in the July 9, 2015 draft commitments table compiled by MVEIRB and posted to the public registry, and understands that MVEIRB will include these commitments in the scope of development for this EA.

The GNWT has not identified any likely significant adverse impacts of the Jay project on the human environment.

Both GNWT and DDEC are committed to continuing to work collaboratively to ensure that the commitments in the SEA are achieved.

The remainder of this section provides additional detail on the GNWT's views on employment, training, health and wellness, and policing and crime in relation to the Jay Project.

6.1 Employment

6.1.1 Impact

The developer predicts that the Project's effect on labour force activity in the NWT would be of high magnitude. Project support of labour force activity would affect the NWT as a whole, and so would be regional in extent, persisting into the long term (DDEC, 2014a (DAR 14.4.4 - Residual Impact Classification and Significance)).

6.1.2 Developer's conclusions

Based on models that consider the other diamond mining projects occurring in the territory, the developer believes that the construction of the Project will help to stave employment numbers from dropping as other diamond mines near the end of their lifecycles. The developer believes that the Project will help the unemployment rate remain stable until 2027, after which it will soften the decline in mining employment when other mines are expected to begin to shut down operations.

6.1.3 GNWT's conclusions

The GNWT agrees with the developer that the effect of the Jay Pipe Project on employment is of high magnitude and of significant benefit given the regional and long-term nature of the project employment on the labour force (DDEC, 2014a (DAR 14.4.4)). The GNWT acknowledges that the Project would maintain local employment and Northern participation would increase as a more qualified workforce becomes available.

The SEA contains commitments for Northern Resident (62%) and Aboriginal employment (50% of Northern Resident employment) during the operations phase of the Ekati Mine Life.

As noted above DDEC has agreed that the Jay Pipe is an extension of the Operations phase (GNWT and DDEC, 2015). DDEC is committed to reaching those commitments and recent trends show an increase in Northern and Northern Aboriginal employment, which is expected to continue.

DDEC has committed to points of hire in all Local Study Area (LSA) communities and sourcing labour preferentially from point of hire or fly point communities. The existing SEA commitments of maintaining priority hiring and contracting for Northerners and

Northern Aboriginals will remain in place DDEC has committed to transitioning existing Ekati workforce to the Project operations.

The GNWT will continue to monitor and report on employment based on the existing mitigation measures established in the SEA.

The GNWT will continue to work collaboratively with DDEC to ensure that the employment commitments in the SEA continue to be realized.

6.2 Training

6.2.1 Impact

With respect to the SEA, the Project will continue to provide the existing training initiatives through apprenticeship opportunities and the Northern Leadership Development Program for the life of the Project. The impact on training will be to continue on the established trend of providing opportunities for training over the long term.

6.2.2 Developer's conclusions

DAR 14.5.4 Residual Impact Classification and Significance (DDEC, 2014a)

The developer notes that in recent years increased educational attainment has been identified. This trend is unlikely to change. The Project will largely continue existing Ekati educational initiatives, and will not generate a large demand for new, trained employees from the NWT. The Project will maintain awareness of the importance of the mining industry in the NWT economy, and education and training requirements needed for mining employment. The Project will preferentially source new employment from the NWT and LSA communities, and will provide educational contributions and programming to Impact and Benefit Agreement (IBA) communities. For these reasons, the Project's effect on educational attainment is considered local to regional in extent, and will extend beyond operations into the long term. The magnitude of the Project's effect on educational attainment in the NWT is not measurable, and so is cautiously considered low to moderate.

6.2.3 GNWT's conclusions

GNWT acknowledges that the demand for labour force training will be of low magnitude given that the majority of the Project's workforce will transition from the existing Ekati Mine and will likely have the requisite pre-employment training. Based on the most recent numbers from DDEC the company is increasing the number of apprentices it employs and reporting on the numbers of apprentices employed by its contractors. Given the training provisions in the SEA and DDEC's commitment to the SEA, the

GNWT is confident that the Project will support future training and particularly the apprenticeship program.

DDEC has addressed the issue of low literacy by reinstating the Workplace Learning Program and reintroduced the adult educator position at site as well as an Aboriginal Workplace Advisor position. The goal of these positions is to improve the education and literacy of employees and support learning in the workplace, training, apprenticeship and advancement opportunities. These positions and programs support building capacity in the NT work force and support DDEC's commitments for training and advancement under the SEA.

The GNWT will continue to monitor and report based on the existing mitigation measures established in the SEA.

The existing SEA with DDEC has provisions for employment, training and continuous monitoring and reporting. As such, the GNWT will be able to continue to provide opportunities for relevant training to ensure a trained and qualified workforce.

6.3 Health and Wellness

6.3.1 Impact

The TOR require the developer to assess impacts to health and well-being of employees and communities.

6.3.2 Developer's conclusions

The developer believes that concerns relating to health and well-being of both employees and communities will be adequately mitigated through programming, training, operational design and continued support of the existing Ekati Socio-economic Agreement (SEA). The developer summarizes these strategies in its Socio-economic Management Plan (DDEC, 2014a (DAR sections. 14.1.3 and 14.1.3.5)). The developer has previously committed to adhere to the terms of the existing Ekati SEA.

It is the belief of the developer that all Project impacts pertaining to health and well-being have an effective mitigation strategy as outlined in the Socio-economic Management Plan.

6.3.3 GNWT's conclusions

The GNWT has reviewed the developer's Jay Project and has identified no major issues with the project moving forward into construction. It is the opinion of GNWT that concerns have been adequately addressed through information provided in the DAR,

information requests, the developer's continued commitment to the terms of the existing Ekati SEA and ongoing engagement.

GNWT will continue to engage and collaborate with the developer to identify and mitigate potential impacts on health and well-being as they arise.

6.4 Policing and crime

6.4.1 Impact

The developer believes that effects of the Project will be a continuation of the current trends in crime and security rather than an additive increase.

6.4.2 Developer's conclusions

The developer believes that concerns related to well-being and crime and public safety will be adequately mitigated through programming and continued support of the existing Ekati SEA. It is the belief of the developer that all project impacts pertaining to well-being and crime have an effective mitigation strategy as outlined in the Socio-economic Management Plan (DDEC, 2014a (DAR sections. 14.1.3 and 14.1.3.5)).

6.4.3 GNWT's conclusions

The GNWT has reviewed the developer's Jay Pipe project and has identified no major concerns with the project moving forward into construction. It is the opinion of GNWT that concerns have been adequately addressed through information provided in the DAR and the developer's continued commitment to the terms of the existing Ekati SEA and ongoing engagement.

GNWT is prepared to explore opportunities for collaboration with the developer to identify and mitigate potential impacts on crime and well-being as they arise.

GNWT wishes to clarify a statement made by the developer on page 14-93 of the DAR: "the majority of crime in the NWT was classified as violent crime, which ranges from harassment threats to sexual assault and homicides." In 2012 and historically, the majority of crime in the NWT was classified as property crime, followed by 'other' *Criminal Code* offences, and then violent crime. While all categories of crime require police resources, violent crimes require a greater amount of police resources and have a more significant negative impact on the victim and the community as a whole. GNWT has filed supporting data from Statistics Canada to the public registry for this EA (Government of Canada, 2015). This clarification does not affect GNWT's conclusions with respect to the potential impacts of the Jay Project on crime and policing.

7. Heritage Resources

7.1.1 Impact

Potential adverse impacts to heritage resources (multiple subsections in DAR Section 15 - Cultural Aspects).

7.1.2 Developer's conclusions

The developer assesses the significance of impacts to heritage resources as low (DDEC 2014 (DAR, Section 15.4.4)).

7.1.3 GNWT's conclusions

Given that the developer will complete scientific data recovery at archaeological site LdNs-53 in 2015, as per the NWT Archaeologist Permit issued by GNWT to DDEC's Project archaeologist, implement the Heritage Management Plan outlined in DAR Section 15.4.4, and be subject to standard regulatory tools and practices, the GNWT is confident that the Jay Project will not result in significant adverse impacts to heritage resources.

The baseline study area for heritage resources contains eight archaeological sites. Five of these sites will be avoided by development of the Jay Project. Two of the three remaining sites have been mitigated through scientific data recovery. For the final site – LdNs-53 – scientific data recovery is pending. LdNs-53 is a lithic scatter located within the proposed footprint of the waste rock pile for the Jay Project. GNWT's Department of Education, Culture and Employment (ECE) has issued an NWT Archaeologist Permit (under the *Archaeological Sites Regulations*) for mitigation of the site through scientific data recovery, which is scheduled for the summer of 2015. The results of this project will not be available in advance of the deadline for submission of technical reports for the Jay Project EA (as per the *Archaeological Site Regulations*, the final report for this project is due to GNWT by March 31, 2016). Based on its review of the application for this site, GNWT is confident that the data recovery at LdNs-53 will be completed to a high standard. GNWT will review the final report upon receipt to determine if the scientific data recovery conducted at LdNs-53 is sufficient to mitigate impacts to the site. If outstanding issues arise through GNWT's review of the final report of the mitigation project, GNWT will address them during the regulatory process.

8. List of Recommendations and Key Conclusions

Air Quality

Recommendation #1:

The GNWT requests that DDEC commit to adopt the AMRP triggering criteria outlined in the table below, and that MVEIRB recognize this commitment as one of the developer's commitments to be included in the scope of development for this EA. For clarity, the table displays DDEC's triggering criteria as proposed in its draft Conceptual Air Quality and Emission Monitoring and Management Plan for the Jay Project, as well as the GNWT's recommended triggering criteria for each associated action level.

Table: AMRP triggering criteria

Action Level	DDEC Proposed Triggering Criteria	GNWT Recommended Triggering Criteria
1 st Action Level	Concentrations less than 80% of the applicable ambient air quality standard AND less than +20% year to year change	1) Concentrations below 80% of the applicable air quality standard -OR- 2) Less than 10% year to year change in concentrations AND above 50% of the applicable air quality standard
2 nd Action Level	Concentrations less than 80% of the applicable ambient air quality standard AND +20% year to year change	1) Concentrations between 80% & 90% of the applicable air quality standard -OR- 2) 10% - 20% year to year change in concentrations AND above 50% of the applicable air quality standard
3 rd Action Level	Concentrations above 80% of the applicable ambient air quality standard AND more than +10% year to year change	1) Concentrations above 90% of the applicable air quality standard -OR- 2) More than 20% change year to year in concentrations AND above 50% of the applicable air quality standard

Recommendation #2:

The GNWT recommends that MVEIRB determine that a significant adverse impact to sediment and soil quality is likely from the incineration approach that the developer is proposing for the Jay Project, and that MVEIRB include the following as measures to prevent the likely significant adverse impact:

- DDEC must submit any waste incinerator stack test results to ENR and EC within 45 days of completing a stack test.
- In the event of a failed stack test, DDEC must develop and submit to ENR and EC an Adaptive Management Response Plan (AMRP) within 90 days of the failed stack test. The AMRP should contain an assessment of the incinerator operations and management that would have contributed to the failed stack test, and methods to improve/rectify them. DDEC should implement these methods immediately upon submission of the AMRP.
- DDEC will re-stack test the incinerators within 6 months of the initial failed stack test. The second stack test will verify the effectiveness of the adaptive management response measures and compliance to the CWS. All stack tests must be conducted in accordance with national standards, and include detailed documentation to demonstrate that representative composition and batch size of waste were used during the testing process. Exemptions for the second stack test may occur based on a review conducted by ENR, in consultation with EC.

Water Quality

Recommendation #3:

GNWT recommends that MVEIRB include a measure that minimizes impacts at localized scales from dike construction, dewatering, operation and closure of the Jay Project Site, and its associated project activities at the Ekati Mine Site, to the extent practical. These local boundaries should include the initial mixing zone, Lac du Sauvage, Leslie Lake, and Kodiak Lake.

Recommendation #4:

GNWT recommends that in order to prevent the potential for significant environmental impact to VCs (i.e. water quality and fish and fish habitat) in Lac du Sauvage and Lac de Gras during operations and post closure:

- MVEIRB include a measure requiring that effluent discharge from Misery Pit be managed such that sufficient storage volume is available in later years to curtail effluent discharge volumes in Years 9 and 10. This should include an evaluation of discharging effluent in Year 3. The above evaluation of management action should focus on accumulating the worst quality mine water within the Misery Pit to reduce toxicity concerns and impacts to Lac du Sauvage and promote more stable meromictic conditions post closure.
- MVEIRB include a measure requiring that additional volumes of Mine Water from Misery Pit be pumped to Jay Pit at closure and an increase to the proposed water cap over Misery Pit Lake to a depth greater than 60 m. Doing

so would result in better water quality in the near surface waters of the Misery Pit Lake than predicted in this environmental assessment and result in better water quality post closure (i.e. goal for long term Mixolimnion concentrations \leq 500 mg/L TDS).

Recommendation #5:

GNWT recommends that in order to prevent the water quality within the water cap in Panda and Koala Pits from degrading over time and potentially affecting traditional use or Valued Components, MVEIRB include a measure requiring DDEC to conduct an optimization study regarding the storage of PK and slurry water in Panda and Koala Pits, during the operational stage. The outcomes of this study should be implemented to enhance DDEC's ability to meet existing closure objectives for the Panda and Koala Pit Lakes.

Wildlife and Wildlife Habitat

Key conclusion:

Based on the information DDEC has filed on the EA registry to date and DDEC's existing commitments to work with parties and the GNWT on development of its Wildlife Effects Monitoring Plan (WEMP) during and after the EA, GNWT supports DDEC's conclusion outlined in Section 13 of the DAR that significant adverse impacts to wildlife species within GNWT's mandate are unlikely.

Recommendation #6:

GNWT requests that MVEIRB recognize the final statement made by DDEC in its response to IEMA-IR-36 as one of the developer's commitments to be included in the scope of development for this EA. This statement reads "DDEC will maintain its commitment throughout the life of the Jay Project to doing what it reasonably can to contribute to and support GNWT-led regional programs to improve the state of the Bathurst caribou herd."

Recommendation #7:

GNWT requests that DDEC revise its commitment as follows: "DDEC will maintain its commitment throughout the life of the Jay Project to doing what it reasonably can to contribute to and support GNWT-led regional programs to improve the state of the Bathurst caribou herd, including working with GNWT towards identifying and undertaking mutually acceptable actions that will support regional processes and programs such as those outlined in the CEAMMF, and revising its WEMP to include this commitment and resulting activities." GNWT recommends that MVEIRB recognize any

such revised commitment as one of the developer's commitments to be included in the scope of development for this EA.

Recommendation #8:

GNWT recommends that DDEC commit to revising its WEMP to include each of the following changes and that MVEIRB recognize any such commitment as one of the developer's commitments to be included in the scope of development for this EA:

- DDEC provide more detailed procedures for key mitigations and monitoring including: road surveys, how collaring information will be used, deterrence procedures, and wildlife encounters/ incidents.
- DDEC revise the objectives of the document to provide a clearer framework for the contents of the plan.
- DDEC further develop the concordance table (Section 1.5) to link specific sections of the document with the various mandates and jurisdiction of the regulatory agencies
- DDEC revise the WEMP to include monitoring to address the prediction that the Jay project will not affect the size and magnitude of the area of caribou avoidance in accordance with the recommendations of the Zone of Influence Technical Task Group, including methods for measuring the Zone of Influence and potential alternate activities.
- DDEC revise the WEMP to provide clearer objectives for the camera monitoring, including supporting methodology, and a section on "Past Scope and Improvements" which explains how the previous work informs the proposed new approach.
- DDEC develop a reliable way to monitor traffic levels and further detail on the approach to monitoring traffic levels be provided in the WEMP, and that traffic modification mitigations linked to those levels be stated (e.g. use of convoys).
- DDEC revise the WEMP to provide more details on procedures for monitoring approaching caribou, including road monitoring and use of collar data, and that they devise and include a method for monitoring approaching caribou at intermediate distances.
- DDEC revise the WEMP to include further detail regarding when and how mitigations for reducing the barrier effect of the road are applied for wildlife VC's other than caribou.
- DDEC revise the WEMP to ensure that appropriate action levels (whether quantitative or qualitative) with associated actions are applied wherever possible to support adaptive approaches to managing impacts to wildlife.

Recommendation #9:

The GNWT requests that DDEC provide the next version of the WEMP as soon as possible, ideally prior to the closure of the public record for this EA.

Socio-economics

Key conclusion:

The GNWT has not identified any likely significant adverse impacts of the Jay project on the human environment.

Both GNWT and DDEC are committed to continuing to work collaboratively to ensure that the commitments in the SEA are achieved.

Heritage resources

Key conclusion:

Given that the developer will complete scientific data recovery at archaeological site LdNs-53 in 2015, as per the NWT Archaeologist Permit issued by GNWT to DDEC's Project archaeologist, implement the Heritage Management Plan outlined in DAR Section 15.4.4, and be subject to standard regulatory tools and practices, the GNWT is confident that the Jay Project will not result in significant adverse impacts to heritage resources.

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