



JAY PROJECT

**INDEPENDENT ENVIRONMENTAL
MONITORING AGENCY**

TECHNICAL REPORT RESPONSES

August 2015



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Abbreviations

Abbreviation	Definition
AEMP	Aquatic Effects Management Program
AQEMMP	Air Quality and Emissions Monitoring and Management Plan
CRMP	Caribou Road Mitigation Plan
DAR	Developer's Assessment Report
Dominion Diamond	Dominion Diamond Ekati Corporation
EIR	Environmental Impact Report
Ekati Mine	Ekati Diamond Mine
GNWT	Government of Northwest Territories
IBA	Impact Benefit Agreement
IEMA	Independent Environmental Monitoring Agency
IR	Information Request
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVRMA	<i>Mackenzie Valley Resource Management Act</i>
NWT	Northwest Territories
Project	Jay Project
TSS	total suspended solids
VC	valued component
WEMP	Wildlife Effects Monitoring Plan
WLWB	Wek'èezhìi Land and Water Board
WROMP	Waste Rock and Ore Storage Management Plan
WRSA	waste rock storage area
ZOI	zone of influence

Units of Measure

Unit	Definition
%	percent
<	less than
µg/L	micrograms per litre
m	metre



1 INTRODUCTION

Dominion Diamond submitted a Developer's Assessment Report (DAR) to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) in November 2014. Following completion of the DAR, Dominion Diamond submitted Round 1 and Round 2 information request (IR) responses (April 7, 2015 and July 3, 2015, respectively), and attended Technical Sessions hosted by MVEIRB in Yellowknife between April 21 and 24, 2015, to address regulator and parties' questions and concerns in regard to the Jay Project (Project) and the DAR.

On July 31, 2015, Independent Environmental Monitoring Agency (IEMA) submitted their technical report to MVEIRB for the Project outlining recommendations on remaining topics of concern. This report provides responses to those recommendations outlined in the IEMA technical report (IEMA 2015), with the intent of clarifying these remaining topics as the Project moves into the MVEIRB Hearings Phase.

2 RECOMMENDATION AND RESPONSE

2.1 Caribou - Significant Adverse Cumulative Impact

In Section 3.1.5 of their Technical Report (IEMA 2015), IEMA recommended that MVEIRB make a determination that there would be a significant adverse cumulative impact of the Project on the Bathurst caribou herd pursuant to s. 128(1)(b) of the *Mackenzie Valley Resource Management Act* (MVRMA). In the Report IEMA suggested that there are some measures that could and should be adopted. The principle is that cumulative effects require cumulative solutions and that these measures if undertaken would result in a greater reduction in existing effects on Bathurst caribou than the Project would create. In the Report, IEMA also recommended a number of measures to the Review Board pursuant to s. 128(1)(b)(ii) of the MVRMA. The measures appear and are responded to below.

The first sentence of each of IEMA's Recommended Measures includes "...to prevent a significant adverse impact to caribou..." The assessment of the effects of the Project on barren-ground caribou was presented in the DAR. The determination (DAR Section 12.6.2) was that the cumulative effects from the Project and other developments should not have a significant influence on the ability of the Bathurst caribou herd (and the Ahiak and Beverly herds) to be self-sustaining and ecologically effective. Subsequent work presented in response to Adequacy Review comments from MVEIRB and to IRs from all parties supported the prediction that the Project would have no significant adverse effect on the Bathurst herd. Furthermore, although the decline of the Bathurst caribou herd since the 1990s may be considered ecologically and culturally significant, all lines of evidence (changes in measurement indicators) indicate that previous and existing developments had little measurable effects on caribou survival and fecundity, and no significant contribution to the decline. In Section 3.1.1 of their Technical Report, IEMA supported their conclusion of a significant adverse impact by declaring that the failure of Dominion Diamond to conclusively demonstrate the absence of effect of the Project on the declining Bathurst caribou herd. Section 3.1.4 of the IEMA Technical Report notes the recent substantial decline of the Bathurst caribou herd and enumerates contributions of the Project to habitat loss, decline in habitat quality through an expansion of the zone of influence (ZOI), the barrier effects of the Jay and Misery Roads, and energetic costs from interactions of caribou with the ZOI. These factors and the associated magnitude, geographic extent, duration, and likelihood of their effects were all identified in the DAR.

In the DAR (Section 12.4.2 and 12.4.3) there are explicit acknowledgements of the negative effects of the Project on the Bathurst caribou herd. All factors were formally assessed and considered in the determination of significance. Further, at MVEIRB's request, the effects of the Project were incorporated into a population model created for the Bathurst herd (Adequacy Review DAR-MVEIRB-15). The population model parameters were selected to examine the maximum potential effects of all human-related development on the Bathurst herd. Despite the application of maximum effects, the conclusion of the population modelling was that additional energetic costs from changes in movement and behaviour associated with the Project and other developments were not expected to decrease population resilience and increase the risk to the viability of the Bathurst herd at any phase of the population cycle. The negative trend in Bathurst herd population growth associated with the current estimates of vital rates for reference conditions were predicted to be similar with and without the development-related cumulative changes in habitat quantity and quality, and caribou behaviour and energetics. That finding was

consistent with Adamczewski et al. (2009) who indicated that effects from the previous and existing mines are limited and unlikely a major contributing factor in the recent decline of the Bathurst caribou herd.

Consequently, Dominion Diamond does not accept that there will be significant adverse impacts to caribou as a result of the Project.

2.1.1 Measure 1

To prevent a significant adverse impact to caribou, DDEC shall implement further measures minimize the ecological disturbance footprint for the Jay Project as follows:

- selection of the Jay haul road route that minimizes disturbance to high quality caribou habitat (PR#305 DAR-IEMA-IR-28 and PR#356 Anne Gunn's proposed routing);
- additional mitigation to reduce the effect of haul truck and other traffic on caribou (e.g., more rigorous dust management, including adaptive management triggers for additional dust suppression; more precautionary traffic management to reduce sensory disturbance); and
- investigate and implement an esker crossing that involves selection of less critical habitat, one-way traffic, buried power lines, and other innovative approaches.

2.1.2 Response to Measure 1

2.1.2.1 Jay Haul Road Route Selection

Dominion Diamond has identified the Jay Road route and design that minimizes the effect on barren-ground caribou. Dominion Diamond's work has included engagement with members of all of the Impact Benefit Agreement (IBA) groups including aerial reconnaissance and on-land engagement to gather input on the most appropriate route for the Jay Road. In this Recommended Measure, IEMA has expressed a desire to minimize the disturbance footprint of the Jay Road on high quality caribou habitat. As discussed in the DAR Section 12.6.2, the direct loss of habitat is not considered to pose a risk to the assessment endpoint for barren ground caribou. Additionally, the historic caribou trail map on which Anne Gunn proposed Alternative 4 for the Jay Road is a map of the density of observed caribou trails (not habitat quality), which is not the sole or primary driver for selection of the best road route for the Project. In the Round 1 IR response DAR-IEMA-IR-28, it was noted that methods for identifying caribou trails from aerial photographs and later used for trail distribution mapping were not able to distinguish between historic caribou trails and trails that are actively in use. The density of caribou trails is also limited by detectability from aerial photographs and field observations. Dominion Diamond has provided a thorough analysis of road routes (including Alternative 4) that integrates all of the relevant information.

In Round 1 of IRs, IEMA (DAR-IEMA-IR-28) requested that the preferred Jay Road alternative meet a different objective:

"DDEC should re-evaluate the Jay road options and demonstrate that from a caribou movement perspective that the route selected has the least potential to disturb caribou movement through the project."

Dominion Diamond considers this to be a more relevant request than Recommended Measure 1 in IEMA's Technical Report. Disturbance to caribou movement was addressed in DAR Section 12.6.2. The area of the Jay Road is recognized as a historic migration route for the Bathurst caribou herd; the main caribou migration route in the Project area runs northwest-to-southeast towards the Lac du Sauvage - Lac de Gras Narrows. All alternatives for the Jay Road, including Alternative 4 (the Anne Gunn route), must run in an approximately east-west direction to connect the Misery Road to the Jay Pit. As such, all alternatives for the Jay Road cross the main caribou migration path in the area and traffic on the road will affect caribou similarly under all alternatives. Beyond traffic, the other factor contributing to the barrier effect of the Jay Road is the physical structure of the road. A detailed alternatives analysis was conducted on all Jay Road alternatives (Technical Sessions Undertaking Request response DAR-MVEIRB-UT-02) and the selected alternative for the Jay Road crosses the least amount of the esker and requires the least amount of road to be constructed with safety berms, which present obstacles to caribou crossing. Alternative 4 also has two very significant downsides. First, it has a steep maximum grade that may not be technically feasible for large payload haul trucks to climb. Reducing haul truck payload would increase the frequency of haul truck traffic, an undesirable outcome. Second, it passes through the Misery Camp, increasing potential concerns for Health and Safety and traffic management. There is no corresponding reduction in risk to caribou that would offset these negative aspects of Alternative 4.

Dominion Diamond has indicated that the main portion of the Jay Road (i.e., roughly between King Pond Dam and the junction with the Jay North Road, a distance of 2.8 kilometres) will be constructed with caribou crossings. However, no caribou crossings will be constructed where raised safety berms are required or where portions of the pipeline will require visual inspection (i.e., joints, valves, vents, and drains). Dominion Diamond will continue to engage with our IBA communities and other people affected by the Project to receive input regarding the design of the caribou crossings for the Jay Road. This input will be incorporated into the final detailed design of the Jay Road. Once roads are constructed, it is anticipated that as part of annual visits of community members to the Ekati Diamond Mine (Ekati Mine) and for monitoring the effectiveness of the caribou crossings will be reviewed, and if necessary, modifications can be implemented. This procedure is currently in place for the Ekati Mine and would be continued for the Project.

The selected alternative for the Jay Road (Alternative 3) is consistent with the minimization of the barrier effect of the Jay Road to caribou movement and migration, a key element of the Caribou Road Mitigation Plan (CRMP) for the Project (Dominion Diamond 2015a), which was informed by substantial engagement with communities.

2.1.2.2 Additional Mitigation Measures

The CRMP developed by Dominion Diamond (2015a) describes the mitigation and monitoring for the Jay and Misery roads with respect to caribou. Dominion Diamond hosted two workshops (in May and June 2015) to receive suggestions on earlier versions of the CRMP, and the current version (Dominion Diamond 2015a) includes revisions based on those workshops. Based on the framework of adaptive management, it is important to note that the CRMP will evolve through time. The CRMP is included as an Appendix in the Conceptual Wildlife Effects Monitoring Plan (WEMP) (Dominion Diamond 2015b).

The objectives of the CRMP include:

- avoiding and minimizing (reducing) the risk of caribou and other wildlife mortalities from traffic;

- avoiding and minimizing the barrier effect of the Jay and Misery roads (and other Ekati Mine roads) to caribou movement and migration; and,
- limiting the effect of sensory disturbance from roads and traffic on caribou behaviour.

Dust caused by vehicles driving on roads, mitigation and monitoring of dust is addressed through the Conceptual Air Quality and Emissions Monitoring and Management Plan (AQEMMP) for the Project (Dominion Diamond 2015c). Mitigation to control dust at the Ekati Mine has included watering and applying dust suppressant to the roads. More detail regarding dust mitigation and monitoring can be found in the Ekati Mine Air Quality Management and Monitoring Program (Section 1.3 and 3.5 of ERM [2015]), and the conceptual AQEMMP for the Project (Section 2.4), and Section 4.1.6 of the WEMP.

2.1.2.3 *Esker Crossing*

This Recommended Measure was previously addressed in the Round 1 IR response DAR-IEMA-IR-43.

As noted in the response regarding the Jay Road Route Selection above, the concerns regarding the Jay Road do not arise from loss of habitat (including esker habitat) but from the potential of the road and traffic to function as a barrier to caribou movement, in this case along the esker. Under all road alternatives, the same amount of traffic will cross the esker. In accordance with Worker's Compensation Board of the Northwest Territories and Nunavut (WCB NWT and NU) Mine Health and Safety Regulations (1995), for two-way haul traffic, the minimum operating road width is required to be three times the width of the widest truck that will operate on the road. The maximum operating width of the haul traffic that will operate on the Jay Road is anticipated to be 8.3 metres (m), which corresponds to an operating width of 25 m for two-way traffic, and the total base width would be 37.4 m. In particular, due to the short summer construction season, having two-way traffic through the esker crossing is necessary from a traffic management and safety perspective.

For comparison purposes, if the road were to be built as a single lane through the esker, the minimum operating road width would be twice the operating width of the widest truck, which corresponds to 16.6 m, and the total base width of the excavation would be 29.1 m. This would reduce the width of the esker cut by 8.3 m (width of a haul truck), but would not be practical or safe from an operating standpoint.

Furthermore, as described above, the same amount of traffic would be present along the Jay Road. Tłıchq Elders' advice has also been utilized in the development of the closure and restoration for the plan for the esker, at the completion of the Project. Esker material excavated during construction of the road crossing will be stockpiled and retained for use during closure. During closure, the power line and pipelines along the Jay Road will be removed; once road access to the dike is no longer required, natural drainage patterns around the esker will be re-established, and the natural grades of the esker will be re-established. Stockpiled esker material will be used to dress the re-graded esker.

Research suggests that effects from power lines are minor when compared to active roads (Berger et al. 2000; Reimers et al. 2000, 2007; Vistnes et al. 2008). Qualitative analysis predicted that the presence of the power lines should result in negligible changes to caribou movements and distribution relative to increased traffic on the Misery and Jay roads; rather it is the potential adverse effects of traffic on Misery and Jay roads that are recognized as the focus of concern. Burying the power line through the esker cut would require substantive extra work to bring the (high-voltage) cables to the ground, encase them in a protective conduit, and elevate them again. The loss of ability for safety inspection on that portion of the

high-voltage cables would introduce unnecessary operational and safety risks, for no apparent environmental benefit.

The location where the road crosses the esker has been selected to minimize disturbance by selecting a portion of the esker with a natural depression and where the width of the esker is narrow. The total length of the esker cut is approximately 80 m. Community engagement was conducted to aid in the selection of the most appropriate location to cross the esker. This included visits to the esker. Community members who visited the esker were in general agreement that having the road cross at this location was most appropriate.

2.1.3 Measure 2

To prevent a significant adverse impact to caribou, DDEC, with other mine operators and GNWT where possible, shall develop and implement a collaborative research program designed to identify the causes of the Zone of Influence (ZOI) for caribou avoidance. The research findings will then be implemented to reduce the size of the ZOI on caribou. The results of the research program are to be summarized and reported annually to all interested parties as part of DDEC's annual report under its Wildlife Effects Monitoring Program. A target date for development of the research program is one year following the acceptance of the Measures by Responsible Ministers and implementation of the research results to reduce the ZOI within five years. DDEC shall commit to using the results of the research for the existing Ekati Mine.

2.1.4 Response to Measure 2

The ZOI represents a combination of direct (physical footprint) and indirect (noise, dust, viewscape and other sensory disturbances) effects around the Project that changes the behaviour and occurrence of caribou. A formal research program as proposed would likely not be effective. To identify proportional effects attributable to specific factors (mechanisms) would require an experimental process with the reduction of some but not other factors, a problematic solution when many of the factors have the same cause. Mining activities and traffic along the haul roads each generate noise, dust, light, vibration, and changes to the viewscape simultaneously. These factors are collectively and effectively accounted for through use of a ZOI.

In Recommended Measure 3, IEMA recommends a collaboration among mine operators and Government of Northwest Territories (GNWT). Dominion Diamond does not agree that it is our responsibility to develop such a collaboration of independent research on ZOIs. Such a group already exists (i.e., ZOI Technical Task Group) and ZOI monitoring at the Ekati Mine (inclusive of the Project) will be guided by the recommendations of the ZOI Task Group, which is led by the GNWT, Environment and Natural Resources. This is the appropriate group to provide such recommendations. Dominion Diamond will also consider feedback from communities, monitoring agencies and other people affected by the Project through ongoing engagement activities and participation in wildlife monitoring workshops. Dominion Diamond has partnered with the Canada Centre for Remote Sensing (Natural Resources Canada) on their SMART program on the effects of development on the Bathurst caribou herd, which includes ZOI assessment. Monitoring and mitigation are described in the WEMP (Dominion Diamond 2015b) and the CRMP for the Project (Dominion Diamond 2015a). The WEMP and CRMP are in accordance with the measures on collaboration and ZOI-related actions of Recommendations #7 and #8 of the GNWT (2015).

2.2 Caribou - Zone of Influence

2.2.1 Measure 3

To obtain information needed to prevent a significant adverse impact to caribou, DDEC shall analyze estimates of ZOI distance and magnitude from the 2009 and 2012 aerial survey data from the combined Ekati-Diavik study area using the new R code analysis. These estimates should be reported within the 2015 Wildlife Effects Monitoring Program report.

2.2.2 Response to Measure 3

To assist in evaluating alternative methods for refining assessments of the ZOIs of developments on barren-ground caribou, Dominion Diamond agrees with the recommendation and will analyze the ZOI distance and magnitude from the 2009 and 2012 aerial survey data as requested and will present the results in its 2015 WEMP report. Dominion Diamond will work with the ZOI Technical Task Group to evaluate the analytical methods and their results. Dominion Diamond has also partnered with the Canada Centre for Remote Sensing (Natural Resources Canada) on their SMART program on the effects of development on the Bathurst caribou herd, which includes ZOI assessment.

2.2.3 Measure 4

To obtain information needed to prevent a significant adverse impact to caribou, DDEC shall undertake aerial surveys to monitor relative caribou distribution and abundance and measure the effectiveness of mitigation measures for caribou currently in use for Ekati and proposed for the Jay Project. The aerial survey study area should be enlarged to include the extensions related to the proposed Jay Project and reasonably foreseeable Sable footprints. Given new analytical techniques, survey timing will be established in collaboration with interested parties but designed to track trends over time. DDEC shall produce estimates of ZOI distance and magnitude for the Jay Project (including the entire Ekati Mine) for the combined Ekati-Diavik study area using the new R code analysis. The results of the aerial surveys and analysis of the ZOI are to be reported annually (as appropriate) as part of DDEC's Wildlife Effects Monitoring Program reports, and will serve as means of measuring the effectiveness of Jay Project caribou mitigation measures.

2.2.4 Response to Measure 4

Following Recommendations #7 and #8 in the Technical Report of the GNWT, Dominion Diamond will collaborate with the GNWT on regional programs and actions, and work with the ZOI Technical Task Group to revise the WEMP to include monitoring methods to address the prediction that the Project will not affect the size and magnitude of the area of caribou avoidance, including methods for measuring ZOI. Dominion Diamond will work with the ZOI Task Group to evaluate the survey, analytical methods and results, and to undertake surveys based on the recommendations of that group. Results of monitoring will be presented in annual WEMP reports. Dominion Diamond has also partnered with the Canada Centre for Remote Sensing (Natural Resources Canada) on their SMART program on the effects of development on the Bathurst caribou herd, which includes ZOI assessment. Dominion Diamond recommends that the GNWT's ZOI Task Group is the appropriate means of carrying this work forwards, rather than instituting specific technical directives as recommended by IEMA.

2.3 Caribou - Compensatory Mitigation (Off-Setting)

2.3.1 Measure 5

To prevent a significant adverse impact to caribou and to reduce public concern with the Jay Project, DDEC shall prepare a Compensatory Mitigation (Off-Setting) Plan for caribou. The purpose of the Plan is to enhance the ability of the Bathurst caribou herd to recover to its previous abundance as measured through reductions in energy loss, positive changes in calf production and survival. To the extent possible, the Plan should be developed collaboratively with interested parties, and shall be a condition of a land use permit for the Jay Project. The Plan should be prepared and circulated by DDEC to the Wek'eezhii Renewable Resources Board, GNWT and affected Aboriginal governments within one year of the acceptance of the Report of Environmental Assessment and shall be in place before construction commences on the Jay Project.

2.3.2 Response to Measure 5

Dominion Diamond does not agree that there is a need for offsetting. As presented in the response to the Round 1 IR to DAR-MVEIRB-IR-90, adverse effects from a project should be mitigated following a standard mitigation hierarchy (IFC 2012; BBOP 2015). The hierarchy is, in order of priority:

- avoidance;
- minimization;
- reclamation; and,
- offsetting.

Effects that are avoided entirely or are minimized yield a reduction in the residual effects of a project prior to implementing reclamation or offsetting. The Project will use mitigation to avoid, minimize, and reclaim adverse effects associated with the effects pathways (see WEMP, Appendix D). The results presented in the DAR indicate that there are no significant adverse effects from the Project, and no offset mitigation has been proposed. Further, there is no regulatory requirement, guideline or precedent in the NWT for offsetting residual adverse effects to caribou and other wildlife, and any changes to the parameters of interest to IEMA from offsetting the effects from the Project will not be measurable.

The offsetting plan requested by IEMA is to provide measurable reductions in energy loss and positive changes in calf production and survival. The residual effects from the Project are expected to contribute little to the cumulative effects on barren-ground caribou energy loss, calf production and survival. The incremental decrease in fecundity from the Project is predicted to be 0.3 percent (%; Section 12.4.2.3.2 of the DAR). The cumulative effects analysis shows that natural factors (such as population cycles and insect harassment) remain the determining factors in caribou energetics, abundance and distribution. Direct habitat loss from the residual physical footprint of the Project (e.g., waste rock storage area [WRSA]) is less than 0.1% of the seasonal ranges of the Bathurst herd. Physical disturbance from previous and existing developments has had little, if any, ecologically measurable influence on the carrying capacity of the seasonal ranges (less than 2% cumulative direct habitat loss). The population modelling completed for Adequacy Review response DAR-MVEIRB-15 (Adequacy Review Item 8.8)

demonstrates that the Bathurst herd's ability to increase is dependent on caribou vital rates and is not prevented by cumulative effects of development disturbance.

Importantly, all of the analyses used a precautionary approach to predict maximum effects and manage uncertainty; hence, most ecological effects are likely to be considerably smaller than those presented in the assessment making them less likely to be measurable. The ability to measure change in an ecological effect is determined by natural variance in the parameter of interest, desired confidence level, desired power of the test, effect size, and sample size. The natural variances in calf production and survival are large and the ecological effect sizes of those parameters associated with the Project are small. No offset mitigation is likely to yield changes that can be confidently and powerfully measured as different from natural variation in energetics, survival, and productivity.

In their Technical Report, IEMA cites the Caribou Mitigation and Monitoring Plan for Peace River Coal's Roman Mine (Stantec 2012). The effect of concern with the Roman Mine is the amount and condition of habitat in the range of a caribou herd where 24% to 27% of seasonal ranges have been affected by development and where linear corridors are 30% above threshold values (Stantec 2012, p. 6). Offsetting for the Roman Mine Project consists of securing habitat against future development and a cash payment for other activities (Stantec 2012, p. 25). Despite assertions by IEMA (2015, p. 11), there is no evidence of success of this offsetting program, only that it has been implemented. The importance of habitat loss in the Roman Mine Project, and the associated ease of measurement of offset habitat create the possibility of offsetting in the Roman Mine example. The importance of habitat loss and ease of measurement are not the case for the Project where the concerns are difficult to measure energetic costs and the related survival and productivity effects of the Project. The Roman Mine is not a good comparison for the Project.

Effective mitigation through avoidance, minimization, and reclamation removes the need for offsetting the effects of the Project.

2.4 Water - Surface Water and Minewater Management

2.4.1 Measure 6

To prevent a significant adverse impact to water quality, DDEC shall develop and submit to the Wek'eezhii Land and Water Board for approval, a revised Water Management Plan for the Jay Project within two years of initiating de-watering operations of the Jay pit. The Plan shall include:

Identification of specific surface and minewater management contingencies including capacities (in terms of effluent volumes and mine production as expressed in operating days);

- Design, construction and implementation timing for each identified surface and mine water management contingency option;
- Detailed monitoring of water quality and quantity to enable early detection of success or failure; and
- Associated adaptive management trigger thresholds for implementation of contingencies.

2.4.2 Response to Measure 6

Dominion Diamond accepts the recommendation that a revised mine water management plan be submitted to the Wek'èezhii Land and Water Board (WLWB); we anticipate this will be a requirement of the Water Licence. As requested in this recommendation, this detailed plan submitted for approval with the Water Licence application will include details of contingencies, monitoring and evaluation, adaptive management trigger thresholds, and timelines for implementation. Details of the final structure and content of this plan, and the timing of its submission, will be ratified as part of the WLWB permitting process.

Within the DAR, Dominion Diamond presented a mine water management plan for the Project (Section 3.5.4; Appendix 3A; summarized in Section 8.3). This plan was developed to minimize potential impacts to the receiving environment through optimization of minewater collection and storage, monitoring of runoff water and minewater before release to the environment, and isolation of minewater under freshwater caps in the mined-out Misery and Jay pits.

2.5 Water - Mercury Contamination

2.5.1 Measure 7

To prevent a significant adverse impact to water quality, DDEC shall provide specific details to the Wek'èezhii Land and Water Board as part of any proposed water licence, as to how it plans to encapsulate mercury-laden lakebed sediments within the Jay WRSA to ensure mercury does not re-enter the Lac du Sauvage water column during operations and closure.

2.5.2 Response to Measure 7

A construction management plan will be developed during the detailed design stage of the Project that will provide details regarding the handling, placement, and management of sediments, and soils associated with the construction of the dike and Sub-Basin B Diversion Channel. Additional information regarding handling, placement and management of sediments and overburden associated with development of the open pit will be provided in the detailed design report for the Jay WRSA.

As part of the dike construction activity, a combination of lakebed sediments and competent soil will be excavated and placed in the WRSA (see responses to IRs DAR-GNWT-IR2-17 and DAR-MVEIRB-IR2-02). If a quarry is identified as a requirement within the WRSA during the detailed design phase, this facility would preferentially be utilized for placement/containment of the lakebed sediments; if the quarry is not developed, containment cells constructed of either rockfill and/or till will be constructed within the WRSA footprint for disposal of this material. The location of these cells has not been defined yet, but would preferentially be located away from the perimeter of the WRSA. The cells will be used to contain the sediments in localized areas, away from Lac du Sauvage or other waterbodies, and allow for collection and management of any seepage, if required.

The majority of the overburden material stripped as part of Jay Pit development will comprise competent soils such as till. Only a small portion of the overburden soil, between about 5% and 10%, is anticipated to be finer grained lakebed sediments. The majority of the lakebed sediments will partially drain and consolidate during dewatering and are anticipated to comprise a solid constituency for transport, not a slurry. In addition, a portion of the stripping of the overburden soils will be completed during winter

months, and therefore, some of the soils will be frozen. Overburden soils will be placed in the interior area of the WRSA footprint. Containment berms will be constructed using the competent soils (till), if necessary, to contain any softer lakebed sediments. Waste rock will be placed around and over top of the overburden soils to the design limits of the pile, thereby encapsulating the soil and sediment. Stage development plans for the WRSA will be developed as part of the detailed design and will indicate areas for placement of soils and sediment.

The Ekati Mine has an adaptive management process in place for the existing WRSA, which is described in Section 7.7 of the Waste Rock and Ore Storage Management Plan (WROMP) Ver. 4.1. It is Dominion Diamond's intent to extend the WROMP to cover the Jay WRSA; therefore, the adaptive management processes will also apply to the Jay WRSA. Under the WROMP, WRSA seepage will be identified and geochemistry analysis undertaken, and results evaluated. The framework for the adaptive management strategy for the Project will remain consistent with the Ekati Mine WROMP, that is:

- identification of issue, verification of action trigger, and development of a response plan;
- additional studies to determine the extent of the impact of seepage (if any), and modification of the WROMP and seepage management program; and,
- implementation of modified programs, and design / construction of mitigation structures and facilities (if required).

Two lakebed sediment samples from Lac du Sauvage were identified possessing mercury concentrations above guidelines. These sediment exceedances occurred in the area where the diked area and mine pit will be established, and from which overburden will be sourced, collected, and transferred to the WRSA. However, the risk to the receiving environment of problematic levels of mercury in the seepage coming from the WRSA with this sediment is considered low. These exceedances were the only exceedances in 59 baseline sediment samples collected from 25 locations in Lac du Sauvage (DAR-GNWT-IR2-13). Additionally, these two samples were from the collection of three station replicates: the mercury concentration in one replicate was more than the CCME (2001) Interim Sediment Quality Guideline; the mercury concentration in another replicate was more than the probable effects level; and the third replicate from this station had a mercury concentration below these guidelines. The remainder of the sediment samples possessed mercury concentrations much lower relative to these samples and aquatic life guidelines (DAR-GNWT-IR2-13). There is a strong likelihood these mercury measurements are anomalous and are not representative of sediment mercury concentrations in this area. Nevertheless, the WRSA seepage source term for the site water quality model assumed a conservative mercury concentration, i.e., an average seepage concentration of 0.0025 micrograms per litre ($\mu\text{g/L}$), and a maximum of 0.044 $\mu\text{g/L}$, which is above CCME water quality guidelines for the protection of aquatic life. Seepage represents a small proportion of the inflow to Lac de Sauvage, but was included as an input to the Lac du Sauvage water quality model. Despite the range of mercury in seepage assigned in the modelling, no adverse effects to water quality in Lac du Sauvage were identified. To minimize the risk of effects to the receiving environment, monitoring downstream of the WRSA (e.g., Surveillance Network Program location), is anticipated.

Dominion Diamond will provide the WLWB with an updated amendment to the WROMP to incorporate the Project during the permitting process and will work with the WLWB on the timing and details of the submission.

2.6 Water - Lac du Sauvage Fish Monitoring

2.6.1 Measure 8

To prevent a significant adverse impact to fish likely to be affected by the Jay Project, DDEC shall incorporate non-lethal testing of large-bodied fish within Lac du Sauvage in any Aquatic Effects Monitoring Program for the Jay Project.

2.6.2 Response to Measure 8

To minimize the potential for mortality to large-bodied fish species, Dominion Diamond is proposing instead to use small-bodied fish species to assess effects on the health of fish populations, as described in the Conceptual Aquatic Effects Monitoring Program (AEMP) for the Project (Dominion Diamond 2015d). Small-bodied fish are less mobile, and therefore, integrate local conditions better than large-bodied fish (Munkittrick et al. 2010). Effects should therefore be detected in a localized population of small-bodied fish before they are detected in large-bodied fish that move throughout the lake or watershed. Monitoring of large-bodied fish would be considered as a response to a triggering a low action level for the health of small-bodied fish.

It is recognized that fish tissue samples can be collected for laboratory analysis from large-bodied fish through the use of non-lethal tissue plugs; however, the potential for mortality still exists from the capture methods. For example, non-lethal large-bodied fish health surveys (e.g. broad-scale monitoring approach) that assesses indicators for fish growth, reproduction, and survival have been associated with the high incidental mortality of target species, as well as by-catch, from the use of gill nets for sampling large-bodied species. For this reason, a large-bodied fish health survey is not proposed at this time. The approach of using small-bodied fish within an AEMP fish health and fish tissue component is used in the Ekati Mine AEMP and other AEMPs in the NWT (e.g., Diavik and Gahcho Kué mines; Golder 2013; De Beers 2015).

As described in Dominion Diamond's July 24, 2015 letter to MVEIRB on engagement on monitoring and management plans, the AEMP is directly regulated under the Ekati Mine Water Licence by the WLWB, and as such, the established WLWB processes will be followed for regulatory and community engagement. Dominion Diamond intends to conduct an AEMP engagement workshop with interested parties prior to submission to the WLWB.

2.7 Water - Impacts on Fish Habitat from Dust Deposition

2.7.1 Measure 9

To support DDEC's position that dust settling on spawning shoals would be naturally swept away, DDEC shall develop and submit to the Wek'eezhii Land and Water Board the results of a model of depth of wave turbulence below the surface in Lac du Sauvage in areas likely to be affected by dust deposition from the Jay Project.

2.7.2 Response to Measure 9

Dominion Diamond does not agree that a water quality model to determine the behaviour of suspended dust in the water column of Lac du Sauvage is required. As per the response to Round 1 IR DAR-IEMA-IR14 and Round 2 IR DAR-IEMA-IR2-02, and the findings of dust deposition studies undertaken at the

Diavik Mine (reviewed in DDMI 2011) and Ekati Mine (Rescan 2012), the deposition of dust sourced from Project activities has negligible potential to result in adverse changes to water quality in Lac du Sauvage. Applicable findings from these sources include:

- water quality monitoring in Lac de Gras has not detected elevated total suspended solids (TSS) concentrations at stations monitored close to East Island (DDMI 2007);
- based on 2002 to 2005 monitoring data, the maximum load from dust in Lac de Gras represents about 0.004% of the estimated TSS load from the watershed (i.e., 2,983,687 kilograms per year) (DDMI 2005);
- Using dust deposition data collected at the Ekati Mine from 2009 to 2012, analyses demonstrated that any link between dust deposition and aquatic effects would be negligible (Rescan 2012); and,
- Summer dust deposition contributions are several orders of magnitude lower than observed concentrations of water quality variables (e.g.TSS) in aquatic systems at the Ekati Mine (e.g., Koala Lake) (Rescan 2012).

As described in the DAR (Annex XIV), a total of 21 spawning shoals were previously identified in Lac du Sauvage. As stated in the Round 1 IR response DAR-IEMA-IR-14, most of the suitable spawning shoals for fish valued components (VCs) are located at least 1,500 m from the Project point of maximum influence of dust deposition. At this distance, the projected maximum change in TSS concentration (assuming no settling) as a result of Project dust emissions is small (<3 milligrams per litre). The closest spawning shoal in proximity to the dike is S4 (315 m northeast of the edge of the dike), which was considered to be only a fair-quality shoal for spawning Lake Trout, Lake Whitefish, and forage species (Golder 1997), with the higher quality shoals located further from the diked area, or in Lac de Gras.

Spawning habitat characteristics for Lake Trout and Lake Whitefish spawning have been well studied throughout Canada, including northern systems (see Richardson et al. 2001). Lake Trout spawn in September and October in northern areas, with most spawning taking place over cobble and large gravel substrate in shallow nearshore areas of lakes. Wind and wave action is the primary mechanism keeping the spawning areas clean (Martin and Olver 1980; Marsden et al. 1995) where winds and waves can scour and clean reefs in the fall and maintain adequate water quality over the winter (i.e., maintain the incubating eggs free of detritus and remove metabolic wastes). Eggs remain in the substrate until hatching in early spring (i.e., March and April) (Scott and Crossman 1973; Richardson et al. 2001). Lake Whitefish spawn in mid-September to mid-October in northern regions, with spawning typically taking place over a variety of substrates from large boulders to gravel and occasionally sand. Eggs are broadcast over the substrate and incubate until hatching some time from March to May (Scott and Crossman 1973; Richardson et al. 2001).

The accumulation of deposited dust on spawning shoals is predicted to be negligible. In addition, wave action and associated currents will also play a part by providing sufficient physical motion within the water column to further disperse the suspended sediment and the potential for its accumulation on the shoals. Wave action and associated currents that characterize high-quality shoals for spawning will continue to maintain high-quality shoals relatively free of sediment accumulation in Lac du Sauvage. As concluded in Round 1 IR response DAR-IEMA-IR-14, any changes to habitat at the spawning shoals are, therefore, considered to be very small, and have no measurable effect to population abundance for fish VCs due to

lack of predicted change to existing spawning habitat, as well as the high availability of suitable spawning habitat in Lac du Sauvage. Any effects would also be reversible as the source of dust deposition will cease following closure, where following closure of the mine, aerial deposition to Lac du Sauvage is expected to return to near-baseline conditions.

Dominion Diamond reasserts that changes to the quality of shoals for spawning and rearing (through changes in dust deposition) in Lac du Sauvage during construction and operations are expected to be negligible. As part of construction and operations for the Project, dust generation and deposition will be monitored under the AQEMMP, as well as water quality (including TSS measurements) at stations in close proximity to Project activities (e.g., dike construction) in the AEMP. Mitigation strategies to minimize dust generation, such as limiting vehicle speeds, applying dust suppressants, or road watering, and monitoring and evaluation (which includes adaptive management trigger thresholds for particulate matter), will be implemented as per the Fugitive Dust Abatement Program detailed in the AQEMMP for the Project.

2.8 Water - Jay Project Impacts on AEMP Reference Lakes

2.8.1 Measure 10

DDEC shall evaluate the Jay Project impacts on Counts Lake as an AEMP reference lake and identify alternative lakes which could be used as reference lakes in the AEMP, or a means of continuing to use Counts should that be a better option, for the Jay Project before construction begins.

2.8.2 Response to Measure 10

Counts Lake is currently included in the Ekati Mine AEMP as a reference lake, as well as Vulture and Nanuq lakes (ERM 2015). As per Section 8.3 of the conceptual AEMP Design for the Project, Dominion Diamond will continue to monitor Counts Lake, due to the proximity to Project infrastructure and for ongoing sampling as part of the existing Ekati Mine AEMP.

Sufficient temporal data have been collected from Counts Lake to enable comparisons to baseline conditions to assess potential effects on the lake from the Project. A lack of observed effects to Counts Lake from the Project will validate the suitability of the lake to continue to be used as a reference lake for the existing Ekati Mine AEMP. As part of the further development of the AEMP Design Plan for future submission to the WLWB, a desktop reference lake study will be conducted for the Project to identify whether a suitable reference lake can be found for comparisons to Lac du Sauvage.

2.9 Water - Effluent Toxicity to Zooplankton Within Mixing Zone

2.9.1 Measure 11

To prevent a significant adverse impact to zooplankton from the Jay Project, DDEC shall evaluate the likelihood of acute toxicity to zooplankton occurring in the proposed mixing zone during operations. DDEC should also commit to reviewing the QA/QC of all future chronic and acute toxicity testing to ensure comparability of results to natural conditions in the receiving environment (i.e. use of water in toxicity testing that has the same temperature and other physical properties as water within the receiving environment).



2.9.2 Response to Measure 11

As previously indicated in the DAR and in the responses to IRs (e.g., see response to DAR-EC-IR2-1 and DAR-GNWT-IR2-04), Dominion Diamond has committed that no discharge of any minewater from the Misery Pit to Lac du Sauvage will occur if acutely toxic. To meet this commitment, monitoring of minewater in the Misery Pit (as a requirement under the Water Licence) will be undertaken during operations; the monitoring will be conducted in early operations (i.e., during the phase when there is no discharge to Lac du Sauvage) and late operations (i.e., during the discharge period). Minewater monitoring will include chemical analysis and acute and chronic toxicity testing. Similar to toxicity testing requirements at the Ekati Mine, toxicity testing is expected to include acute lethality testing with Rainbow Trout and the cladoceran, *Daphnia magna*, and chronic toxicity testing with the green algae, *Pseudokirchneriella subcapitata*, and the cladoceran, *Ceriodaphnia dubia* (WLWB 2014). This testing will track water quality conditions in Misery Pit to prevent water that is acutely toxic from being discharged to Lac du Sauvage.

Dominion Diamond will evaluate the use of standard laboratory procedures versus site-specific procedures for toxicity testing as part of its water licencing submissions to the WLWB. A robust quality assurance/quality control plan will be developed and implemented for all water quality and toxicity testing procedures. The effluent toxicity data from the Surveillance Network Program will also be integrated into the interpretation of the results of the AEMP.

2.10 Water - Assessment of Taxonomic Change in Plankton

2.10.1 Measure 12

DDEC shall incorporate an annual assessment of plankton community changes based on shifts in community structure into any Jay Project Aquatic Effects Monitoring Program with the objective of determining how these changes could ultimately impact fish populations of Lac du Sauvage. Differential impacts to various fish species and age classes must be considered.

2.10.2 Response to Measure 12

The final AEMP Design Plan to be submitted to the WLWB will include details on the proposed assessment of changes in plankton community structure. The design will include an assessment of phytoplankton and zooplankton biomass by taxonomic group and multivariate analyses to assess changes in community structure. This approach is similar to the existing Ekati Mine AEMP, which evaluates potential for changes in zooplankton species composition, abundance, and biomass (ERM 2015). Community level changes in plankton will be considered in the interpretation of the fish health component of the AEMP and the overall integration of results of the AEMP to obtain a further understanding of potential changes to fish health.

If a low action level is triggered for plankton as part of the AEMP Response Framework for the Project, determining how changes in community structure could ultimately impact fish populations could be proposed as part of a response plan or as a Special Study. Such a study would potentially involve determining the edibility of phytoplankton to zooplankton and the edibility of zooplankton to fish and assessing how the changes in the plankton community could impact fish.

2.11 Waste Rock Seepage Management

2.11.1 Measure 13

To minimize the likelihood of a significant adverse impact to aquatic resources from the Jay Waste Rock Storage Area, DDEC shall develop and submit to the Wek'eezhii Land and Water Board for approval, a revised Waste Rock and Ore Storage Management Plan within one year of initiating overburden stripping operations. The revised Plan shall include:

- relevant information for the Jay WRSA, information on the design, construction monitoring and management of the facility;
- full justification and rationale for all proposed setbacks from water bodies;
- a robust monitoring system (including thermal monitoring and/or internal water sampling) with locations identified, to provide early indicators or warnings on performance;
- an adaptive management approach with clear triggers and action levels that lead to responses or actions to prevent Acid Rock Drainage; and
- annual reporting of monitoring results including any trigger exceedances, and longer term reporting of trends.

2.11.2 Response to Measure 13

Consistent with the permitting of other WRSAs at the Ekati Mine, Dominion Diamond anticipates that the requirements identified above will be incorporated into the Ekati Mine Water Licence by the WLWB as part of its public review and licencing process for the Project. Therefore, Dominion Diamond suggests that there is no need for the MVEIRB to also provide regulatory requirements on this topic.

2.12 Air Quality and Dust - Monitoring and Monitoring Site Locations

2.12.1 Measure 14

To prevent a significant adverse impact to air quality, DDEC shall develop a revised Air Quality and Emission Monitoring and Management Plan for the Jay Project, collaboratively with interested parties and the GNWT before construction commences. The Plan shall include:

- specific triggers for air quality monitoring results for NO₂, PM_{2.5} and TSP that will result in adaptive management responses and actions including prevention and mitigation;
- detailed actions and responses for tiered thresholds and action levels that will include a range of lead times from immediate action when necessary, but recognize longer term trends;
- a plan and timetable to develop thresholds and actions in relation to dustfall,
- snow and lichen sampling results;
- plans to manage road traffic to reduce fugitive dust including vehicle spacing, cameras for monitoring amount of dust (visibility), and triggers or thresholds when dust suppressant must be re-applied;

- monitoring and sampling sites to capture dust, and sample snow and lichen on the northern and eastern shores of Lac du Sauvage and along the esker system, and other appropriate sites considering prevailing winds, habitat sensitivity and similar factors; and
- explicit quality assurance and quality control protocols to ensure data reliability and properly functioning equipment

2.12.2 Response to Measure 14

The suggestions made by IEMA were first articulated in an engagement workshop on the AQEMMP in Yellowknife on July 20, 2015, and will be considered in future versions of the document. As described in the Dominion Diamond's July 24, 2015 letter posted to the MVEIRB public registry regarding the Draft Engagement Program for Amendments to the Ekati Mine Wildlife and Air Monitoring and Management Plans to Incorporate the Project, additional engagement on the AQEMMP will occur following the Environmental Assessment approval and prior to construction of the Project.

2.13 Overall Conclusion

2.13.1 Measure 15

DDEC and other parties to whom Measures and suggestions have been directed, shall report annually on progress made on the Measures, suggestions and commitments recorded in the Report of Environmental Assessment for the Jay Project. DDEC's annual reporting on Measures, suggestions and commitments is to be included in the Annual Report now submitted pursuant to the Environmental Agreement and water licence.

2.13.2 Response to Measure 15

The Ekati Mine Environmental Agreement is a contractual agreement between Dominion Diamond, the GNWT, and the Federal Government. As such, it is not subject to amendment by the MVEIRB as recommended above.

In addition to routine annual reporting, the Ekati Mine Environmental Agreement contains the requirement for a 3-year Environmental Impact Report (EIR), which is for the purpose of reporting on actual versus predicted environmental effects, mitigation measures and adaptive management, as follows:

VI REPORTING REQUIREMENTS

.2 Environmental Impact Report

(a) BHP shall prepare and submit to the Minister, the GNWT, the Monitoring Agency and the Aboriginal Peoples a comprehensive report (the "Environmental Impact Report") on April 30, 2000 and on each third April 30 thereafter until full and final reclamation of the Project site has been completed in accordance with the requirements of all Regulatory Instruments and the terms of this Agreement. Each Environmental Impact Report shall be accompanied by a plain English summary prepared by BHP and shall report on longer term effects of the Project and the results of environmental monitoring programs and the actual performance of the Project in comparison to the



results predicted in the Impact Statement and to evaluate how BHP's adaptive environmental management has performed to the date of such report.

The EIR is broadly reviewed by regulators and Aboriginal organizations and is required to be assessed by the Governments as 'satisfactory'. Dominion Diamond finds this established process to be rigorous, and thorough, and that the 3-year timeframe is appropriate for this intense level of project review (which is in addition to annual reporting). Dominion Diamond recommends that the MVEIRB rely on this established process as an effective means of ensuring an ongoing review of effects, mitigation measures, and adaptive management.



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