Appendix I

2016 EAAR Correspondence

SEP 2 1 2017

Mr. Gord MacDonald
Principal Advisor, Sustainable Development
Diavik Diamond Mines (2012) Inc.
300 5201 50TH STREET
YELLOWKNIFE NT X1A 2P8

Dear Mr. MacDonald:

Satisfactory Determination of the 2016 Diavik EA Annual Report

On June 23, 2017, Diavik Diamond Mines (2012) Inc. (Diavik) distributed copies of the 2016 Diavik Environmental Agreement Annual Report (Annual Report) directly to Parties of the Environmental Agreement, the Government of Nunavut (GN), and to the Environmental Monitoring Advisory Board (Advisory Board) per *Article 12.1(a)* of the Diavik Environmental Agreement (the Agreement).

An opportunity to review the Annual Report was provided to the Advisory Board, the Department of Fisheries and Oceans Canada (DFO), Environment and Climate Change Canada (ECCC), Indigenous and Northern Affairs Canada (INAC), the GN and the Aboriginal Peoples as required under Article 12(e) of the Agreement. The Advisory Board provided written comments which are attached for your consideration. No comments were received from DFO, ECCC, INAC, GN, or the Aboriginal Peoples.

The Government of the Northwest Territories (GNWT) has reviewed the Annual Report and the comments submitted by the Advisory Board. The GNWT has also provided written comments on the Annual Report, which are attached. The GNWT acknowledges Diavik's efforts to incorporate the recommendations from last year's Annual Report and the recommendations on the draft report made by the Advisory Board and the Department of Environment and Natural Resources (ENR).

The GNWT is satisfied the contents of the Annual Report are in accordance with *Article 12.1* and finds the 2016 Annual Report to be satisfactory. However, there are some outstanding issues in the attached comments that the GNWT requests Diavik address, either by addendum or an updated Annual Report, within 45 days.

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The GNWT looks forward to working with Diavik and the Advisory Board on the 2017 Annual Report. If you have any questions about this process please contact Ms. Kate Witherly, Manager of Environmental Impact Assessment, at (867) 767-9233 extension 53095 or kate_witherly@gov.nt.ca.

Sincerely,

Dr. Joe Dragon
Deputy Minister
Environment and Natural Resources

Attachments

c. Grand Chief George Mackenzie, Tłı̨cho Government
Chief Darryl Boucher-Marlowe, Lutsel K'e Dene First Nation
Chief Edward Sangris (Dettah), Yellowknives Dene First Nation
Chief Ernest Betsina (N'dilo), Yellowknives Dene First Nation
Mr. William (Bill) Enge, President, North Slave Métis Alliance
Mr. Stanley Anablak, President, Kitikmeot Inuit Association
Ms. Tyanna Steinward, Lands Protection Manager, Tłı̨cho Government
Ms. Ray Griffith, Manager, Wildlife Lands and Environment, Lutsel K'e Dene First Nation
Mr. Alex Power, Regulatory and Research Specialist, Yellowknives Dene First Nation
Mr. Shin Shiga, Regulatory Analyst, North Slave Métis Alliance
Mr. Geoff Clark, Director, Lands, Environment and Resources, Kitikmeot Inuit Association
Mr. Napoleon Mackenzie, Chair, Environmental Monitoring Advisory Board
Mr. John McCullum, Executive Director, Environmental Monitoring Advisory Board
Mr. Mohan Denetto, Regional Director General, INAC
Ms. Colleen English, Superintendent, Sustainable Development, Communities & External Relations, DDMI
Ms. Georgina Williston, Head, Environmental Assessment North, ECCC
Ms. Sally Wong, Fisheries Protection Biologist, DFO
Mr. Marty Sanderson, Manager, Diamonds Resource Management, GNWT- Lands
Mr. Steve Pinksen, Assistant Deputy Minister, Department of Environment, Government of Nunavut

Government of the Northwest Territories' Review of the Diavik Diamond Mines (2012) Inc. 2016 Environmental Agreement Annual Report

The Government of the Northwest Territories (GNWT) has reviewed the 2016 Environmental Agreement Annual Report (Report) and provides the following comments and recommendations to Diavik Diamond Mines (2012) Inc (DDMI).

Topic 1: Compliance (12.1(c)(iv)) - NCRP Waste Rock Placement

Comment:

Section 6 of the Report describes how in 2015 the GNWT Lands Inspector noted deviations of rock placement in the North Country Rock Pile (NCRP) and raised concerns related to storage of Type III rock in the Clean Rock storage area (CLR), Northwest storage area (NWR), and Sedimentation Pond storage area (SED) basins of the NCRP. The Report does not include any details regarding when the deviations in rock placement began or the exact locations and corresponding amounts of Type III waste rock that was placed in each basin of the NCRP. Further, the Report does not specify that placing this material in these areas was against the approved Waste Rock Management Plan (v.6-0) and the Water Licence (W2015L2-0001), nor that this placement will need to be considered in regards to closure and reclamation.

In the Final Closure and Reclamation Plan – Waste Rock Storage Area – NCRP - V1.1 (NCRP-C&R Plan), the NWR basin is split into two separate areas (NWR-east and NWR-west). In that plan, a cover will be placed on the NWR-east area as it contains Type II waste rock, however NWR-west will not have a cover post-closure since it only contains Type I waste rock. In the Report, it is unclear if the deviations of rock placement in the NCRP, particularly in the NWR basin have implications on the NCRP-C&R Plan.

Recommendation:

The GNWT requests that DDMI provide more detailed information about deviations of rock placement in the NCRP as part of the EA report, specifically:

- when the deviations may have begun and, the locations and quantities of Type III waste rock that deviated from the Waste Rock Management Plan
- what steps DDMI has undertaken to address these events and prevent them from occurring in the future; and
- any implications the deviations of rock placement may have on final closure and reclamation planning and closure cost estimates, specifically considering the NWR-west and NWR-east areas of the NCRP.

Government of the Northwest Territories' Review of the Diavik Diamond Mines (2012) Inc. 2016 Environmental Agreement Annual Report

Topic 2: Environmental Monitoring Programs (12.1(c)(i)) - Total Suspended Particulate (TSP) Monitoring

Comment:

The Report states that the TSP monitoring station on the A154 dike was nonfunctional for 10 months of the year. For the remaining two months the data collected was not valid and therefore not included in the reporting for 2016.

Recommendation:

The two TSP monitoring stations are part of the overall Air Quality Monitoring Program. It is important that monitoring occur in order to validate the predictions made by Diavik. It is expected that monitoring equipment has periods where it is inoperative, but in this case 100% of the data was lost. The GNWT requests that Diavik to provide information in the EA report about the reasons for the loss of data and how the situation was rectified.

WORKING WITH THE PEOPLE FOR THE ENVIRONMENT

August 22, 2017

Monica Wendt
Environment and Natural Resources
Government of the Northwest Territories
P.O. Box 1320
Yellowknife, NT X1A 2L9

Re: Comments on Diavik's final version of the 2016 Environmental Agreement Annual Report

Dear Monica,

The Environmental Monitoring Advisory Board (EMAB) provided comments and recommendations to Diavik Diamond Mines Inc. (2012) on their draft 2016 Environmental Agreement Annual Report (EAAR) in June 2017. EMAB has since had the opportunity to review how our input was incorporated into the final 2016 EAAR.

EMAB is satisfied with the 2016 EAAR and pleased that Diavik incorporated some of our comments and recommendations. However, EMAB would like to highlight the following comments and recommendations that remain outstanding.

A full summary of public concerns and responses to public concerns
EMAB recognizes Diavik's list of community engagement meetings related to the North Country Rock Pile (NCRP) Final Closure Plan for the year. However, the results of these engagements and Diavik's responses to communities, as well as changes that were made to the NCRP Final Closure Plan in response to engagement should be fully described in the Community Engagement and Traditional Knowledge section of the 2016 EAAR.

EMAB submitted numerous letters to Diavik throughout the year with recommendations for improving quality of their Environmental Monitoring Programs. The contents of these letters, as well as Diavik's responses should also be described in the 2016 EAAR, as well as correspondence from other organizations throughout the year.

Additional comments:
Plain language aspect could improve for the whole Report
EMAB appreciates the timely submission of the Draft 2016 EAAR to allow for translation.

We trust these comments are useful and encourage you to give them full consideration. If you require further information, please contact John McCullum at the EMAB office.

Sincerely,

N. Mackenzie

Napoleon Mackenzie
Chair

Cc EMAB members (by email)
Parties to the Environmental Agreement (by email)

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F 1-866-313-2754

Dr. Joe Dragon, Deputy Minister
Environment and Natural Resources
Government of the Northwest Territories
PO Box 1320
Yellowknife, NT X1A 2L9
Canada

13 November 2017

Dear Dr. Dragon:

Subject: DDMI Response to the GNWTs Satisfactory Determination of the 2016 Diavik EA Annual Report

Please find attached Diavik Diamond Mines (2012) Inc. (DDMI) response to the outstanding issues identified in your letter of 21 September 2017 which determined that DDMI's 2016 Environmental Agreement Annual Report was satisfactory and that the contents were accordance with Article 12.1 of the Environmental Agreement.

As a part of this letter, the GNWT requested that DDMI address the outstanding issues identified in comments from the GNWT and the Environmental Monitoring Advisory Board either by addendum or an updated Annual Report. The 2016 Environmental Agreement Annual Report Addendum is provided herein for your review.

Please do not hesitate to contact the undersigned if you have any questions.

Yours sincerely,

Gord Macdonald
Principal Advisor, Sustainable Development

cc: Distribution List

Attach: 2016 Environmental Agreement Annual Report Addendum

RioTinto

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Diavik Diamond Mines (2012) Inc. 2016 Environmental Agreement Annual Report Addendum

Table 1: Review Comments and DDMI Response

Reviewer	Topic	Comment	Recommendation	DDMI Response
GNWT	North Country Rock Pile (NCRP) Waste Rock Placement	Deviations of waste rock placement relating to Type III rock in the CLR, NWR and SED storage basins of the NCRP	Provide more detailed information about deviations of rock placement in the NCRP as part of the report, specifically: 1) when the deviations may have begun and the locations and quantities of Type III waste rock that deviated from the Waste Rock Management Plan (WRMP)	1) A delay in A21 mine development and material needs for the A418 dike, along with a change in the segregation criteria for rock types, resulted in changes to rock placement starting around 2005. Refer to Figure 1 for details on the location and extent of the storage basins. In general, the following changes were made: Till – none QUAR – none, designed for Type III rock CLR – temporary storage of Type III rock (on top of Type I rock, to be used for underground backfill) SED – placement of Type III rock (originally designed for Type II rock) CLAR – none NWR – placement of Type I rock (originally designed for Type II rock) Type III rock can result in poor quality seepage water and Type I rock is considered clean; the former Type II rock also had the potential to create poor quality seepage. Where Type III material was added, it was planned for places where seepage water would go to the same place as that from other Type III areas.

Reviewer	Topic	Comment	Recommendation	DDMI Response
			2) what steps DDMI has undertaken to address these events and prevent them from occurring in the future;	2) Diavik has provided updated information to the Inspector and WLWB. This included an assessment of any water quality risks, an updated storage design and an updated WRMP (V7.1). Diavik's current Water License now requires that proposed changes to Management Plans occur a minimum of 90 days in advance of implementing any such change (Part H Item 12a).
			3) any implications the deviations of rock placement may have on final closure and reclamation planning and closure cost estimates, specifically considering the east and west NWR areas of the NCRP.	Changes to rock placement within the NCRP have been captured within the NCRP Final Closure Plan V1.1 that is currently under review by the WLWB. The WRMP V7.1 also states that DDMI will not use the Type I material in the CLR basin for construction or closure, unless it has been specifically tested to confirm suitability.

Reviewer	Topic	Comment	Recommendation	DDMI Response
GNWT	Dust (Total Suspended Particulate, TSP) Monitoring	TSP monitoring station on the A154 dike was nonfunctional for 10 mos of the year, and the remaining 2 mos of data collected was not valid or included in the report.	The two TSP monitoring stations are part of the overall Air Quality Monitoring Program. It is important that monitoring occur in order to validate the predictions made by Diavik. It is expected that monitoring equipment has periods where it is inoperative, but in this case 100% of the data was lost. The GNWT requests that Diavik provide information in the EA report about the reasons for the loss of data and how the situation was rectified.	In February 2016, DDMI requested ERM visit site to conduct maintenance and troubleshoot some issues (alarms, data variance) with the TSP sampler. It was determined that the TSP sampler located near the A154 dike was in need of offsite repairs and it was sent to the vendor (CD Nova). DDMI received the repaired A154 dike sampler at the beginning of July 2016. After a period of 2 months of sampling, it was determined there were continued operational issues with the sampler and it was returned to CD Nova for repair. The A154 dike sampler was offsite for repair for the remainder of the year. No data from the A154 dike sampler were presented in the report as little to no data was valid for the short period it was operational. DDMI has since had the vendor train DDMI staff on maintenance and calibration of the samplers in the hopes of reducing the need for external assistance and lengthy offsite repairs in the future. DDMI is currently conducting a review of the Environmental Air Quality Monitoring Program which will be completed in early 2018.

Reviewer	Topic	Comment	Recommendation	DDMI Response
EMAB	Public Concerns	NCRP Final Closure Plan	The results of engagements and DDMI's responses to communities, as well as any changes that were made to the NCRP Final Closure Plan in response to engagement should be fully described in the Community Engagement and Traditional Knowledge section of the 2016 EAAR.	It is DDMI's opinion that this was included within the EAAR. Paragraph 2 of Section 5 notes that "In general, many of *the community's comments relating to environmental considerations for closing the pile echoed those of TK Panel participants* and included things such as safe caribou access and pathways, re-vegetation plans and protecting the water and fish. These are described in the next section of this report." Pages 76 to 81 describe the recommendations and identify how DDMI addressed these within the NCRP Final Closure Plan.

Reviewer	Topic	Comment	Recommendation	DDMI Response
EMAB	Public Concerns	EMAB recommendations	The content of EMAB's letters, as well as Diavik's responses should be described in the 2016 EAAR, as well as correspondence from other organizations throughout the year.	EMAB provided recommendations for improving the quality of some of DDMI's Environmental Monitoring Programs during 2016. Outside of those comments shared through the WLWB public review process, EMAB also shared the following: 1) 2014-15 Air Quality Monitoring Program (EAQMP): Program objectives, calibration/ data quality issues with TSP monitors, location of samplers, dustfall sampling frequency, provision of SOPs and QA/QC practices. DDMI responded to each of these recommendations. 2) 2015 Wildlife Monitoring Program (WMP): EMAB involvement in changes to the WMP, identification of community members that participate in programs, continued work with the GNWT Technical Task Group on caribou, continued monitoring of waste and other possible attractants as well as wildlife tracks and incidental observations. DDMI responded to each of these recommendations. DDMI suggests that copies of EMAB's recommendations for the Air Quality and Wildlife monitoring programs, including DDMI's response, be included as an appendix in future EAARs.

Reviewer	Topic	Comment	Recommendation	DDMI Response
EMAB	Report comprehension	Plain language aspect of report requires improvement	Plain language aspect could improve for the whole report	This comment was also mentioned by EMAB for the 2015 EAAR and DDMI attempted to address this in the 2016 EAAR. If there are additional concerns relating to the plain language aspect of this report, it would be helpful if EMAB could identify these items during their review of the draft reports.

Appendix II

Summary of Adaptive Management & Mitigation Measures

Table I-A Adaptive Management & Mitigation

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Waste	- Minimize waste management issues. - Maintained dump site for inert waste materials. - Waste rock is managed to reduce the chance of acid runoff.	- All domestic and office wastes are incinerated at the waste transfer area. - Use of clear plastic bags in all areas for domestic and office space waste. - New WTA facility incorporated access road around the facility to allow equipment access and snow removal during winter to reduce opportunities for animals to climb over the fence; fencing angled and extended further in to ground to prevent access to burrowing animals; extensions placed on gate & gate automated in an effort to prevent animal access; improved sump facilities for contaminated soil containment area. - New incinerator housed in a building to further prevent animal attraction & rewards. - New, more efficient incinerator that burns more cleanly & completely. - Inert solid waste facility (landfill) access restricted. - A new landfill was approved within the WRSA-NCRP. - Storage procedure for empty waste bins to minimize wildlife incidents - Liner repairs conducted in areas where seepage from the dam was	- All employees and contractors are provided orientation on proper waste management. Color-coded collection bins and posters for non-food waste around site. - DDMI Environment Staff conduct regular toolbox meeting discussions regarding waste management. - Regular waste inspections are conducted by Environment Staff at the Waste Transfer Area and Landfill. A site-wide compliance inspection is completed weekly. - Site Services implemented clear plastic bags in all domestic and office areas to allow staff to verify contents prior to disposal. - Surface Operations staff collecting waste bins inspect bins prior to pick-up and notify Environment department to arrange for sorting. - Gate installed at inert solid waste facility to limit access to dump area. - Waste rock is classified according to sulphur level and is tested and sorted prior to disposal; Underground waste rock is all classified as Type III. - The waste rock pile is designed to encapsulate the rock with the highest sulphur content, and the PKC contains	- During Inspector's visits in 2017, no concerns were raised regarding food waste, or the landfill. - Bear visits on East Island remained similar to past & bears sightings were not associated with waste management areas. - Improper disposal of waste is identified during DDMI waste inspections (including food waste) despite training and awareness sessions with site staff, but it is minimal when compared to the volume of waste disposed. - There were no wildlife deaths in 2017. - Some compliance issues identified with rock management practices in 2017 - incorrect placement of Type III rock. - Installation of seepage interception wells at the PKC have proven effective. - Seepage and runoff events have occurred in the past, but there were no such events in 2017. - Significant efforts undertaken to identify, inventory, remove, re-use or dispose of site infrastructure as a means of progressive reclamation.

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
		found. - More instrumentation was added in some areas to monitor dam and rock pile temperatures and movement. - Seepage monitoring stations changed in response to observations over the years. - Re-vegetation research is testing the use of waste rock as a substrate for plant growth.	the waste kimerlite rock; each of these areas are surrounded by collection ponds to capture seepage or runoff. - Seepage interception wells have been added to PKC Dams to prevent seepage through the dam. - Granite (lowest sulphur content) is the rock permitted for use as a construction material at the mine site. - Instruments were installed to monitor performance of structures such as the PKC dam and the rock pile. - Extensive lab and field (test piles) experiments are done to test how the rock pile will perform. - Sewage sludge holding cell relocated to prevent human health concerns. - Installation of a waste oil heater for the batch plant. - New approach to waste management plans includes Solid Waste & Landfill, Hydrocarbon Contaminated Materials, Incinerator Management and Dust plans. - Storage and testing procedures developed and implemented for ash. - Investigation into rock management process that resulted in incorrect placement of Type III rock; areas where Type III rock was placed are being identified, recorded and tested as required. Any possible changes to remediation plans will be evaluated once the investigation is complete.	- Progressive reclamation opportunity for WRSA-NCRP identified and under review with WLWB during 2017. - Development of the WRSA-SCRP began in late 2017 with pre-stripping of the A21 open pit.

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Water	- Effluent is treated before being discharged to Lac de Gras, or is recycled. - Ammonia levels within water license limits. - Prevent seepage water entering Lac de Gras. - Decrease freshwater use. - Have fish and water quality that are safe for use.	- Review loading and blasting procedures and materials for opportunities to reduce ammonia levels in pit and underground water. - Re-use North Inlet water as supply water to facilities at the mine site. - Treatment plant expanded and some components re-designed to accommodate additional water flow from underground. - Evaluated the use of treated effluent for dust suppression. - Conducted a study with the University of Alberta to evaluate the biological removal of ammonia and other nitrogen compounds in the North Inlet. - Special Effects Studies (SES) are completed when unexpected effects are measured during the AEMP. - Established Action Levels to respond to findings of various parameters of the AEMP. - Evaluate seepage prevention or interception methods upstream or downstream of areas of concern. - Investigate, assess and repair site infrastructure where seepage issues arise, and where possible. - Improve turbidity curtain anchors in response to elevated TSS levels due to deep water trench and site-specific exposure issues.	- The North inlet provides retention time for mine water before treatment, allowing for ammonia reduction by natural attenuation; mine water discharge located far away from treatment plant intake. - Influent and effluent in the NIWTP is monitored consistently via instream sensors (immediate feedback) and the SNP for parameters that are indicators of water treatment effectiveness. - Daily sampling of pit, underground & effluent water to produce trends & track compliance. - Plant able to automatically stop discharging treated water that meets or exceeds DDMI's *internal* limits (which are set below the water license limits). - Sulphuric acid is available for secondary treatment of water with high ammonia levels. - Ammonia Management Plan followed to minimize ammonia loss. - Batch and paste plants utilize treated effluent as a water source instead of fresh water. - Sumps and pumps installed underground to collect and transport water to the North Inlet. - Ability to re-use water from the North Inlet and PKC, prior to	- Ammonia levels in 2017 were well below the license limit of 12 mg/L. - Ammonia levels in mine water and effluent have remained low over time. - Parameters regulated in the Water License in NIWTP effluent remain well below discharge criteria. - No seepage events occurred in 2017. - Over 700 toxicity tests have been done on treated effluent since 2002 and most have been non-toxic. - Traditional Knowledge study of fish and water health completed in 2015; fish and water quality were found to be good. - Action Level response plans for AEMP results are being identified and implemented. - PK trail began in 2016 to reduce amount of water in fine PK and increase coarse PK. Trial has been successful. - TSS exceedance during A21 construction; management actions in response to exceedance effective for remainder of construction season.

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
		- Retrofit Process Plant to change the waste stream ratio; reduce fine PK and increase coarse PK. - Preventative work-stop measures and a TARP were established for A21 construction to reduce potential for TSS exceedances. - Request to clarify License requirement for water against the PKC dams submitted to WLWB.	treatment, to reduce freshwater intake volumes. - Frequent visual inspections of areas downstream of dams, dikes & ponds. - Seepage intercepted with the use of wells and pumps installed in PKC dams. - Repairs to damaged infrastructure to prevent seepage. - Source water (North Inlet, Collection Ponds, PKC) chemistry around site are monitored as part of the SNP. - SES to determine mercury concentration/availability in fish and sediments within Lac de Gras. - Evaluation of hydrocarbon levels in North Inlet. - Separation of water collection systems underground to capture clean groundwater and divert it to the North Inlet prior to it coming in contact with mine infrastructure/ water. - Use of absorbent berms or skimmers to remove oil from water in underground sumps. - Sediment collection sumps installed underground to separate dirt from the mine waste water. - Turbidity curtain and anchors for A21 dike construction redesigned and reinforced.	

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Wildlife	- Minimize wildlife-related compliance issues.	- Wildlife monitoring programs are adjusted based on results of previous years of studies. - Review of wildlife monitoring programs has been done with all 3 mines, Monitoring agencies, government and communities. - Study area expanded for caribou based on potentially larger mine zone of influence than predicted. - Participation in a regional wolverine DNA study with BHP-Billiton and GNWT to gain further insight on the wolverine population in the Lac de Gras region and around the mine. - Monitoring methods for grizzly bear changed to consider a more regional objective, while being safer for field crews. - Pit wall & infrastructure surveys for raptors that may nest in the pit or on other structures was added to the raptor monitoring program. - Raptor surveys changed to align with the North American Peregrine Falcon Survey. - Nests relocated or work activity ceased in response to wildlife presence. - Bird mortality monitoring conducted after installation of wind turbines. - Building installed to contain new incinerator and prevent wildlife	- Orientation and environmental awareness training related to wildlife on site is provided to all employees. - Employees notify Environment department of any wildlife sightings; these are then recorded. - Caribou advisory board & site-wide radio notifications for caribou presence on island. - Waste inspections conducted regularly. - Waste management system in place. - Caribou are herded away from high-risk areas, such as the airstrip, as required. - Bears are deterred from the mine site, as required. - Problem wildlife is relocated or destroyed, in consultation with the GNWT. - Wildlife reporting system is in place site-wide, for wildlife observations. - Wildlife have the 'right-of-way' on site. - No hunting or fishing is permitted by employees. - Buildings are skirted and higher-risk areas are fenced or bermed in an effort to deter animal access. - Surveys have been completed to look for caribou on roads, the rockpile and PKC when caribou are getting close to the mine.	- Mine-related wildlife incidents and mortalities have remained low over the years. - No caribou herding events occurred during 2017. - There were no wildlife deaths from mining in 2017.

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
		attraction. - New Waste Transfer Area designed to minimize opportunities for scavengers to enter the area and access attractants/rewards. - Storage procedure for empty waste bins to minimize wildlife incidents. - Inclusion of community members in wildlife monitoring programs to allow consideration of both TK and science when evaluating impacts. - Recommended reduction in PVP and lichen monitoring frequency based on results and slow growth of species in sub-arctic conditions.	- Wind turbines equipped with flashing beacons designed to reduce wildlife impacts. - Mine-altered pond water levels are kept low to discourage use by waterfowl. - Re-vegetation research has been on-going for 10 years and will help to determine habitat available for wildlife after closure. - TK Panel focuses on wildlife concerns when considering closure planning options and monitoring programs. - Ground-based caribou surveys initiated when caribou are seen on site or collar maps show them approaching. - Revised storage procedure for empty waste bins on site.	

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Dust	- Isolated higher deposition levels due to construction activities (dust deposition is expected to decrease as construction activities at Diavik decrease and the mine switches from open pit to underground operations).	- Evaluate dust control measures used to minimize dust released from construction and operations. - Evaluate the use of treated mine effluent for dust suppression, which would reduce fresh water use from Lac de Gras. - Evaluate dust suppressants that can be used in key areas to reduce dust levels. - Assess vegetation and dust sample locations to provide better coverage of the area for improved data collection. - Recalculate dust emission predictions to consider underground mining methods and construction activities. - Use of BC Objectives for Dustfall at mining operations as a comparison for DDMI levels. - Additional snow core sample stations added to program. - Additional dustfall monitoring stations added to program.	- Dust suppression on roads and mine areas using water during non-freezing periods. - New crusher commissioned in 2009 is contained inside a building and has an advanced dust control and collection system. - Dust suppressant used on the apron, taxiway, airport parking lot and helipad (approved by both the Lands Inspector and Transport Canada). - Trial use of dust suppressant on parking pads and some site roads. - Addition of vegetation monitoring stations to improve ability to detect potential changes to plant cover or composition. - Modified lichen monitoring program to obtain more samples from further distances & link metal levels to caribou exposure. - Use of blast mats to control dust in smaller-scale blasts. - Transition to a completely underground mine has reduced dust levels from previous years. - Obtained far-far-field (100 km away) lichen samples in 2016 to determine differences from far-field (40 km) results, in response to community concerns; little difference observed.	- Control of dust from crusher, small blast areas and roads. - Dust suppressant continued to be used on the airport's taxiway, apron, parking lot and helipad in 2017. - The transition from open pit to underground mining reduced dust levels from blasting. - A21 dike construction resulted in higher dust levels during 2017, but they were down from 2016. - Dust levels are below the BC Objectives for mining operations. - TSP levels in 2017 were below the GNWT 24-hr Ambient Air Quality Guideline within the vicinity of the mine site, except for 1 reading.

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Air Quality	- Measure consumption of applicable sources of GHGs - primarily diesel combustion. - Meet Internal GHG Reduction Targets. - Report GHG Emissions to regulatory agencies and within Rio Tinto.	- Evaluate new technologies and equipment that may allow for pollution controls/reduced emissions. - Wind power generation research. - Determine energy draws, optimal use and options to reduce power requirements for buildings on site. - Various fuel consumption reduction initiatives, e.g. no idling. - Review of air quality monitoring program and equipment requirements. - Added monitoring of TSP in 2013 with 2 on-site stations. - Conducted energy audits on site buildings in 2014. - Determine optimal operating temperatures for the underground mine. - Evaluate energy efficient equipment options. - Evaluate and optimize transportation schedules and volumes to/from site.	- Use of low sulphur diesel. - Archaeological assessment for areas where wind turbines could be installed. - Installation of Delta V fuel consumption monitoring system for all key power consuming buildings on site. - Boiler optimization program. - Installation of 4 wind turbines, integrated into the power distribution system, to reduce fuel consumption. - New waste incinerator (with pollution prevention device). - "Waste" heat from powerhouse generators used to heat facilties connected to powerhouse (camps, maintenance shops, etc.). - Underground air quality monitoring conducted. - Improving efficiencies of plant operations to reduce power draw. - 2 TSP monitors installed at the mine site. - Installation of waste oil heaters on site. - Adjust (lower) underground mine operating temperature by 1°C. - Install energy efficient motors on underground haul truck fleet. - Optimize the glycol heat recovery system in Powerhouse 2 to reduce boiler use. - Waste Management Plan revisions to test incinerator ash and stack tests procedures.	- DDMI reports GHG emissions annually to appropriate regulators and internally to Rio Tinto. - The wind turbines offset fuel consumption by 3.9 million litres in 2017. Wind power provided 9.2% of the mine's power needs in 2017.

Appendix III

Traditional Knowledge Panel
Session 10 Report

DDMI Traditional Knowledge Panel Session #10

WATCHING / MONITORING AN D THE WASTE ROCK STORAGE AREA -SOUTH COUNTRY ROCK PILE

Diavik Diamond Mine, NT
September 14-18, 2017

Thorpe Consulting Services

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Diavik Diamond Mines (2012) Inc.
Traditional Knowledge Panel Report

Session #10: *Focus on Watching/Monitoring and the Waste Rock Storage Area - South Country Rock Pile*

Diavik Diamond Mine, NT
September 14-18, 2017

Facilitation

Joanne Barnaby, Joanne Barnaby Consulting
Natasha Thorpe, Thorpe Consulting Services (TCS)

Participants

Kitikmeot Inuit Association	Bobby Algona, Nancy Kadlun, Tyler Akeeagok (youth)
Łutsel K'e Dene First Nation	August Enzoe, Celine Marlowe, Roger Catholique (youth)
North Slave Métis Alliance	Kathy Arden, Wayne Langenhan
Tłı̨chǫ Government	Dora Migwi, Louie Zoe, Janelle Nitsiza (youth), Peter Huskey (interpreter)
Yellowknives Dene First Nation	Rose Betsina, Modeste Sangris, Theresa Lynn (youth), Berna Martin (interpreter)

Observers/Presenters/Visitors

Environmental Monitoring Advisory Board	Allison Rodvang (observer, 18 Sept)
Tłı̨chǫ Government Lands Department	Joline Huskey (observer)
Diavik Diamond Mines Inc.	Gord Macdonald
C&E Consulting	Colleen English
Thorpe Consulting Services	Janet Murray (transcriber)

Interpreting equipment provided by Pido Productions.

Background

The TK Panel is mandated to assist Diavik Diamond Mines (2012) Inc. (Diavik) and work with local communities in facilitating appropriate and meaningful accommodation of Traditional Knowledge (TK). The TK Panel provides guidance in environmental management and monitoring as well as in closure planning at the Diavik Diamond Mine. From 2011 through early 2013, TK Panels were assembled by the Environmental Monitoring Advisory Board (EMAB) to discuss select concerns related to the Diavik Diamond Mine. The most recent session was held at the Diavik Diamond Mine (Figure 1) from September 14-18, 2017 and was the sixth in a series of TK Panel sessions now administered under Diavik rather than EMAB. With this session, the TK Panel celebrated their tenth gathering held to date.

Session Purpose

Aboriginal peoples have long practiced "watching" as guardians of their lands, water, wildlife and more, routinely noting changes or significant events as signals of overall environmental health and wellness. These skills continue to be practiced today: informally within communities and out on the land, as well as formally through community-based monitoring programs.

The TK Panel Session #10 was intended to vision watching programs at Diavik for closure and post-closure, to satisfy closure plan requirements and to respond to recommendations made by TK Panel members to further explore and develop these programs. However, while some time was dedicated to this topic, participants wanted more opportunity to discuss details and make recommendations related to the Waste Rock Storage Area - South Country Rock Pile (WRSA-SCRP). Thus, the facilitators proposed that the purpose of the session was revised with this focus. Diavik staff as well as participants agreed with this change, with the understanding that a future session would focus on watching.

A presentation highlighting northern community-based monitoring programs as well as some examples from elsewhere in Canada (e.g. including *Eyes and Ears on the Land and Sea*, a documentary of the Haida Watchman Program in Haida Gwaii) provided background for discussion. Examples of programs led by other northerners were particularly relevant. However, with the shift in focus of the session, this presentation served to stimulate preliminary discussions and to inspire thinking for future planning.

The TK Panel drew upon previous sessions related to the Waste Rock Storage Area - North Country Rock Pile (WRSA-NCRP), observations made during previous site visits, and presentations on revisions to the site-wide Closure and Reclamation Plan (CRP V4) and plans for development of the WRSA-SCRP to enable discussion about the proposed structure (e.g. location, shape, content, slope) and plans for the WRSA-SCRP.

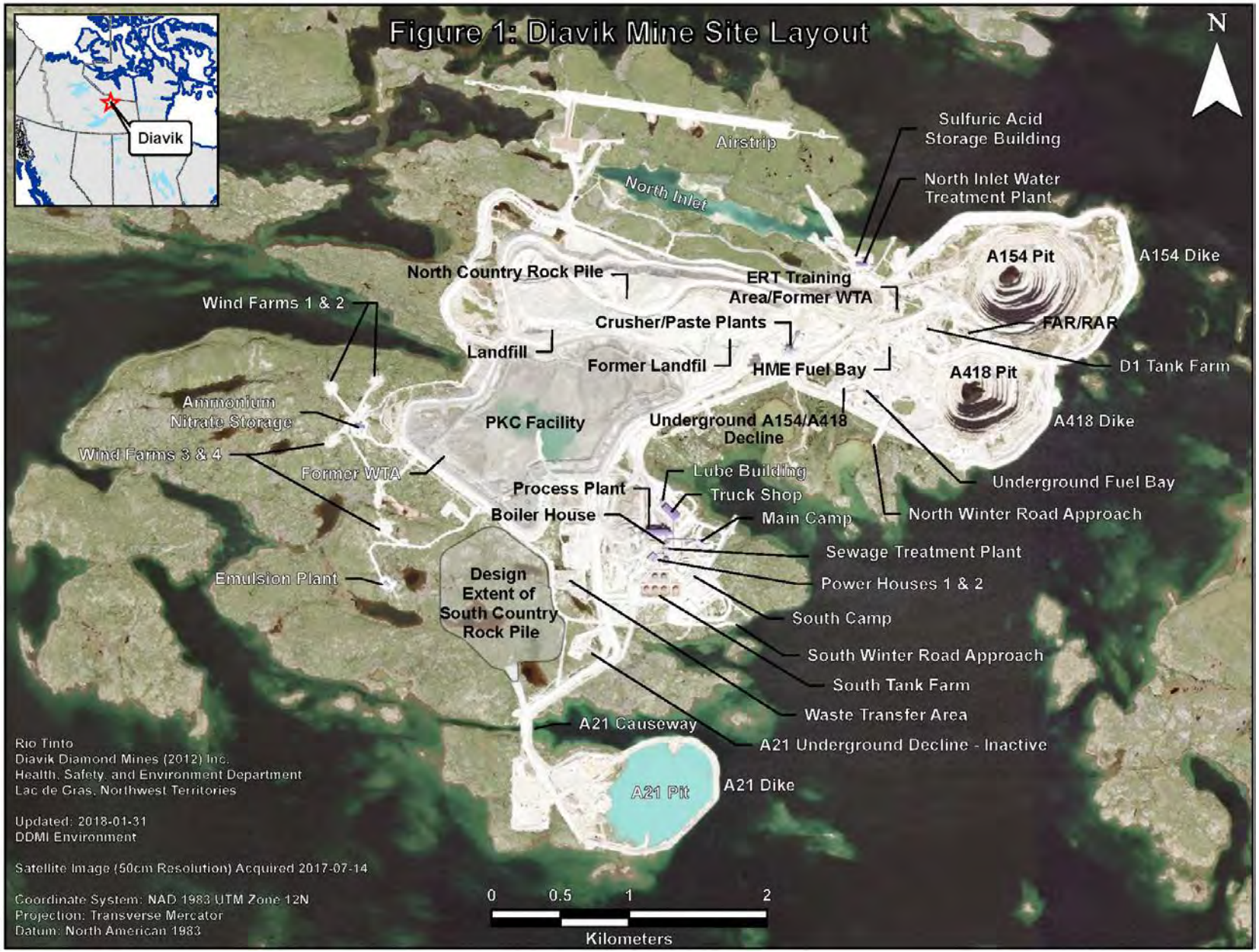


Figure 1: Diavik Mine Site Layout
N
Diavik
Airstrip
North Inlet
Sulfuric Acid Storage Building
North Inlet Water Treatment Plant
A154 Pit
A154 Dike
North Country Rock Pile
ERT Training Area/Former WTA
Wind Farms 1 & 2
Crusher/Paste Plants
FAR/RAR
Landfill
Former Landfil
HME Fuel Bay
D1 Tank Farm
A418 Pit
Ammonium Nitrate Storage
PKC Facility
Underground A154/A418 Decline
A418 Dike
Wind Farms 3 & 4
Former WTA
Lube Building
Underground Fuel Bay
Process Plant
Truck Shop
Boiler House
Main Camp
North Winter Road Approach
Sewage Treatment Plant
Emulsion Plant
Design Extent of South Country Rock Pile
Power Houses 1 & 2
South Camp
South Winter Road Approach
South Tank Farm
Waste Transfer Area
A21 Causeway
A21 Underground Decline - Inactive
A21 Pit
A21 Dike
Rio Tinto
Diavik Diamond Mines (2012) Inc.
Health, Safety, and Environment Department
Lac de Gras, Northwest Territories
Updated: 2018-01-31
DDMI Environment
Satellite Image (50cm Resolution) Acquired 2017-07-14
Coordinate System: NAD 1983 UTM Zone 12N
Projection: Transverse Mercator
Datum: North American 1983
0
0.5
1
2
Kilometers

Finally, the TK Panel reviewed responses from Diavik to the recommendations presented at the TK Panel Session #9 Focus on Caribou and developed new recommendations for review and consideration by Diavik, including suggestions for future TK Panel sessions. The format that is followed is similar to that of previous sessions and provides strong consistency, feedback, and communications between the TK Panel members and staff from Diavik.

This tenth anniversary session was marked by an in-person visit from Patrick Boitumelo, newly appointed President and Chief Operating Officer for Diavik. He welcomed the TK Panel and took the opportunity to hear their thoughts related to both the TK Panel and mine.

Session Goals and Activities

The TK Panel reviews closure plans for various areas of the mine, shares their knowledge in relation to each topic and presents recommendations to Diavik. In this way, they are continually increasing their understanding of the mine site and its closure challenges, while also directly influencing Diavik's closure plans. The goals for Session #10 were to:

- Provide an opportunity for input on progressive reclamation opportunities and progress for the WRSA-NCRP
- Provide input to the design and plan for the proposed WRSA-SCRP
- Review examples of other monitoring/watching programs in order to put forth ideas around future watching programs at Diavik
- Provide guidance on ways to encourage safe movement of caribou and other wildlife on/around site and how best to monitor animals throughout closure
- Review and suggest future session topics for the TK Panel

The session format followed an established routine, modified according to participant feedback and developed over the previous nine sessions. At the session outset, the group reviews and approves the proposed format and agenda. An evaluation process held at the end of the session helps to improve future sessions.

Participants typically take a brief surface tour of the mine upon arrival to re-familiarize with the site and to have changes to the site highlighted by Diavik. A more focused field trip then takes place in the next few days around features discussed in the session or sites requested by the TK Panel. For this session, the tour took place on September 16 and included key stops to the following locations: top of the WRSA-NCRP and till pile, view of re-slope areas on WRSA-NCRP, test pile, proposed location of WRSA-SCRP, and viewings of A21.

Report Overview

This report first outlines key themes related to closure planning, WRSA-SCRP construction and monitoring / watching as discussed during the session and closes with recommendations made by the TK Panel.

Appendix A includes photos from the session and field trip. Appendix B contains the session agenda while Appendix C provides a blank copy of the informed consent form that was signed by participants or observers new to the TK Panel. Session notes were reviewed and verified by the speakers and included in Appendix D. Appendix E includes a backgrounder on community-based monitoring / watching programs and highlights recommendations related to monitoring / watching made by the TK Panel to-date while. Appendix F contains presentations given to the TK Panel by Diavik related to the CRP V4 and WRSA-SCRP.

The TK Panel gave their guidance and recommendations related to the WRSA-SCRP and monitoring / watching as shown in Appendix G. Diavik provided a presentation on their response to TK Panel Session #9 recommendations on caribou monitoring (Appendix H). A short presentation used for discussion on the next steps and session topics is included (Appendix I), followed by a summary of participant evaluations (Appendix J).

Starting in early 2018, A21 mining will commence and decisions need to be made as to what to do with the waste rock. Thus, input from members of the TK Panel was important.

Proceedings: Key Questions and Themes

The TK Panel was tasked with exploring guiding questions during this session. The original questions proposed by the facilitators as well as the general direction of the session were modified with input from the TK Panel over the course of the session. Key guiding questions included:

- Should there be a wildlife pathway on the WRSA-SCRP? If yes, where should a wildlife pathway be located at closure? Is it ok for the remaining surfaces of the WRSA-SCRP to be rough? Are there any water quality or flow concerns or questions? If WRSA-NCRP Closure is approved and the WRSA-SCRP pile becomes smaller, how should the shape of the pile change?
- At and after closure, what types of checking and watching should be done on/around site?
- What should a watching program look like? How? What? When? Where? Why? Who?

Throughout discussions to consider these questions, the following key themes emerged throughout the session:

1. Re-sloping and progressive reclamation of the WRSA-NCRP is supported
2. The WRSA-SCRP should generally follow those recommendations put forth by the TK Panel for the WRSA-NCRP, with efforts to make it as small and smooth as possible
3. A future session is required to further develop ideas around monitoring / watching

1. Closure Planning

After Diavik gave an overview of the updated site-wide Closure and Reclamation Plan (V4), the TK Panel revisited some of their recommendations from previous sessions.

Participants discussed proposed closure options for the existing infrastructure (e.g. building materials, windmills, etc. will be put into the landfill, pits/underground or hauled off-site) as well as equipment (e.g. equipment with hydrocarbons or other hazardous materials will be hauled off-site or cleaned for disposal). Concerns about hydrocarbons led the panelists to discuss the importance of covering lay-downs and other areas that would have been exposed.

There was a strong interest in having salvageable and useful materials donated to the communities. In particular, a trailer or some sort of structure would be helpful as a monitoring station for ongoing watching programs at closure and post-closure. Diavik confirmed that they will follow all regulations about what is allowed versus not allowed to enter the landfill so that hazardous materials do not escape into the environment. In summary, the TK Panel put forth the following guidance points:

- After viewing on September 16, 2017, the TK Panel is pleased with and supports the current 3:1 slope on all sides and areas for caribou ramps on the WRSA-NCRP
- Lessons learned from planning, constructing, closing and monitoring the WRSA-NCRP should be applied to the WRSA-SCRP

2. Slimes

The TK Panel re-visited the question of how to deal with the "slimes"[1] presently being stored in the PKC after DDMI asked: *What if we put the slimes in the bottom of the pit and into the underground tunnels so we could make the PKC a dry area at closure*? Diavik elaborated that if the slimes were to be pumped to A418, there would be large blocks called bulkheads built to minimize seepage of water or slimes between A418 and A154.

Some TK Panel members expressed concern about slimes being disposed in pits due to potential for their contact with fish and water. However, others thought this would be less of a concern given that the depth that the slimes would be placed would not necessarily be where fish were found. The slimes are not known to be toxic but it's toothpaste-like consistency can pose a problem for people or wildlife that might get stuck if they were to wander into the slimes. In general, panelists expressed an interest in covering the slimes if possible. Even if the decision is made to take the slimes from the present PKC and put them into the pit, the PKC area should be covered.

[1] There are approximately 5 million m^3 of slimes at present.

After much discussion, the TK Panel put forth the following guidance points:

- There is a concern if slimes were to be put into a pit that they may be released into the environment.
- As long as there are no chemical contamination or physical suspension issues (i.e. the slimes don't mix with the lake water), the TK Panel generally supports Diavik researching this alternative for disposal of the PK into the pits. The rationale for this guidance is that the TK Panel wants the WRSA-SCRP and disturbance footprint on the tundra to be as small as possible – move slimes out of the PKC and use WRSA-SCRP rock to cover the PKC area. It was hoped that this might help prevent wildlife access.

3. Waste Rock Storage Area - South Country Rock Pile

DDMI presented the proposed plans for the WRSA-SCRP for consideration by the TK Panel. The TK Panel suggested generally following the same recommendations put forth for the WRSA-NCRP. However, it was pointed out that since the WRSA-NCRP was already built by the time the TK Panel began their session, the TK Panel has the opportunity to provide input into planning and closure of the WRSA-SCRP before it is being constructed. This led the group to wanting to spend more time than originally envisioned to consider this important aspect of closure planning.

After a tour to view the WRSA-NCRP and proposed site for the WRSA-SCRP, the TK Panel continued a lengthy discussion about the shape, size and characteristics of both piles. Diavik presented schematics showing the size (i.e. volume) of waste rock (Appendix F). Diavik generally inquired whether the WRSA-SCRP should be 1) rocky with a wildlife pathway, 2) all rocky, or 3) all smooth for wildlife.

After returning from the site tour, the group divided into two groups to address questions with respect to the WRSA-SCRP:

- Should there be a wildlife path over the pile?
- If so, where should the wildlife pathway be located?
- Is it okay for the surface to be rough?
- Are there any water quality or flow concerns?
- Should the South Country Rock Pile be smaller than proposed? How?

Participants considered alternatives for the WRSA-SCRP such as adding more waste rock to the WRSA-NCRP, covering the PKC, adding rock to the airstrip or sides of the roads. They discussed at length the trade-offs between making the WRSA-SCRP higher or wider than proposed and how that might affect the undisturbed tundra, wildlife movements (e.g. caribou migrations) and visual effects. The group then deliberated on how waste rock from one pile

could be moved to another area, put in the pit or otherwise disposed. In concluding their discussions of alternative use for the waste rock from A21, the TK Panel put forth the formal recommendation to:

- Consider alternative uses for A21 material:
    - Cover the PKC area after removing slimes
    - Assuming the slimes are gone, slope the south face/wall between the WRSA-NCRP and the north end of the PKC to allow for caribou movement
    - Extend the west end of the WRSA-NCRP and slope it for caribou
    - Cover areas that may have been contaminated after clean-up like the hydro-carbon containment area
    - Smooth edges of roads, airport and building areas

As with the WRSA-NCRP, the TK Panel concluded that there shouldn't be any harmful materials on the surface of theWRSA-SCRP. The WRSA-SCRP should have caribou-friendly trails and large boulders strategically placed to facilitate caribou movement.

In general, there was agreement to make the WRSA-SCRP as low as possible, so the sides are not steep for wildlife, while at the same time trying not to disturb too much tundra. As with the WRSA-NCRP, the idea would be to make the pile as much like an esker as possible. In particular, there should be specific caribou trails that are oriented to be in keeping with well-known historic caribou migration corridors through East Island. According to TK, caribou have used the proposed location of the WRSA-SCRP before crossing Lac de Gras. Thus, the suggestion was also made to re-locate the WRSA-SCRP somewhere else.

Discussions during plenary continued throughout break-out sessions, and resulted in the following recommendations:

- Avoid disturbing new areas (e.g. tundra) with A21 material at the WRSA-SCRP as much as possible. The proposed WRSA-SCRP area is part of a major caribou migration and feeding corridor and should not be disturbed.
- If this area must be used, minimize the size (i.e. volume/amount) and height of the WRSA-SCRP as much as possible and slope all sides like an esker so that animals can easily walk over it. We recommend the slope should be at 3:1, as seen on the WRSA-NCRP.
- If the WRSA-SCRP is large, designated pathways become more important and must follow caribou routes known through TK.
- We recommend that rock from A21 that could go to WRSA-SCRP be used to cover the WRSA-NCRP.

- Drain the pond that would be covered by the WRSA-SCRP before using the proposed area.
- Have all WRSA-SCRP water tested (both science and TK) before releasing into Lac De Gras
- Use natural filtration methods in areas where water will run off the WRSA-SCRP after closure.
- Diavik must plan for the same values, principles and goals held by the TK Panel for the WRSA-NCRP, to the WRSA-SCRP (e.g. maintain low height, 3:1 slope for caribou).

Rock Terminology

The TK Panel and Diavik discussed some terms and processes related to mining diamonds in the Lac de Gras area in an effort to help everybody understand more about geology. The Elders reminded everybody of the importance of not speaking about rocks (or anything in the environment) as "good" or "bad" as this can be disrespectful. In an attempt to use plain language, there were discussions about "good" rock being Type 1 rock which does not contain the biotite schist that can leach "metals/rust" into the waterways. Type 2 and Type 3 rock from the A418 and A154 pits contains biotite schist and had been called "bad" rock. There was a lengthy discussion about how A21 does not appear to contain any of the biotite schist and was said to be the best rock for reclamation. Moving forward, it was agreed that the rocks would be referred to as Type 1, Type 2 and Type 3 and that details about their origin and whether they contained biotite schist would be discussed.

Glacial till collected from the bottom of lakes is set aside separately to be used for cover material or re-vegetation. Some of the TK Panel members affirmed the importance of till for growing vegetation, especially after viewing flowers growing on the test pile. Type 1 and A21 rock is good for construction of roads, dikes and laydowns, and is "simple" from a geochemical perspective.

The following specific guidance was presented to Diavik:

- Respectful language should be used such that the rock should not be called "good" or "bad" as everything is understood to be gifts from the Creator

4. Drainage at the WRSA-SCRP

The mens' break-out group discussed drainage, noting that a pond which presently drains into Lac de Gras is located underneath where the WRSA-SCRP would be constructed, and it was recommended that it would need to be drained. At closure, any water that will make its way into Lac de Gras would have to be tested, monitored and treated (if required).

The TK Panel made a request to see the lake water within the A21 dike before it is pumped back out to Lac de Gras. Diavik explained that they were close to starting the pumps (i.e. in October) and while it was not possible to go out on a boat at this time, Diavik accommodated the request by taking those interested to view the A21 dike and pool water, with an opportunity to pay the water on the shoreline inside the dike. There was also discussion about fish in A21 and whether they were all removed in preparation for the water being pumped out of A21. Diavik confirmed that the fish had already been fished out, in accordance with direction from DFO and assistance from community members.

After a competitive process, the Tłı̨chǫ were contracted to fish out the dike created for A21. There were monitors catching and releasing the fish, and any fish that didn't survive were given to communities.

The TK Panel put forth the following recommendation related to water:

- Water should be tested by both science and traditional knowledge before releasing into Lac de Gras – where needed, use moss and other natural filtration as treatment.

5. Caribou Crossings

As in every TK Panel session to date, caribou were another component of the discussions. Concerns about whether caribou will return to East Island after closure were expressed, with several TK Panel members predicting that they will not return, regardless of what accommodations are made. Other TK Panel members explained that people simply "do not know" if caribou will return. At the same time, caribou are known to be smart animals and will be able to sense the changes.

The development is thought to have "chased" the caribou away. For example, caribou are known not to go towards lights such as those from the mine. Maps showing TK of caribou movements and migrations documented in the 1990s during the EA were shown to the TK Panel. These maps affirmed the observations made by TK Panel members that the caribou migrations have changed such that they are deflected from East Island. There used to be three major routes during the southern migration (i.e. one eastwards through Łutsel K'e, one westwards through Tłı̨chǫ communities and one through the central area at Lac de Gras).

The importance of caribou crossings was emphasized again in this session. Specifically, members talked about how there are many unmarked graves at caribou crossings given they were important campsites. Concerns about disturbing deceased ancestors were raised, with parallels made between disturbing burial sites and disturbing tombstones at a cemetery. The area proposed for the WRSA-SCRP is also known as a "staging" area for caribou preparing to cross Lac de Gras.

6. A Robust Community-based Monitoring Program

While the TK Panel spent much time considering a long-term monitoring program, the last key theme that emerged was that the existing TK Camp should be transferred to the GNWT or another organization at closure and serve as the basecamp for community monitors after closure (i.e., 2025) and that a robust watching program must be developed at Diavik and transferred upon closure. Details around funding, liability, responsibility and more need to be fleshed out well in advance and while community members would like to develop and design the program, they would seek administration assistance from the GNWT. Other agencies could also use the station for cumulative effects monitoring and other initiatives. More details of the program should be discussed at a future TK Panel session.

A documentary produced by the Haida Watchmen was shown to the group to showcase a community–based monitoring program, stimulate discussion and provide examples of possibilities. A lengthy discussion followed, with specifics about what should be watched. The idea of building upon a traditional system of watching that includes reporting on and sharing what is heard, touched, watched, tasted, and smelled was strongly supported: "modernizing the traditional system to meet today's needs." The suggestion was made to build upon the monitoring programs already in place at Diavik, particularly the Aquatic Effects Monitoring Program. The youth spoke about the aquatic monitoring in the Deh Cho as well as Ni hat'ni Dene as good models from which a watching program should be built.

On the afternoon of the third day, the panelists broke into two groups to focus on watching programs. Any type of watching program developed at Diavik would have to be grounded in both science and TK. The TK Panel discussed possible ways in which TK could be the foundation of a watching program, building on much of the current scientific monitoring. For example, Louie provided a suggestion for TK-based monitoring that could be used for rabbit scat, which can be an indicator of a healthy environment. It has to have a particular smell, shape, consistency, etc. and when this is changed, the environment has similarly changed. Shorebirds were also mentioned as being important because their health can be indicative of healthy water (e.g. shorebirds eat bugs in the water and the presence of bugs usually suggests that the water is healthy). The TK Panel strongly asserted that watching water is critical, particularly as animals and people depend on healthy water. Water was said to be one's "livelihood" and the importance of water needs to be better taught to youth today in order for them to care for water long into the future. Everything is important in terms of watching: animals, fish, birds, plants and more.

The suggestion to get out and walk on the land more often during the TK Panel sessions was made, particularly given the accessibility of boats and motors. It was suggested that panelists would then be able to see whether ground squirrels and other animals still live on East Island.

Future discussions need to explore who should be doing the monitoring, how monitors will be trained, where watching will occur and what should be watched and how the program could be

coordinated between many Aboriginal groups. Sorting out who will pay for monitoring will also be important to resolve. Some panelists thought that monitoring should be year-round and ongoing while others suggested that it could be done seasonally. However, once it was pointed out that there are different animals and environmental conditions throughout the months, the idea of watching throughout the year was preferred. The challenge of high costs was considered and an option of monitoring in two-week periods several times throughout the year was suggested.

The airstrip as well as emergency fuel would be helpful in terms of infrastructure left behind.

6. General Process

One of the key strengths of the TK Panel is that participants are constantly offering suggestions to improve the sessions. Some suggestions are shared through the evaluation form, while others are communicated formally during the session or informally during the breaks. The facilitators work to ensure that these are documented and, in most cases, Diavik and the facilitators are able to accommodate these suggestions. The participants made the following suggestions related to the TK Panel sessions, process and logistics:

- Elders honoraria rates need to be reviewed and raised
- Copies of presentations need to be provided to interpreters in advance
- TK Panel members would like to have more time out on East Island to watch with their own eyes the state of the land, water, wildlife, etc. This includes quiet time on the tundra.
- Respectful language should be used such that the rock should not be called “good” or “bad” as everything is understood to be as gifts from the Creator
- TK Panel would like to have the results of the 10-year overview of the re-vegetation research
- TK Panel should be presented with the results of all the monitoring programs in order to understand what impacts are being documented now and until closure

Outcomes: Recommendations

The TK Panel collectively developed 10 unanimous points of guidance and 23 recommendations (Appendix G).

The resulting recommendations centred around the following themes as detailed above and summarized below:

- SCRP—Eight recommendations to avoid disturbing new area, minimize the pile size, ensure caribou routes, make sides smooth and drain the underlying pond

- A21 Pit—One recommendation detailing five alternative uses for waste rock in an effort to reduce the size of the WRSA-SCRP
- Help caribou—A recommendation specific to returning East Island to a caribou-friendly state and designed with migration corridors, regardless of whether caribou will return
- Watching Programs (Framework)—Eight recommendations citing the importance of youth engagement, training, year-round monitoring, long-term planning, funding, need for collaboration and foundations in both traditional knowledge and western science
- Watching Programs (General)—Four recommendations detailing how planning and implementing a collaborative monitoring program should occur including details on the importance of carrying out background research, drawing from other examples, celebrating 'best practices' of the TK Panel and ensuring infrastructure (i.e. trailers / buildings) remains on-site
- Cultural—One recommendation reminded the group of the importance of designing watching programs that are culturally appropriate, respectful and relevant as determined from the elders

Recommendations are numbered to reflect the TK Panel session identification (i.e., Session 10) and to subsequently identify each specific recommendation (i.e., 10.1–10.23). Diavik will consider these and add them to their Recommendations Tracking Table. Diavik's response will be presented back to the TK Panel at the next session in 2018.

TK Panel Next Steps

During each TK Panel session, participants typically re-visit the list of session topics carried out to date and those suggested for the future (Appendix I). The TK Panel reviews the list of potential future TK Panel topics and put forth the following possible list:

- Underground and PK deposition in mine workings (possibility of taking video coverage for those who are not comfortable going underground)
- Waste management at Closure

It was suggested that both a male and female youth from each group could attend future sessions and to hold the TK Panel meetings during times when the youth are off school.

One participant suggested that the next Aquatic Effects Monitoring Program (AEMP) contain a focus on rivers so that people can look at the rivers draining into Lac de Gras.

Appendix A

TK Panel Session #10 Photos

Wayne Langenhan, Natasha Thorpe, Janelle Nitsiza, Berna Martin, Tyler Akeeagok, Dora Martin, Rose Betsina, Modeste Sangris, Angust Enzoe, Gord Macdonald, Louis Zoe, Nancy Kadlun, Celine Marlowe, Kathy Arden, Roger Catholique, Jolene Huskey, Joanne Barnaby, Louis Zoe, Bobby Algona (L to R). Peter Huskey (front).

Upon arrival onsite, Kathy Arden takes a moment to look out on Lac de Gras while others pay the water nearby.

Tyler Akeeagok, Bobby Algona, Louis Zoe, and Modeste Sangris (L to R) pay their respect to the water before dewatering at A21.

Members of the TK Panel walk up the test pile, evaluating the slope and cover with respect to possible caribou movement at closure.

Celine Marlowe and Roger Catholique explore onsite modifications made to encourage caribou movement at closure on the test pile.

Louis Zoe stands at the top of the Waste Rock Storage Area -North Country Rock Pile (WRSA-NCRP) that has been re-sloped (at 3:1) according to suggestions made by the TK Panel, with caribou pathway in the background.

An access road for WRSA-NCRP re-sloping work has been situated in an area that will become part of the caribou walking path at closure, in accordance with design recommendations from the TK Panel.

TK Panel members inspect the WRSA-NCRP and future caribou pathways.

Close up view of the west side of the WRSA-NCRP, which has been re-sloped to enable cover placement and safe movement of caribou in the future.

View from a distance, looking up the WRSA-NCRP that has been re-sloped.

Southern flank of the NCRP, still in the process of being re-sloped.

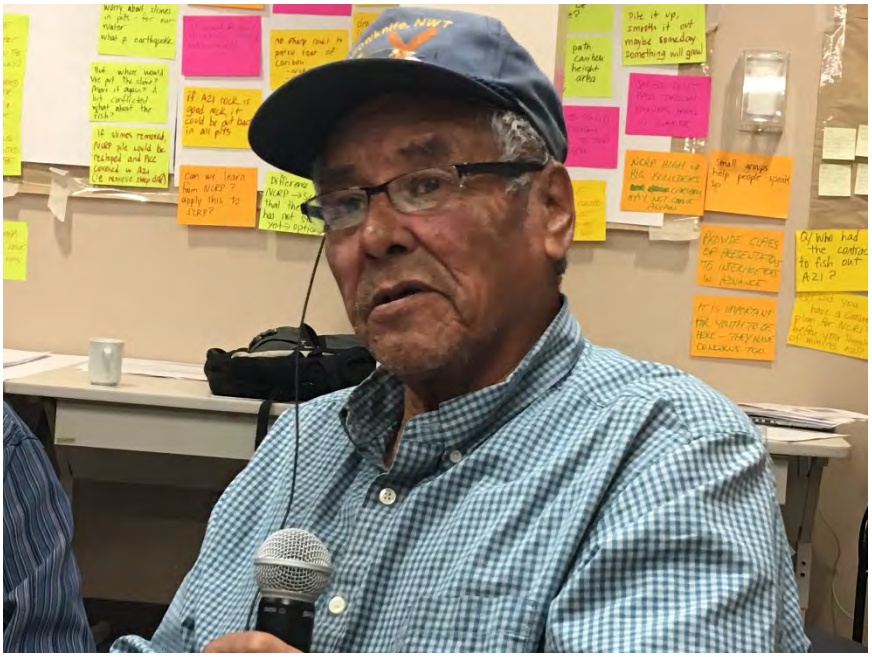
Members of the TK Panel walk down to the tundra where the Waste Rock Storage Area-South Country Rock Pile (WRSA-SCRP) will be constructed.

TK Panel members connect with the tundra near the proposed WRSA-SCRP location.

Natasha Thorpe and Joline Huskey take a moment on the tundra.

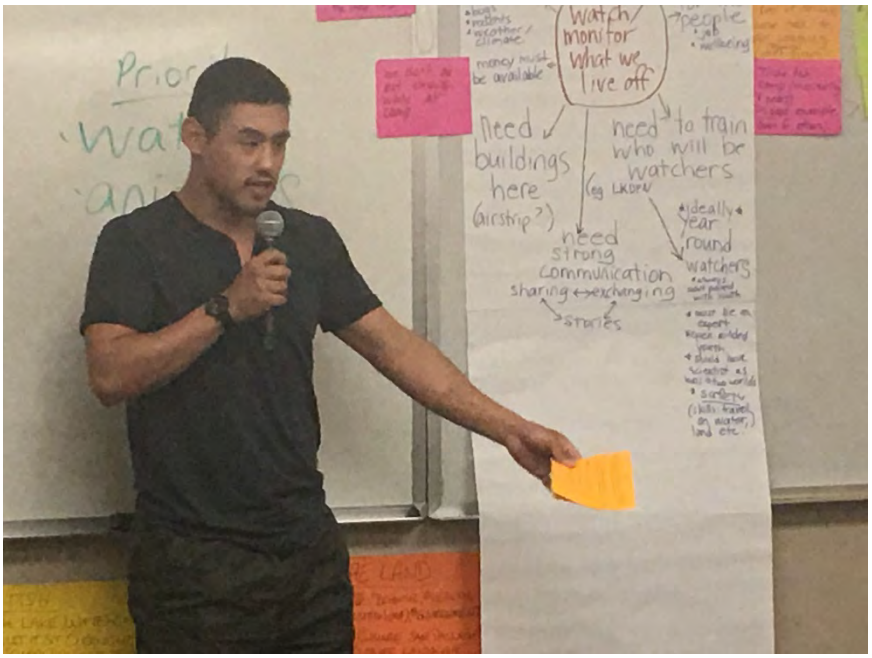
All in favour?!

Bobby Algona speaks to watching programs in the future.

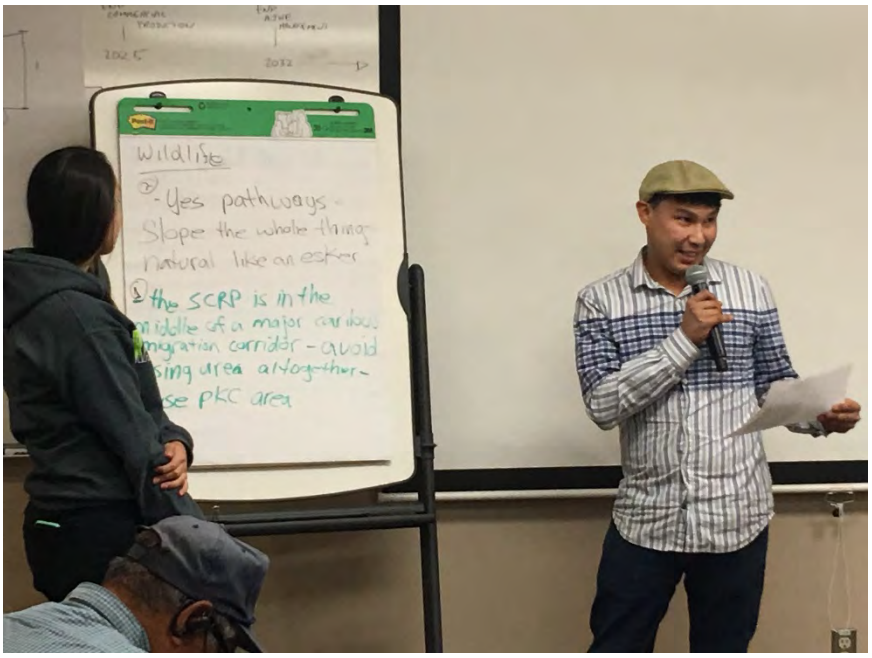


Modeste Sangris shares his recommendations with the TK Panel.

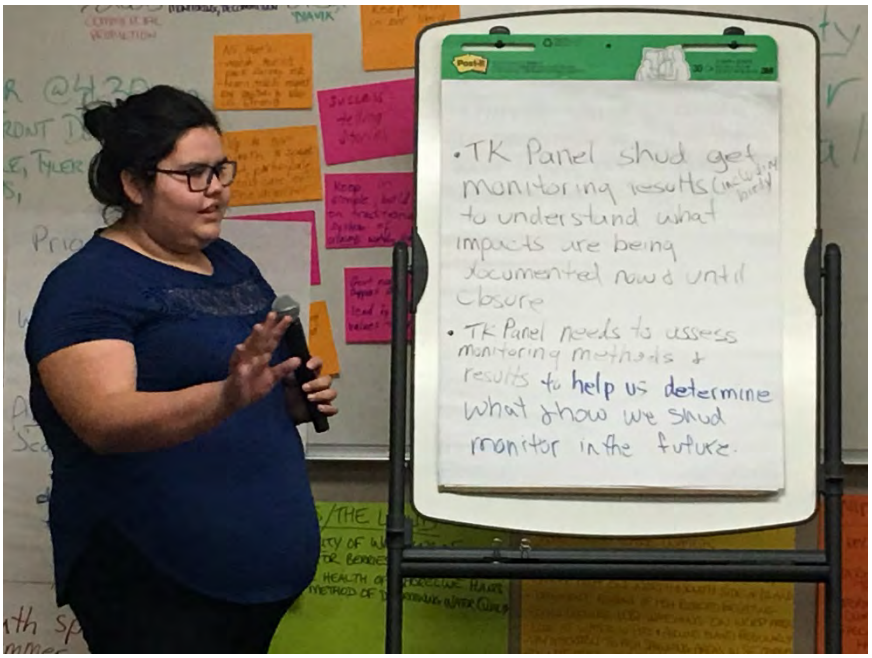
Rose Betsina explains the importance of “watching” now and into the future.



Tyler Akeeagok summarizes recommendations put forth by a break-out group.



Roger Catholique and Theresa Lynn present break-out group results to plenary.



Janelle Nitsiza summarizes findings from a break-out group.

Patrick Boitumelo, newly appointed President of Diavik Diamond Mines (2012) Inc., introduces himself and shares in a discussion with the TK Panel.

Celine Marlowe cuts the cake to honour the tenth session of the TK Panel.

The kitchen staff take good care of the TK Panel, preparing special meals as well as a cake to honour the TK Panel.

Wayne Langenhan enjoys the first bite!

Peter Huskey and Janelle Nitsiza help with the celebrations.

Appendix B

TK Panel Session #10 Agenda

Agenda

Diavik Diamond Mines Inc.
Traditional Knowledge Panel
Session #10: Watching, Monitoring, Learning and Planning
September 14-18, 2017

Thursday, Sept. 14

3:00 pm	Arrive onsite - quick surface tour en route to camp (~1 hr) Security, Orientation & camp tour (~1 hr) Rooms & Luggage assistance

Friday, Sept. 15

8:30 am	Opening Prayer, Welcome, Round Table Introductions, Review Draft Agenda, Workshop Purpose Overview
9:00 am	Diavik Presentation – Site overview, Closure Plan and community engagement update, Responses to previous session recommendations
	Group Discussion
10:30 am	BREAK
10:40 am	Diavik Update: South Country Rock Pile
	Question 1: Where should the wildlife pathway be located at closure? Is it ok for the surfaces of the SCRP to be a rough surface? Are there any water quality or flow concerns or questions? If NCRP Closure is approved and the SCRP pile becomes smaller, how should the shape of the pile change?
11:30 am	Lunch
12:30 pm	Group Discussion
3:00 pm	Opportunity to Set a Precedent & Group Discussion
4:30 pm	Close

Saturday, Sept. 16

8:30 am	Opening
8:45 am	Understanding Watching Programs: A review of current 'best' practices' community-based monitoring programs - Overview of current status, issues according to Traditional Knowledge (Facilitators)

	Summary of TK Panel Recommendations Made to date on Monitoring
	Understanding Current Monitoring at Diavik: Big Picture
9:45 am	Break
10:00 am	Break-Out Group Discussion: Men / Women
	Question 2: At and after closure, what types of 'checking' and 'watching' should be done on/around site?
	Report to Plenary
11:30 am	Lunch
12:30 pm	Group Discussion
2:00 pm	Break
3:00 pm	Site Field Trip: south country rock and till pile (SCRP), A21 area, processed kimberlite containment (PKC) area, north country rock pile, A154/418 open pits

Sunday, Sept 17

9:30 am	Opening
9:35 am	Debrief from site field trip
10:00 am	Plenary or Break Out Group Discussion
	Question 3: What should a watching program look like? How? What? When? Where? Why?
11:30 am	Lunch
12:30	Plenary or Break-Out Group Discussion
2:30	Group Discussion
4:15 pm	Next Steps / Next Sessions
4:30 pm	Close

Monday, Sept. 18

7:30 am	Bags & belongings out of rooms, store under stairs in lobby
8:30 am	Opening
8:35 am	Facilitators present draft of TK Panel recommendations for discussion
	Group Discussion: Finalize recommendations
11:00 am	Break
11:20 am	Next Steps/Next Session Group Discussion
11:40 pm	Presentation to Diavik: TK Panel recommendations
	Diavik Response and Group Discussion
12:40 pm	Closing Circle and Prayer
1:00 pm	Lunch
3:00 pm	Check out for return flight

Appendix C

TK Panel Session #10 Informed Consent Form

Diavik Diamond Mines Inc. Traditional Knowledge Panel

Informed Consent Form

I (name) _____ _____on _____, 2017 give permission for Diavik Diamond Mines (2012) Inc. and its contractors to take notes, photographs and / or audio and video recordings related to my participation in meetings, workshops and events related to the Traditional Knowledge Panel established for the Diavik Diamond Mine. I understand that my participation includes meetings and workshops held throughout each year either in communities in the NWT or NU or at the Diavik Diamond Mine.

Through my signature below, I understand that:

1. I consent to have my words, activities and responses regarding and related to my knowledge recorded on maps, in notes and photographs, and using audio- and video-recording equipment (collectively referred to as Traditional Knowledge Data);
2. I am free to choose not to respond to any questions asked or participate in any discussions without prejudice or penalty;
3. I can choose to be anonymous in my participation without penalty;
4. My representative Aboriginal Organization, DDMI and / or its contractors may use the information collected to contribute to operations and closure planning at the Diavik Diamond Mine;
5. DDMI and its contractors may share my information which I have verified and given permission to share in either reports and/or photographs and provide such information to my Aboriginal organization and other regulators:
6. I agree that my contributions may also be used for future educational, cultural, heritage, and environmental purposes that are outside the scope of the TK Panel and that my representative Aboriginal organization, DDMI and/or its contractors will make all reasonable efforts to consult me, or my descendants, before using my information for purposes not indicated above;

7. I will receive financial compensation for my participation in accordance with DDMI policy;
8. I am free to request that any information I share is removed, erased or deleted and that I will have the opportunity to verify draft video-documentaries, reports and maps to make edits before I sign them off and that final copies will be provided to me;
9. I also understand that DDMI cannot ensure the protection of the Traditional Knowledge from public release once the reports are released (e.g., via youtube.com, Facebook, other social media, or Aboriginal group websites);
10. The Traditional Knowledge Data will be summarized and integrated into a report which will be publicly available.

Signed this_____ day of_____ 2017, in _____ Northwest Territories,

Signatures:

_____ _____

Participant Aboriginal Organization

_____ _____

Diavik Diamond Mines Inc. DDMI Contractor

Appendix D

TK Panel Session #10 Daily Notes

Louis Zoe: Opening Prayer

Joanne Barnaby: 10th session of this panel. A few of you have been to all of the sessions. A major milestone for us. Thank you all for your hard work.

Roger Catholique: From Lutsel K'e as a youth.

Nancy Kadlun: I work with heritage center.

Tyler Akeeagok: Kugluktuk

Bobby Algona: Kugluktuk

Kathy Arden: Represent North Slave Metis Alliance

Wayne Langenhan: Highway 3

Rose Betsina: N'dilo

Celine Marlowe: Lutsel K'e

Janelle Nitsiza: Tli Cho Government

Dora Migwi: Behchoko

Berna Martin: Interpreter from Dettah

Peter Huskey: Tli Cho

Joline Huskey: Tli Cho Government

August Enzoe: Lutsel K'e

Louis Zoe: Gameti

Modeste Sangris: Dettah

Theresa Lynn: Dettah

Joanne Barnaby: Hay River

Natasha Thorpe: North Vancouver (Hwy 1)

Colleen English: Salt Lake City

Janet Murray: Yellowknife

Ryan Dempster: Yellowknife

Gord Macdonald: I am being ordered around by the youth already. She told me I had to come out here. I am with Diavik and thank you for being here.

Natasha Thorpe: DDMI house-keeping issues, phone numbers for family to call.

Gord Macdonald: Diavik Presentation. You may feel like things are going very slowly however, for us it feels very quick. We are really starting to see the benefits of the information that you are giving us and the advice that you are giving us is actually starting to translate to real decisions and progress on the ground. This group is being held out as being a leading example both in the NWT and within the world of Rio Tinto.

Update on closure plans. North Country Rock Pile closure plan has been submitted, waiting for approval.

Site wide closure and reclamation plan (version 4) was submitted.

CRP V4

Open Pits and Underground

Flood piping, fill options

Inert Waste to pit option

PK to underground/pit option

A21 is almost ready

North Country Rock Pile- re-sloping has started so we can cover it and it will have the less steep slopes.

3 universities want to research the pile and how the cover will work.

Bobby Algona: There are 3 types of rocks you are putting on that rock pile. Is the rock on the SCRP going to be the same?

Gord Macdonald: I think you mean the different geochemical rocks.

Types of rock, type 1 is good rock coming out of A21. Out of the two other pits it was type 2 and 3, bad rocks. We won't need a cover for the South Country Rock Pile because it is all good rock. The rock out of A21 is the best rock for reclamation that you can get.

Wayne Langenhan: The bad rock types 2 and 3 out of the other pits, whats the distance between the pits? What makes the rock in A21 good rock and the other 2 pits bad rock?

Gord Macdonald: It is amazing. I will bring a map up but there is a whole change in geology in the middle of the island. The two sides of the island are geologically very different. I can show you a bit later.

Bobby Algona: So what you are saying is that the rock in this pit (A21) is different than in the other two pits. You don't have that in this pit as well?

Gord Macdonald: That is right. Bad rock is an easier term but it is called Biotite schist and this is the bad rock that is in the first 2 pits. We have found none in A21 in all testing and drilling we have done. Yes there may be some (a small amount but we have yet to see it) and we will be monitoring it very closely. Geologically, it is very different.

Modeste Sangris: I want to touch on a few things I have concerns about. This island was a good place for migration of caribou. Everything was smooth around this island, it was good for crossing the lake before when there is no more minerals to be used the mine will eventually shut down. We know this is a big camp and I am sure there is a lot of money coming out of this mine every day. There used to be a lot of caribou around here now there isn't because of the mine. It is getting tougher for our people to get out hunting because we have to go too far. Now we are talking about closure of the mine and that we will be happy if the closure is done in the proper way and safe way. I know water travels a long ways, how will the water be? Once the closure of the mine, people can go out hunting, maybe they should have a couple of trailers for people to use when they come this far and the air strip, it should be left, it would be good for the hunters to land, and it would be good for emergency landings and have it for use when monitoring after Diavik is gone.

They make millions of dollars working here. As elders we don't get paid much to be here, we get $250 per day to be here, I am sure you get paid more to be here. Things can happen as we travel and then we sit in the meetings all day.

Gord Macdonald: Thank you for that comment, and it leads me nicely into this. Leaving a trailer or infrastructure for hunting is harder for us but if you want it for monitoring that would be easier for us to do that. So if you want to put that in a monitoring recommendation. We would need to figure out how that would happen.

Joanne Barnaby: Has there been any thought in to keeping one of the windmills to provide power to the remaining infrastructure?

Gord Macdonald: Ekati has indicated interest in building a power line from the windmills to them. We looked at taking them down but that doesn't seem to be a good idea.

Windmills saved 3.5 million liters in diesel last year.

Presentation continued

Bobby Algona: For infrastructure, all the infrastructure needs to be tested before it goes in to a pit, it may have contaminants on it. Will that all be tested before it is sent to a pit? I am really curious to see what types of material might be hazardous and some of our panel would like to hear what is in the building material. All buildings have some hazardous materials.

Gord Macdonald: Example of things that cannot go into a landfill, the florescent light bulbs above us is something that cannot go in the landfill; old thermostats are also not allowed to go in a landfill. There are regulations of what is allowed and what is not allowed.

Equipment with hydrocarbons also can't go in a landfill. We probably won't clean equipment with hydrocarbons, we will probably just remove the equipment from the site.

Louis Zoe: We are situated on an island and this island is very limited in size. How long would it take for the closure plans and also once they are done mining how long are they going to do the monitoring? I am just saying I am thinking that it might not be long doing the monitoring. Our ancestors always said that this Island is the caribou migration route, but the caribou walk along the roads but they can't cross the road because of the boulders, we should make sure they can cross. Make it a gradual slope. If the open pit is filled with water it might make the lake water go down. Those things are going to take place and it would be good to monitor them.

Gord Macdonald: We wanted to take the conversation today into monitoring and how would you do that, so this is good, how do you monitor the lake levels, we know how from a science perspective but what do you look for? Monitor filling of the pits and the level of the lake. Just because we close and do the reclamation doesn't mean that the caribou will come back, they may stay away for other reasons.

2025 end commercial production

2032 end active monitoring, I don't want you to think that we will stop altogether, but our hope is that this is when we would be handing it off to someone else, around this year.

Roger Catholique: I am just wondering about buildings that go in the pit? Whatever is contaminated is shipped off the site, right? But whatever is not contaminated in the buildings, are they going to put it in the pit and cap it? To me it wouldn't really seem like a good idea to me because fish like to go deep and if you have stuff way in the bottom and lay eggs there. What if fish go way under and then no one would even know.

Gord Macdonald: Your question is exactly what we are talking about, we are either going to put this material either in the rock pile and then cover it with rock, the other option is in the bottom of the pit 150 metres (450 feet) I don't think fish would go there to that level but that is my view, but your view is exactly why not to.

Roger Catholique: Buildings perish and may resurface.

Nancy Kadlun: The paint and stuff, we would prefer to have them in a dry place because what if it starts to lift up and then it will do more damage to the lake. No matter how deep it is, it is going to come up some time.

Kathy Arden: When you say the bottom of the pit do you mean the bottom where we have been or do you mean into the tunnels?

Gord Macdonald: Bottom of the open pit for the buildings because we couldn't get them in the holes to the underground. But the PK material would be into the tunnels.

Tyler Akeeagok: Just wondering about the two pits on the north side, if you knew they were the type 2 and 3 was there a plan to help mitigate the harmful effects on the environment?

Gord Macdonald: When we designed it we knew that issue was there. And the plan was to separate the bad rock from the good rock and put the bad rock all in one place where we could manage it and only use the good rock to do all the rest of the construction. What makes it bad or good? When you take a piece of metal with no paint it will rust, that rust is iron, that metal rusts, that is the same process that happens to the rocks that are brought out of the ground, if it is a bad rock and is exposed to air it will rust. Good rock is like aluminum (doesn't rust) bad rock is like steel.

Colleen English: I think part of Tyler's questions is not having the history of why the decision was made to separate rocks and put them where they are.

Gord Macdonald: If you put a bad rock at the bottom of the lake it won't rust as fast because it needs oxygen to rust. Diavik looked at doing that with the bad rock during the Environmental Assessment but it wasn't the preferred option for regulators and communities at the time.

Celine Marlowe: When Roger was talking about crushing the metals and putting it in the bottom in the lake. I don't agree with putting it in the bottom of the lake because of all the stuff you see when we are walking out around the lake and you see cans and such rusting in the lake, in the long run if you put the buildings in the lake eventually the paint and rust will start coming up to the surface with fish eating it.

When we landed and I was looking at everything there I just about cried that's how I felt, just try the best you can for the younger generation.

Gord Macdonald: I want to come back to this, I really don't know what is the best answer, but I would like to be able to explain why I think it might be a good idea, it is not a cost saving, it will be more expensive to put the material at the bottom of the pit.

Wayne Langenhan: I have been paging through the minutes of the last meeting, it would cost too much to truck the slime to Alberta and burn it. This sludge is heavy enough that if it was put deep enough, the fish would not go to that depth, and it wouldn't rise because it is too heavy and will not float.

August Enzoe: I have been sitting with this board for quite a while. A new thing just came out about crushing the metal and putting it at the bottom of the lake and I am against it. I know us elders won't see it so its good the youth are coming here with us. Even though the metals would be at the bottom it will rust and the rust will come back up to the top of the lake.

Gord Macdonald: The option of putting the building material at the bottom of the lake is a new option; we have not discussed it before.

Rose Betsina: Last year when we came here, everything that we are saying is like repeating ourselves, what my uncle Philip said later in life there is going to be big trucks coming in this area, hotels and big buildings. And once this is closed they are going to be

moving down and they are going to haul a lot of things up here and then out of here. I don't think we will benefit from any of it. Things that would be usable, maybe it can be given to the communities, I am sure the company is making lots of money, maybe the trucks can be given to the communities. A lot of things to think about before the closure, they will probably all just leave and go back down south. A lot of people have passed away in the communities, like George Marlowe, they aren't with us anymore. Our elders from Fort Rae had passed on, we are losing a lot of elders. There is a lot of sickness in the community. I wish the company would help the community somehow.

Gord Macdonald: Thank you for that, I am reiterating that we want to find opportunities to match community needs with what we can give. What is going to be at the bottom of this bay (North Inlet) is Hydrocarbons- they are at the bottom of the North Inlet and they are not good for fish or bugs, it is not good enough to connect with Lac de Gras.

We want to connect the North Inlet back to Lac de Gras so water can go back and forth but fish cannot. We expect the water to be fine but not the sediment.

We want to make sure that the North Inlet is okay for other wildlife.

Bobby Algona: When I look at the mining I don't blame mining for all the problems on our planet. We talked about washing the walls before filling it, I hear you say that nature will take a long time to heal, when we look at things out on the land, maybe we need to look at the long terms effects of oxidization.

If you breach it, it is going to come down to Kugluktuk. My son was guiding DFO in the streams and rivers in our area and they were saying there was no char, where usually there would be lots of char. People are not making dry fish because of the lack of char.

I accepted some fish from friends, the fish was still alive, but it looked pale and you could smell it right away, it was sour and my wife cut it open, the fish didn't feel like fish, it was very mushy and breaking up.

We don't blame the mines for everything because the fish come from all over the arctic. Another thing is I've emphasised a lot is that our part of the world is lower land then the more southern parts, its coming from not only the mines but it's coming from all over the provinces as well. Especially Fort Mac Murray and I am really

leery of it, mining has a lot of contaminates. I am really wondering what might be in that dust that goes up in the air.

Gord Macdonald: Going back to your pit walls and what that will do. It won't be a problem once it is covered in water.

The last area is the PKC which for us is the really good rock, kimberlite, that is where the diamonds are taken from. Right now it is contained by dams with a pond in the middle. Coarser material is taken out in trucks and placed around the PKC.

What if we put the slimes in the bottom of the pit into the tunnels so we could make the PKC a dry area?

Break

Natasha Thorpe: The reports are done and then sent back to the communities. So any suggestions on how to get these directly to the youth by email would be good.

Kathy Arden: I think the other thing is we need to make an effort to see our organizations to make sure they have received the reports. I think we need to make an effort because they are busy too.

Natasha Thorpe: I am super excited that everyone is here and that it is our 10th session. The real focus for the next couple of days is the importance of monitoring. Lutsel K'e has a great "watching" program. The Tli Cho has a great monitoring program. What might a program look like after Diavik is gone?

The goal over the next few days is to explore what monitoring might look like at 2032 and what it might look like between 2025 – 2032.

Agenda/housekeeping/logistics 8:30-4:30pm Lunch at 11:30am

Wayne Langenhan: What I would like to see is instead of an agenda made for us, I would like to have a discussion about what we would like to see in the next meeting.

Natasha Thorpe: We do have that scheduled in for Sunday and Monday.

Joline Huskey: I just want to mention for better interpretation they need presentations ahead of time.

Dora Migwi: May we have a safe trip home to each of our communities. They are correct in saying it is very important to have a morning prayer Sunday morning and for the youth it is very important. I am thankful for all of you to be here and that is what I am thinking about. The things we are talking about are very important.

Natasha Thorpe: Thank you. I think one of the real strengths of this panel is that we have youth here and how amazing it would be in 20 years for you to be here then to see how what we talk about has been implemented.

Louis Zoe: Thank you, we are having a good meeting and in the future we will share a lot of thoughts and I just want to say a few words. When this mine site is completed they will probably leave and it would be good to have the reclamation and monitoring in place so it can take place many years after the closure of the mine.

Modeste Sangris: We as the Yellowknives Dene, when we talk about mining closure there is an elders committee and also we have the leaders, the council, they are the ones that make the decisions and we as the elders don't know how to read or write and those are the people that keep the documents flowing. When we have closure plan like this and the reclamation and the water monitoring and we have about 3 people monitoring these things, Angus they monitor the wildlife and the fish and the surrounding area. And those are the people and now because of the North Country Rock Pile being so high, the caribou may not come back at all. In the past I know of migration of caribou used to be across this island.

Colleen English: I think what Gord mentioned is that one of the things that has been helpful is that when Diavik goes back to the communities, there was a lot of support for the ideas that the Panel generated and the recommendations that came out of the Panel.

Joanne Barnaby: Modeste also emphasized the importance of creating links with the other community people and the elders involved in monitoring other sites.

August Enzoe: I like the idea of a later start on Sunday so we can take time to pray.

Natasha Thorpe: Ok on a Sunday later start.

Joanne Barnaby: For the young people we have a process where Janet is typing out the notes and then you check them over if anything needs to be corrected.

Lunch Break

Gord Macdonald: **South Country Rock Pile Design presentation**

Wayne Langenhan: Just supposing you don't get approval to put the rock on the North Country Rock Pile, how would you cover the North Country Rock Pile?

Gord Macdonald: We would have to re-mine it from the pile then move it over to the North Country Rock Pile.

Kathy Arden: Did you say there was enough good rock to cover the North Country Rock Pile?

Gord Macdonald: Yes, the pit produces 16 we only need 4 of the rock to make the cover.

If we do it right away, the till is thawed because it is just coming out of the lake. So it is easier to handle.

Joanne Barnaby: I heard two different things about run off and seepage water.

Gord Macdonald: During production it will be treated the same as all water now. Once closure happens then yes it will flow into Lac de Gras.

Kathy Arden: I am just trying to get my bearings, is that the PKC behind it? I was thinking on the North Country Rock Pile on this side we had wanted the caribou to run off the south end but we also had to make them not get into the PKC. Where is slope going off that end.

Gord Macdonald: All the way around the PKC will have the steep sides, if everything works the way we think the caribou would come down the nicer slopes.

Pathways on the SCRP - do we want them, if so, where should they go?

Bobby Algona: If you made it more dispersed then the pile would be shorter. If you make the pile smaller then it would be really tall. Then it would be harder for the animals to go up and down. If you build it rough on one side then the wolf chasing caribou through there the caribou will stumble and then the wolf will have their meal.

Joanne Barnaby: Would it make sense to keep the South Country Rock Pile smaller then make the North Country Rock Pile longer?

Gord Macdonald: Our permit only allows us to go as high as it is.

Wayne Langenhan: Do you have room to extend it? So there would only be one rock pile?

Gord Macdonald: There is some room but not enough for all the rock.

Wayne Langenhan: I think that might be the way to go.

Roger Catholique: I know you wanted feedback for the South Country Rock Pile. It is hard to really think about it when it is just a top view. I think we need a broader side view and diagrams to really discuss how the animals will go over.

Gord Macdonald: I agree. We were hoping to do the same. I will print some of these on paper. This is normally when I leave and you work with these guys and try to come up with ideas.

Dora Migwi: The stockpile we are talking about, although you are going to put the stockpile there, it might not be as high and once the reclamation takes place and the sediment on top, and then the gravel will go on top it will probably sink into itself so it probably won't be as high as the other stockpile.

Modeste Sangris: We don't know anything about rocks; you know about the minerals, we know the kind of damage that was done to us with Giant Mine everything is stored underground. You guys store rocks underground in the tunnels, and in the pile maybe the water can leak out and cause damage. I don't really catch what you are saying. We never got any benefit from the damage that was done to us, but we didn't know about mining at the time the leaders they use to get together once in a while once a year we have a meeting in the community. We live on a rich land today, so things are happening and it is good we are involved.

Louis Zoe: The pile that we are talking about, it is very high up and the way we are discussing it, maybe there are things that will be there to cover it, I hope there won't be big boulders that are sharp in there. They need to make it safe for wildlife. We need to see for ourselves too.

Wayne Langenhan: The pits could maybe drawn on the board so we can see the height of the rock pile and how deep the lake is in relation to the bottom of the pits.

Gord Macdonald: Good idea Wayne I will work on it.

Louis Zoe: It would be good to have the gradual slope. All of these holes should be level with the ground.

Joanne Barnaby: If we need Gord to come back he is here all weekend.

Colleen English: We did print off some small posters for you to work with.

Joanne Barnaby: We want to begin to talk about what it is that we can advise Diavik to do with the South Country Rock Pile and you all have spent quite a bit of time on the North Country Rock Pile and now we have a second one with the material from the new pit. Some of the concerns from the North Country Rock Pile may also be for the South Country Rock Pile.

Wayne Langenhan: I thought that we broke into two group's men and women then used different colors on the maps and came up with different plans.

Kathy Arden: Maybe we stay together as a group and throw out our ideas.

August Enzoe: Your side will be strong but not a lot of women go hunting in the bush. Us men have more power. So then you learn something from us and we probably learn something from you.

Kathy Arden: I agree, so maybe we throw out our ideas on the South Country Rock Pile. The positive is that it is good rock and used to cover the North Country Rock Pile and we have an option here with the South Country Rock Pile to make a smaller foot print, it could be lower and wider or higher and smaller.

Natasha Thorpe: It sounds like the group wants to stay together. So we can work on the first question. Should there be a wildlife pathway over this pile?

Kathy Arden: On the North Country Rock Pile Gord had said that they had a permit and can only go so long and wide and high. So possibly the same for this one.

Colleen English: There are land leases that Diavik works under. It is related to the airstrip as well. Plus the explosives are near the South Country Rock Pile and there are rules as to how close other infrastructure can be.

Kathy Arden: So where the till is, once the till is gone can the rock pile be spread there as well? That would also give it a better slope, more gradual.

Colleen English: Yes the amount for the till going down is fairly significant so that is a lot of foot print, so if they pull back the till footprint you may be able to put some rock there. Yes that is a good point.

Natasha Thorpe: The other thing is that if we take it higher then it means we take away some of the land, whether or not the land is undisturbed. If you went out wider then you would disturb more land.

August Enzoe: For the rock pile you guys are talking about how was it done the first time? Type of rock?

Colleen English: In the North Country Rock Pile you have the type 3 rock in one area then type 1 (good rock) in a different area. The South Country Rock Pile is only one type of rock.

August Enzoe: When they talk about the bad rock what do they mean?

Colleen English: The bad rock means rock that can cause poor quality seepage water. There is no bad rock in A21.

Wayne Langenhan: How much further out can it come any place? Can it be widened? Or lengthened a bit? So there is only one rock pile. Or a large rock pile and a much smaller rock pile.

Colleen English: How much could we add to the North Country Rock Pile to make the South Country Rock Pile smaller? It would be a good calculation to do and see if we can get an estimate.

Kathy Arden: We had talked about putting rock around PKC? Do they already have rock selected for that? If not maybe some of that good rock can be used for that to keep the animals away, maybe we can put it back into the pits?

Joanne Barnaby: In terms of timing, is that idea of using the rock from A21 to fill the other pits, does that work?

Colleen English: In terms of the PKC the A21 rock would likely be the rock that they would use to cap it if that's what they do.

Colleen English: It would be challenging only from the perspective of, right now A418 wouldn't be completed until 2021 and A154 would be mined right to the end. So rock would not be put back into the pit while people are still working underground.

Kathy Arden: Could we propose that? And ask them is there a reason why you are stock piling it anyways? So it is sort of a twofold question. The South Country Rock Pile needs to be reclaimed to be used for wildlife before 2025? Can they not keep it until the two pits are ready for flooding and then dump the good rock on top of the PKC? Or is it a question that there will be no equipment here to move the rock?

Bobby Algona: In the beginning we talked about the PKC a lot too and the effects the PKC has and how we can fix it. It is not going to harden for the life of it. PKC area is just like a bowl once you fill it up with more rock it will spill over the edge. But we don't want the PKC to spill over.

Joanne Barnaby: Do we want wildlife to come back to South Country Rock Pile area?

Tyler Akeeagok: Gord was talking about the South Country Rock Pile that are was the median point for how long and how high the pile could go. He talked about how the pile could be sloped so that the caribou can come and over time that hill would be re-vegetated. It's not too far and its not to high and you could put some of it on the PKC.

Rose Betsina: For the wildlife to go on this island and all the vegetation that will be growing back later on, and the berries will be growing back and would this be safe for the animal? If the south country rock pile is too high the caribou would break their legs. We have minerals all over our country.

Economy is going up, getting groceries is getting expensive. We used to go get caribou in those days people use to store caribou in the ground. Not today our freezers are empty. Our people are struggling; maybe there are minerals on the land that is stopping them from coming. Maybe we will see caribou again before Christmas.

Tyler Akeeagok: The questions are from Gord right? From what I think for the South Country Rock Pile, it's just that there's always those steps in the pile and animals know its human-made, I just want to give you an idea and a head start on the south rock pile and make it a little more creative and little more familiar for the animals, because they know if it's not natural and humanmade. We could try to replicate an esker.

Celine Marlowe: I just want to ask where the slimes area is. Is it possible if you could put that back in the two open pits then the rock and then the water? And not reconnect to Lac de Gras? Or is it too much work and too much money?

Colleen English: Number 1 would be yes it would cost a fortune to put all of that rock back in there. But bigger than that is that it won't all fit, plus there are liability issues. When companies have dams or dikes, those are engineered structures that need to be inspected and maintained. For the company to leave it, it can no longer be a containment dike. If we were to fill it with rock it would still be considered containment because it is still keeping the water out.

Joanne Barnaby: So Celine when you are asking about that is that because you are concerned about having water mixing with other stuff that is in the pit?

Celine Marlowe: I am getting myself so confused here, the land here is already destroyed, and what I am hearing is that it is okay for these people to come and destroy our land. All we are asking is try and make it similar to what it was before. Is it possible to do it that way? I don't even know about Ekati that one too is all gone. Now we don't even get our caribou anymore because of all these mining companies are coming to our land. Who is going to fill up our freezer for us? Is the mine going to say here there is this many pounds of meat. I am going to fill up your freezer for you. That would nice. Nothing I doubt it, it's going to cost too much.

Joanne Barnaby: So obviously it is not going to be put back to the way it was before. Most of the damage is already done. Can we create a site that maybe the caribou will come back to? Or should we create a site that the caribou will never come back to? There were areas on the island where we said yes we would like to try to accommodate the caribou and other animals coming back.

Celine Marlowe: The PKC where all the softness is, what if you could just put a big cement dome over it? After you put the rocks in, make a cement dome then put more rock on top again.

Modeste Sangris: There's two open pits. Are we going to leave it as is or are all the boulders going to be put back in the open pit? Gravel should cover it after.

Alfred and I had come to the mine site a long time ago, there were no meetings we just came and looked. Just recently we had a meeting and Alfred asked them about the hill that existed and he was laughing at them making jokes and they blasted the little hill that existed and made the airstrip. On Ace Island the North Country Rock Pile is very high. The North Country Rock Pile is so high, they should slope it like an esker.

I used to be a trapper and I knew where my trap lines were and that is how the caribou are, they know where to go, we don't feed the caribou but God takes care of them and they roam where they want to roam. In this area, the caribou might not migrate in this area. How can we help them with the recommendations? I said yesterday payment is not enough.

Joanne Barnaby: I would like to suggest we take a short break.

Break

Natasha Thorpe: I asked Colleen to print out the recommendations for the North Country Rock Pile and we can see what works for the South Country Rock Pile.

Nancy Kadlun: Speaking about the slime, if you filled it up with rock then all the slimes are going to start flowing out all over.

Joanne Barnaby: My understanding from what Gord said was putting the slime in the pits then water.

Colleen English: The slimes are heavy and sit at the bottom and the water would sit on top and keep the slimes down, no rocks are planned to be added as they would sink. And the slimes would be deep enough that the fish wouldn't go down that deep, according to science.

Nancy Kadlun: The big boulders I can see on the sides of the roads too, are they going to fix those too?

Colleen English: South Country Rock Pile or somewhere else? Right now the way that Gord was talking is rough edges on the SCRP except for the wildlife path. If it is a yes for the South Country Rock Pile, then we ask is 1) it rocky with a wildlife pathway, 2) is it all rocky, or 3) is it all smooth for wildlife?

Kathy Arden: I was looking at the caribou maps and you can see the caribou came across this whole entire island, following different pathways the way caribou do. So I think we should make everything on this island caribou friendly as we can. Eskers, we spoke about that before, I think we should be doing it for the South Country Rock Pile and sloped as low as it can go. Use as much of that rock in other areas on the property to do the same thing. I think that rock pile coming out of A21 is a godsend and we use it as much as possible. We need to make it as friendly as possible for when the caribou come back.

Bobby Algona: We made a lot of recommendations on the North Country Rock Pile I see no difference in trying to make the South Country Rock Pile as close to the same as we can. I think we should look at the recommendations we made for the North Country Rock Pile and use those for the South Country Rock Pile.

Joanne Barnaby: There is a big difference, the North Country Rock Pile was already there when we (the Panel) started, and in the North Country Rock Pile there was some bad stuff in there, the rock was bad rock. The South Country Rock Pile would be good rock and the rock is not already there. We may still have to have some sort of pile but we don't have the same limitations as we had with the North Country Rock Pile.

Bobby Algona: Two differences the pathways for caribou, everything I think should be the same as the North Country Rock Pile. We should be making it as caribou friendly as we can. No rough edges. Do everything we can for caribou management.

Joanne Barnaby: Apply the same principles and goals that we had for North Country Rock Pile to the South Country Rock Pile and we have further opportunities beyond that in terms of making other uses of that material to actually improve perhaps the North Country Rock Pile or improve other sites on the mine.

Rose Betsina: We can't say the rock is no good. We heard that god stood on the rock. God created the earth, he created everything, maybe because of the chemicals that was added to extract the rock. Rock is not bad. I found a really round rock, like soap, if a person was sick with illness, all that was put on was fat and then the heated rock. The person woke up healthy and was fine. We can't say the rock is not good. There are a lot of people from out of province that work in this area, the rock must be good, they work here for many years and tomorrow when we go out on the land and then we can talk to this.

Tyler Akeeagok: I guess we have to factor in cost as well, because more cost is also more diesel and is also more emissions we are creating. I am suggesting that we cover the North Country Rock Pile then we start the south pile which is very close to the new pit that they are going to develop.

Natasha Thorpe: Very interesting way to think about it.

Roger Catholique: Since the mine opened there has been a lot of talk about the North Country Rock Pile and they made many recommendations. Where are all the words from the elders?

To make it as smooth as possible, no rough rocks, it's really high up and it's not natural for an animal.

Nancy Kadlun: When we look at mines like this and the mines come and tell all the people around the area, and telling them they will benefit from the mines. What do our people get? Nothing. Our land is so destroyed. We would like to make it as nice as possible. They made it sound so great but unless you are working you don't get anything.

Tyler Akeeagok: Great point but what I see from back home in Kugluktuk, they have the complex that was funded by the Dominion Diamond Group. The helped with it now it is a great place for kids to go play soccer or hockey it keeps them off the streets. Another thing is that I am still in school, I am still in high school and I see scholarships to get an education, that is what I see so I do believe they are helping us, it's just education, recreation and what have you. We are benefiting from it and education is power.

Natasha Thorpe: Thank you for those perspectives.

Joanne Barnaby: Or some of both, using some of the material for other places that needs it but also to make the pile smaller.

Celine Marlowe: All that is going to be good rock, and after the mine is closing all those areas where the housing is, why not use the rock to cover those areas and the buildings. Where else are you going to put it? As long as it is out of the way.

Kathy Arden: If you take a look around here on this whole entire site and probably before it was built you will notice that there is a lot of jumbled rock. It looks like someone came in and just threw the rock around. And they are all full of lichen and moss growing in between. With the good rock we can probably create close to the same thing. Look out your window there are boulders. Earlier when I said to try and create it as caribou friendly as possible, we

can use the boulders to do the same thing. We can give it the best shot we can. Our recommendations have been looked at by people around the world that's pretty powerful. There is a jumble of rock, let's use that jumble of rock.

Berna Martin: Make the North Country Rock Pile like an esker so the animals can go up and down; make it like a long esker.

Joline Huskey: Just from taking part in traditional knowledge with Tli Cho government not only here but at Ekati and Gahcho Kue with the elders, when I first started with Georgina in the research area she always reminded me because I was just learning then, that caribou is important not only for the Tli Cho but also for all Aboriginals. The caribou are in critical condition. We are very limited in how much and when we can harvest. But at the same time when we look at industry, we have to think like caribou and other animals that roam across the tundra.

I remember when we went to Mesa Lake, Robert Mackenzie and Harry Apples, and all the elders that worked on the Tli Cho land use plan. They would talk about where caribou roam and why eskers are important. How they are going to slope some areas and create a berm?

What I am suggesting is that if we can shape the stockpiles as smooth as possible into natural forms of eskers instead of being steep and then looking at the engineered design and they are already at their max going up but if we shape it as natural as possible. I know it's going to be hard because you are looking at engineering, but I think that would be a recommendation made to DDMI.

This is where caribou use to roam, 1998 when industry started up in this area, their migration route has massively changed and there is a decrease in the herd, industry may have played a little part of the impact in the herd but also climate and all the other things that are happening. We are trying to restore and protect our wildlife. Make this site as natural as possible.

Colleen English: The pink on the drawing is the till from the bottom of the lake. No tailings go into either rock pile – it goes to the PKC.

The rock and till are separated because the till can be used for re-vegetation. They can be used for different purposes so that is why they are separated.

Joline Huskey: I find that a lot of us are not really speaking up when you ask the question about whether or not to have a wildlife pathway. I found that when we broke into two groups we talked more, it doesn't have to be man and women just smaller groups.

Wayne Langenhan: How high is the proposed stockpile if none is taken out?

Colleen English: 460 metres

Wayne Langenhan: How high would the pile be if we do take the rock to use elsewhere?

Colleen English: I don't know but we can ask.

Wayne Langenhan: If you filled in all those other spots it would up maybe half of what it says there. So the pile could be the same footprint but only half as high.

Colleen English: In theory, yes.

Kathy Arden: There was another recommendation that we had talked about for the North Country Rock Pile with regards to re-vegetation around. I don't know that we will have the same problems. That would have to be monitored like the previous one. We asked for a study the wind and snow accumulation before finishing.

Modeste Sangris: Up at Mackay Lake there was a big hill there and the caribou can get up there. But we are talking about the North Country Rock Pile they take a lot of minerals out of our land; some other companies have walked away. We never got any benefit. The caribou they have nowhere to go. Caribou are quite smart; they won't go up where they think they can't go. The north pile, smooth it down like an esker, like we talked about. I went out testing the water, tasting the fish, we used to live around this place, we used to travel around here with my dad. I don't think the caribou will come back here. We are talking about the country rocks, if we can smooth it out maybe someday they can come back.

Joanne Barnaby: If the slimes are removed from here [PKC] what is the intention of reclamation of that area? I am just wondering for amounts needed.

Colleen English: On the PKC, if they did get rid of the slimes and the surface became stable; it would likely be covered like the rock pile. However, it is envisioned as a thinner layer of rock because it is for a totally different purpose. They don't have any

calculations for rock volumes, other than the amount planned for use in the North Country Rock Pile cover.

Joanne Barnaby: Right now if you remember we created a barrier to prevent caribou from traveling that way and if that whole situation changes and there are no slimes there, we could add rock to that area and make it slope

Nancy Kadlun: If you take the slime out isn't there going to be a pond from water and snow?

Colleen English: I don't think so, they would pump the water out then put rock on top and create drainage for runoff.

Louis Zoe: We are talking about the big North Country Rock Pile and the till, maybe they can smooth it down to the till and make it easier for animals to get on top. There are big boulders around that area. Maybe later there could be vegetation growing there again. Make it even. Make it smaller. Not to pile them up so high. Even animals can climb very high hills. Even caribou can get on top of the high snowdrifts. So this is a high steep pile.

Bobby Algona: We were thinking about the slimes and putting it somewhere else, underground in my mind it is conflicting with moving the slimes again, creating another pit underground for the slimes. Fish are going to find these cool spots in the deep water and we have to think about the fish, they tend to want to go down deeper. What we need to stick to is the slimes are there, but let's find something to cover it, I don't think I really want it under those two pits. I don't want it to get in contact with the water anywhere else.

I would not recommend putting the slimes in the pits because fish are going to be finding these and the metals are going to contaminate the water.

Wayne Langenhan: Colleen could you maybe tell us the depth of the pit?

Gord Macdonald: How much area is still available to fill at the North Country Rock Pile? We have 2 million cubic metres left that we could possibly fill.

Wayne Langenhan: Do you have a shaft at the bottom of the pits? Or is it a decline or a drift that goes out?

Gord Macdonald: Its a decline down to the underground.

Wayne Langenhan: If you were to pump that slime down there, it would not come to the surface because it would be in a hole.

Gord Macdonald: Yes. Straight in the hole where the kimberlite came from. Like pulling a carrot out.

Wayne Langenhan: Ok so a fish wouldn't go that low.

Kathy Arden: How much cubic metres of slime do you have to pump?

Gord Macdonald: I have to check that number.

Kathy Arden: Bobby talks about metals in the slime. Is there metal in the slimes?

Gord Macdonald: There is metal in everything. All we are talking about is putting the slimes back where we took it from, its just crushed now.

Kathy Arden: Could you put the buildings and the rocks down there?

Gord Macdonald: No because it would push the slimes out. Picture of the heights of the South Country Rock Pile, the till pile, the lake and the dike and the pit.

Lake Surface 415

Tyler Akeeagok: Slime characteristics please.

Gord Macdonald: Toothpaste is the best description of it. We will get the samples.

Tyler Akeeagok: Is there a chemical that can help separate the slimes from the water.

Gord Macdonald: Yes there are but the chemicals are not good for the environment and fish.

Nancy Kadlun: I don't want the slimes in the water. I am scared for our water in Kugluktuk.

Gord Macdonald: Do you feel safer if the slimes are on the island and there is an earthquake and the slimes leak out. Or if the slimes are in the bottom of the pit and there is an earthquake but then the slimes have nowhere to go.

Tyler Akeeagok: I think the best is to put them in the pit.

Gord Macdonald: The slime isn't toxic. It won't kill a fish or anything but it can kill people or animals by getting stuck in it.

Joanne Barnaby: We were looking at alternative uses of the rock coming out of A21. One of things was if you remove the slimes from the PKC then the PKC is somewhere that can benefit from the good rock.

Gord Macdonald: The only thing is the timing.

Kathy Arden; Is that because you have to have the North Country Rock Pile completed before? Why can't you wait until it's done?

Gord Macdonald: We would have to wait until the mining was done.

Celine Marlowe: Can we just close now some of the elders are not well and would like a rest before supper.

Joanne Barnaby: I think we had a really good discussion, not a lot of really concrete points yet but I think we need to listen to the request.

Natasha Thorpe: One quick thing, please have a look tonight at the North Country Rock Pile recommendations.

Colleen English: If you want to go outside you can go on the deck or out the front door.

END

Joanne Barnaby: Last night after we broke up, Colleen, Natasha and I were talking about today's schedule and whether we should stay focused on the South Country Rock Pile before moving on into the discussion around watching and monitoring and we decided that was probably a good idea since there is a lot of interest and concern being expressed so we want to make sure we get clear on that and perhaps come up with some recommendations around that. So then we talked about how to use today in the best way and we realized that having the tour in the afternoon can really tire out the elders and that it is hard to come back and work so we decided it might be good to have the tour in the morning. So we will head out around 9:30am. In terms of getting ready for the bus tour we have suggested that we go to the South Country Rock Pile and we have enough time so you can get out and walk around the area. And then whether we do it right after or later on in the tour we can also go to the North Country Rock Pile and pay attention to the height, we are going to try and go up to, and pay attention to the size and pay attention to the slopes and the rough edges and we will point out where the proposed trails will be for animals and we will point out where the slopes will be for animals and people.

Colleen English: Just to help people with the North Country Rock Pile, when we had discussions about the North Country Rock Pile what Diavik heard was: We talked about the different angles. When the truck dumps rock it is the 1:3 angle, very steep. The slope that is easy to walk up and is finished is 3:1 angle. What Diavik heard was that 3:1 was preferred for the whole rock pile except for the side that connects with the PKC that would stay 1:3. So the whole North Country Rock Pile is going to be pushed out to the 3:1 angles. The North Country Rock Pile will look like the test pile. The South Country Rock Pile would currently have just a wildlife path over it, the rest would be the 1:3 angle.

Wayne Langenhan: Some of these people haven't seen the test pile.

Colleen English: We will go there today. After last night when we were talking about A21, I feel there were two key questions for you to think about. Say in an imperfect world the North Country Rock Pile closure plan isn't approved, then Diavik will say well then we will have the maximum size for the South Country Rock Pile. If that were to happen, what would you want this pile - the South Country Rock Pile - to look like? If it was the biggest it could possibly be and none of that material was used elsewhere would you want the rough sides with the caribou path or would you want no caribou path or would you want it all sloped out like the North Country Rock Pile where it is just easy access to go over anywhere?

The second question/recommendation would be let's try to make that pile as small as possible however you can do it. The Panel doesn't necessarily have to solve the problem of where to put the rock to make the pile smaller – that would be Diavik's job.

Joanne Barnaby: The first option is something that Diavik doesn't have any control over. So Diavik wouldn't have a lot of choice then about the size of the rock pile but if they do get that approval to use it on the North Country Rock Pile and elsewhere then there is more control over the size and shape of South Country Rock Pile.

Wayne Langenhan: My question is how long does it take approval to get the go ahead to move that material around that island?

Colleen English: Good question. The North Country Rock Pile closure plan originally went in, in March 2016, the most recent version they are just submitting with some updated engineering plans went in this month, and they hope to have an answer before the end of the year. January 2018 is when A21 is going to start to be mined and that is when Diavik wants to be moving that material directly on to the rock pile.

Wayne Langenhan: After the decision is made does the panel have to get back together?

Colleen English: Depends on what you say as a recommendation. If you say to make this pile as small as you can then its Diavik's responsibility to figure it out, or you can give more direction as to where that rock might elsewhere go.

Nancy Kadlun: This rock pile there if they start using it to make the North Country Rock Pile smooth before piling it up that would be easier. That way they don't have to have a big pile already then haul it again.

Colleen English: I think that is what Diavik is hoping.

Geology map.

Kathy Arden: Can you point out where A21 is.

Joanne Barnaby: Maybe when we get to that area, we can have elders that know that area point out where caribou use to cross.

Natasha Thorpe: These maps are from the mid 1990's from a few different groups.

Joanne Barnaby: That would be a crossing that the caribou would use in the fall time.

Natasha Thorpe: Spring map – again traditional knowledge is showing the South Country Rock Pile is proposed through the caribou crossings.

July 12-30 map – collared caribou results. Red areas caribou food, black arrows caribou trails

August Enzoe: When we mentioned how they used to pass when they were coming back from the calving grounds.

Natasha Thorpe: We just wanted to put this out to you in terms of where we are going to go and where we want to spend most of our time. Sounds like most want to go see the North Country Rock Pile and the South Country Rock Pile. To climb up to the top of the North Country Rock Pile takes quite a bit of time, even in the bus. So we had talk also about going to the A21 pit but there was a suggestion this morning that may not be a priority compared to going to see the other two.

August Enzoe: First up to the North Country Rock Pile.

Bobby Algona: When we are talking about caribou crossings and migration routes, we have had a lot of discussions over the years, all along coming to these meetings because it is right on the migration route, I have been to the Bathurst Caribou Range Plan in Yellowknife this year and there are something's in my opinion, you white folks build cemeteries, how would you feel if your loved ones tombstone was disturbed, knowing or unknowing. It's the same thing with our people. We have heard of other families living on the migration routes, and they all have burial grounds, like in my area Pellet Lake we have burial grounds there, they passed away from polio I think it was, when all the disease was going through. When you look at people being buried and their tombstones are disrupted, that's against the law when that happens and in our minds the caribou crossings that we don't really know about we have a lot of burial grounds that we don't even know about yet in those areas. Some people have worked on these caribou crossings a lot and get together and lived in migration routes and there are burial grounds and I don't think that industry should be allowed there, that is always conflicting to me sometimes we don't know who might be buried there, just like a tomb stone when you leave sometimes we do find those things out on the land by chance.

Joanne Barnaby: That is really important insight to share. I know there was archeological research done and I am not aware of any either traditional knowledge pointing out any burial sites in that area or archeological findings. Caribou crossings and trails and corridors are obvious places to look for burial sites because it would have been a logical place for people to camp.

Modeste Sangris: I just ask about what Bobby was talking about and the burial sites maybe 15 years passed and there was a camp at the end of MacKay Lake and we were paddling a canoe and doing research with the archeologists and how they use to work. There was James Sangris, Curtis Sangris, there were six of us. We looked along the way and they talked about polio and we found one site along the way and it would be good to identify these areas where our ancestors and forefathers were. I said yesterday, my late father was born in this area and they would harvest caribou in this area so they could use the hide for clothing and the meat for food. It would be good to identify these areas, the caribou is a smart animal, the area around here is beautiful but the way the island looks now the caribou would probably migrate a different way.

Joanne Barnaby: Any other thing to watch out for? Everybody has his or her warm clothes and boots?

Colleen English: I would have to check.

Tour/Lunch

Gord Macdonald: Wayne asked a question about how much slimes are there? We talked about the whole South Country Rock Pile being 16 (million cubic metres) and that if it was smaller because we used a lot of it on the North Country Rock Pile then it would be 12, the amount that is in the middle (PKC) here is 5.

We want to take the slimes out of the PKC and put them in the pit. That amount is 5.

Kathy Arden: I had asked what the cubic meters were for the slimes to know how much was going to go in to A418. Also what is the depth of the A418 carrot?

Gord Macdonald: We will get back to the depth but the amount of slimes is 5 million cubic metres.

Wayne Langenhan: So you take 5 out then put 5 in from the South Country Rock Pile.

Gord Macdonald: Start with 16 – 4(cover) = 12 left then -2 around the island then -5 to put in to replace the PKC taken out. So left with 5. So yes, volume wise that works.

Wayne Langenhan: So that would be a very low pile.

Gord Macdonald: Probably one 15m lift.

Wayne Langenhan: So that wouldn't cause a problem for anything then.

Gord Macdonald: This whole thing (PKC) is holding about 45 of processed kimberlite.

Wayne Langenhan: Just trying to think of a way that if we add on to the north pile and made it just a little bit bigger, like wider, that we wouldn't have the same network down below, we wouldn't have two we would mostly have the one.

Gord Macdonald: You have the right volume concepts so that is good.

Kathy Arden: You had told us that when you started this mine you know that there was bad and good rock, bad out of the two pits and good rock out of A21, did you have a plan for if A21 didn't get approved to cover the North Country Rock Pile.

Gord Macdonald: We did. We don't have to do it anymore because it's not that plan anymore but remember when we were standing and watching those dozers pushing that slope and there was that big hole there that we dug all the rock out of to build this dike. That was all good rock, so we would have done the same thing and re-mined this rock and used it to cover the pile. We would have re-mined this NCRP till pile to cover the rock too.

Kathy Arden: Okay so the fault line between the good and the bad rock is where. But there is a good zone in there as well.

Gord Macdonald: There was about 15% bad rock but you can't easily pick out the bad rock from the good rock. We were able to pull out quite a bit.

I don't know if anyone talked to the driver of the bus because he was part of doing the re-mining and he said it was exactly like mining out of the pit, it was frozen and it was not easy. We are glad we don't have to do this, that we can take it straight out of the A21 pit.

Natasha Thorpe: Any other questions for Gord?

Modeste Sangris: We are not geologists we don't know anything about the different rocks. They are the ones that extract the mineral. The land is being ruined, the land belongs to us and we live off the land and the caribou and our forefathers they went trapping, hunting but today the minerals all over the land is the one running the economy. In the past we didn't know anything about the minerals, so you use numbers at times and you say the good rock and the not good rock. What are you talking about, the rock not good and the other part is good. Maybe you are talking about the chemicals used to blast the rocks. Yesterday Rose told us that God created everything in the earth including the rock so it can't be bad. I can't really take in the information saying that the rock is not good and the rock is good.

Gord Macdonald: We are using the words good and bad hoping only for a way to describe the chemical composition of the rocks.

A21 rock – for closure (better then type 1 rock)

Type 1 rock – roads, dikes (geochemically simple)

Type 3 rock – NCRP (can create a bad seepage)

It's not because of blasting that it becomes that way. It is its natural composition of the rocks.

Celine Marlowe: For A21 was there anyone from the communities there when the fish were taken out of A21 to monitor?

Gord Macdonald: I think it was a Tli Cho contract. Can I get back to you with an answer for that?

We went to all of the communities to say this is work that we need to do and different groups bid on the work and I can't remember which community did the work. It was one community not multiple communities.

Celine Marlowe: So you mean we have monitors back home that can't be here to watch taking the fish out?

Gord Macdonald: Its not that they can't come to watch, I suppose they could have come to watch but we didn't have people from every community up watching the work as it was done.

Celine Marlowe: So how do we know all the fish are out of there.

Gord Macdonald: We will know in two ways. The decision about when to stop trying to take the fish out is up the regulators (Department of Fisheries and Oceans) they are the ones who told us when to stop. And two, when the water is pumped out we will be able to see the bottom. When we did the other two pits it worked very well.

Bobby Algona: The geology map.

What you are telling us is the rock up there is different from the rock at the bottom. Why would there be diamonds in the rock if it isn't the same type of rock?

Gord Macdonald: The kimberlite is like volcano's that came out of the earth. So where they came to the surface doesn't have anything to do with the rock type, it has to do with where there are cracks in the earth, weakness in the earth trying to get out of the earth's crust. If you look at the pipes they are all aligned with the weakness in the earth.

Bobby Algona: When we go out on the land, you walk a hundred yards and the rock and soil is different, it would be the same thing as there then.

Gord Macdonald: Yes, that's why it took so long to find these because there is not a surface signature to say if I am standing on this type of rock there is gold here, which is how you find most elements.

Joanne Barnaby: Any other questions for Gord?

We want to come back to the questions that we had posted here, and start working through those questions with you. I think there is a feeling that we are ready to move into small groups to look at the maps. It doesn't have to be men/women but smaller groups.

Break to set up for two groups

Natasha Thorpe: 5 questions to work through all about the South Country Rock Pile and now that you have been out there to have a look I think this will be a rally productive conversation.

Wayne Langenhan: What pattern are we going to get in to answer the questions?

Natasha Thorpe: One question at a time.

Question 1 – should there be a wildlife path over the pile?

Question 2 – if so, where should the wildlife pathway be located?

Question 3 – Is it okay for the surface to be rough

Question 4 – Are there any water quality or flow concerns

Question 5 – Should the South Country Rock Pile be smaller. How.

Wayne Langenhan: Question 1 – We have to determine if they are going to get the permit to move the material around the island. Obtaining this permit would allow them to move the rock all around the island which would make the pile much smaller. If they do get the permit and are allowed. This pile will only be a fraction of the size, half the height of the North Country Rock Pile. We may not have to worry about a path but just be sloped the sides it would allow caribou to just go over it like another hill.

Should have two scenarios – 1. The pile as half the height. 2. The pile at its biggest.

I haven't hunted this region and I know there are people here who have. I know there are trails across the island for caribou. It would be better if we have to plan on a high esker like the other one to let those that have hunted here say where they think it should go.

August Enzoe: I have been on this board for many years, and we are talking about the future of the mine closing. The North Country Rock Pile we asked them to smooth around the whole pile same as the roads leave it as is but make it smooth. Around the airport as well.

In 1996 or 97 I was here and there were caribou all over this island. And then they head to the south side and they swim right across. Right now we should stick to the island how it should be done. Never mind outside I don't think we will see caribou around here again like there use to be way back when.

The South Country Rock Pile we need to think about how big it is going to be and how high, make it nice and smooth, so that is what we have been working on for a number of years now. We have to try and put it back to the way it was a long time ago. It won't be the same but we can make it nice for travel and easy for them to get up and down.

Make it clean and smooth.

Modeste Sangris: In the fall time we have the migration of the caribou, they usually come down this way, they have three routes. Some years there is nothing. It goes to Tli Cho region and it goes to the east to Lutsul kè. Three migration routes and right in the middle it goes on this route only. This is a big development that has happened on this island. I don't think the wildlife will come back.

They have to try to make it smooth, there use to be a hill where the North Country Rock Pile is. I don't think the caribou will come to this area anymore. The caribou are smart and sense that something is happening over here. We hear from elders they have three ways to migrate, east, north, south. There use to be a lot of caribou at that time, now you don't see caribou now that a lot of development is happening so it kind of chased the caribou away. I don't think that you will see caribou migrate here. Smooth the pile so the animals can get up and down.

Louis Zoe: We are talking about the North Country Rock Pile and it is really high; it would be nice if they can lower it down, so it's not so steep so the animals can get up and down. It would be easier for the animals to get on top. Right now with development happening we don't know if we will see caribou again in this area. I know they are making a lot of roads too. There are all kinds of roads being built and the roads are steep. That area where we went use to have a lot of caribou but we don't know if the caribou will come back. We go travel to Wekweeti to get caribou. Every region has their hunting area. We usually travel to the Sahtu region but because of the fires we haven't see much caribou there either. It is critical for us to go out and get wildlife.

Nancy Kadlun: Talking about this pile here to keep it low as possible without a big mountain, we can put some of it over here so we can have a low mountain and if they pull out the slimes the bottom might not be so clean for animals but they can cover that part with rocks and then it would be good for animals. To try to keep the South Country Rock Pile as low as possible so use it where they can.

Natasha Thorpe: 1st recommendation: Keep the South Country Rock Pile as low as possible.

Would we want to encourage wildlife to travel over the pile?

Would we want to slope the South Country Rock Pile or would we want to allow for pathways.

Wayne Langenhan: We came to the conclusion to shape the North Country Rock Pile as an esker. If they get the permit to use the rock then the South Country Rock Pile will be much lower and it will be much easier just to slope the sides down and make it caribou friendly the whole island. If they come back. So if they come back it is there for them. If they don't come back then they don't but at least if they do come back it would be in a shape that would attract them. So they can get up high to get away from the flies, but I think we should prepare it for the event that they (caribou) will come back and hope they come back, but if they don't come back we haven't lost anything it's still there for them.

Natasha Thorpe: Plan the South Country Rock Pile to be caribou friendly.

Nancy Kadlun: Yes caribou friendly.

Tyler Akeeagok: Just listening to my elders here and gaining knowledge of what they saw and they know that this island was a very popular feeding ground, migration ground and that if they can make is caribou friendly as possible then we would be prepare whether they do or don't come back, at least we know that it is caribou friendly.

Janelle Nitsiza: When you think about Diavik closing, who's to say how many other mines might open, so the caribou are running out of lands to run across, they are running out of playground space, so we do need to prepare for if they do want to come back. It is their choice we can't herd them or tell they where they can and can't go. Overall goal should be to make the entire island caribou friendly, not just the rock piles. Hopefully lichen will grown, I know it takes a long time to grow, so if we are preparing now maybe lichen will grow for future generations of caribou, if our caribou live that long, god willing.

Modeste Sangris: The caribou, we can't control the caribou and we've been saying this since yesterday but in the past maybe 2 summers ago and doing fish samples, during August its very dark and we see the mine site from the fish camp, you could see that the caribou were swimming in the narrows but they won't swim across where the light is shining. If the caribou is traveling at night it won't go towards the light. In the past we used to travel in this area with my dad, we use to travel in this area with dog team, and there was so much caribou that they couldn't move forward. There were so many caribou on the lake we couldn't move forward and we harvested caribou in the afternoon, my dad said that we should go to shore and we set up a tent and then clean up the caribou and store the meat in the ground. I don't know how many thousands of caribou

there were. Since then I have never seen that many caribou again, I think it is because of the mines, if the mines do the reclamation hopefully the caribou will come back. We are identified by our palms but the caribou are identified but the mark on their forehead. When I was young there were caribou around Yellowknife.

Dora Migwi: Yesterday I have been listening all day and today and the rock pile that we walked on and we see it with our eyes, the rock pile should be reduced in height and slope should be gradual and those are the things that has been said. We should all be in agreement, that is the only way we will improve the wildlife path and also the migration of the caribou we aren't in control of the migration. The caribou knows where its food is. It doesn't live in only one place. It moves as Louie was talking about the migrating of the caribou it goes in the Wekweeti area and looks for the food where it is available, because of the forest fire we don't know when the caribou are going to go back in that area. It is up to our Creator. In certain years there was plenty of caribou and in other years there was none.

The slope should be gradual and all the rocks smoothed out and there is going to be lots of work to be done, using the permit, we should follow the permit, we can't sit here and say nothing. The North Country Rock Pile is high enough and I think we should have a gradual slope all around it.

August Enzoe: I see a lot of adults from the 1980's and the way they used to tell me stories, they told me it was from way back, 1870s. They told me that the caribou are lost right now. I am not blaming the mine right now, they told me there were lots of caribou but one day you will go up the hill and look for caribou and you will see none and you will have tears in your eyes.

Rose Betsina: We can't talk about these things very often and it's just like talking on radio. They say caribou hear us in the long distance and it seems like we are talking in the same manner of last year. The destruction of the land was by the mining company. The way caribou used to migrate, it's not going to take place. You can reduce the height of the North Country Rock Pile but once we check the ground and it seems there is less of a height then last year, because the equipment goes on the North Country Rock Pile it seems the height is reduced. The wildlife may not walk along the rock pile. Where will it feed itself on the rock pile? I don't think it is going to happen. The caribou use to go on the land because it was feeding. The lichen, the food of the caribou usually grows on the land and because of the forest fires so maybe we will have re-

growth, once the mining is done they will be leaving, because the company is not from the north, they don't live here and they come from the south. They are foreigners and they destruct the land and take the minerals and although they may be using lots of money, we can't blame them all the time.

Louis Zoe: The South Country Rock Pile I think while we were standing on the ground there was a little lake there maybe they would drain the water and then put the pile there so the height of the pile wouldn't be so high and the A21 we don't know the exact amount of rock that will be removed. I have worked with ENR officers using helicopters, I have worked with them for three days and if there are about 10 caribou along the shore the ENR officers would tell the pilot to go in the bush and the caribou would come out of the bush. They were using a helicopter and they were hovering above the caribou. The caribou were in distress. They found two caribou collars in two different places. They retrieved the two collars and if the caribou has a collar on its neck when it is running it may be a distraction to the caribou, injuring it from the neck to the jaw. When the caribou have the collar on and they are feeding when they bend over the collar would be a distraction for the caribou.

Natasha Thorpe: What I am hearing is the recommendations for the North Country Rock Pile would be the same for the South Country Rock Pile. You had made a recommendation about the North Country Rock Pile to keep it as low as possible. Would it be okay for some of the sides of the pile to be rough or am I hearing that you would like it all smooth?

Colleen English: Like you see in some areas on the North Country Rock Pile that haven't been smoothed.

August Enzoe: Caribou all know if you see boulders the caribou won't pass through there in the summer. Sometimes when it is really hot they do sleep in the shade, the caribou won't go over the big boulders.

Janelle Nitsiza: Wolves are predators to caribou, what if the wolves use the rough areas as traps for the caribou?

Louie might remember but when we went to Daring Lake we went berry picking and there was a slope and it looked like a caribou had slide down and walked on the shores and we found him sleeping so the slope does work I think.

Natasha Thorpe: Smooth everywhere (North Country Rock Pile) except the side of the PKC. We don't want the caribou to come into the PKC. Over here if this is where the South Country Rock Pile is going to be what I am hearing is that all the sides should be sloped like an esker to be caribou friendly.

The South Country Rock Pile all the sides should be sloped to be caribou friendly. Are there any sides you would want left rough?

If you could mark it with a pen. Is there an area on the South Country Rock Pile that you would want a walking path or just smooth everywhere?

Tyler Akeeagok: A healthy slope all the way around for mobilization and so that the vegetation can grow all around the hill too.

Janelle Nitsiza: I second it on the record.

Wayne Langenhan: I third it.

Consensus

Natasha Thorpe: Next topic is water and drainage. Are there any water quality concerns or questions about the South Country Rock Pile?

Wayne Langenhan: It is a different type of rock that poses no threat and is not going to cause a problem so I don't see any reason why there should be any concern about water run off, holding ponds or testing ponds. Maybe have testing ponds for the first little while along the edge just to make double, double sure, then if it's still fine then leave it. Test for a little while.

August Enzoe: The North Country Rock Pile before they were testing are they still testing? Then they should do the same for the other one.

Natasha Thorpe: Louie's recommendation was to drain the pond before putting the pile on top.

Louis Zoe: All the rocks from A21, don't make it really steep and to have rabbits in the area.

And the water is being re-used again and the water quality if it's not that good do they put the water back into the lake.

Natasha Thorpe: Are there any streams that drain out of the pond that would drain into the lake? Louie suggests draining the pond before putting the pile on top of it. They are wondering if there is any flow that would come from underneath this proposed pile.

Colleen English: Right now for natural drainage, the pond drains to this pond, which then drains to Lac de Gras. (Natural flow) When Diavik is operating any water that comes off any buildings or drainage, they are not allowed to release it. (when they are operating)

When they are closed the water would be kept there then tested and then connected back to LDG if it is good.

Modeste Sangris: Two years ago we did water sampling at the camp across the lake. I don't know if they keep on monitoring, we did fish sampling and where ever the water is being treated maybe they are doing that but the people who are working here are using the water from this lake and its being treated and they have to monitor the water and also the fish. It would be good if you monitored these things while it's in operation and then also at closing time.

Colleen English: Just to let you know there is a lot of monitoring that still does take place. That camp (TK Aquatic Effects Monitoring) is planned again for next year [2018]. Their boat was out today sampling where the treated water is released back in to Lac de Gras. Every summer they also do a huge lake-wide sampling program and that includes the water, includes the bugs, and the sediments on the bottom of the lake, it includes the bugs that live in the water and the fish. They have a really rigorous monitoring program and it is called the Aquatic Effects Monitoring Program, or AEMP.

Natasha Thorpe: Are there any volunteers to present to plenary from our group?

In general we want to make the island caribou friendly except

Pile to be as low as possible

Smooth on all sides

Similar to the North Country Rock Pile

Use A21 rock where possible around the site.

Not up to us if the caribou come back we need to make it friendly for them if they do.

Drain water in pond before putting the South Country Rock Pile.

Wayne Langenhan: We have only done one scenario here what if the permit is not granted.

Natasha Thorpe: What I have been hearing is that they want Diavik to explore other options for the rock regardless.

Wayne Langenhan: If they don't allow the permit to move the rock then the pile is going to be higher and it is going to be something along the line of the north slope and therefore maybe we should think about patterning the whole concept of the south slope in accordance with the north slope. Like the on ramps, off ramps because it will be considerable higher.

Natasha Thorpe: That is what I was trying to see, does anyone want on ramps, off ramps.

Tyler Akeeagok: Gord was talking about this being the maximum area, regardless how big it is they can do the healthy slopes.

Colleen English: They have planned for it to be able to be done but it is not planned to be done.

17 September – Breakout Session led by Joanne

Celine, Kathy, Joline, Theresa, Roger, Bobby, Tyler, Janelle, Joanne, Colleen

Joanne: Any ideas or further discussion on priorities for monitoring/watching? Louis suggested water and animals.

Roger: Water is like gold and becoming limited.

Joline: I remember back when we were out on the old airport road, going to check mushrooms. My son ran into some scat from woodland caribou and my dad was smelling it and taught it smelt like willow because that's what they were eating in the woodland area. Even scat can help to determine their health. Not only for caribou. On the tundra by the SCRP, we asked louis to come and asked what kind of poop it was. He said it was rabbit and that it stunk and it didn't smell right due to disturbance around here. During winter, its easy to cross onto island when ice is here.

Kathy: Do rabbits migrate?

Joline: I haven't seen rabbits yet.

Kathy: If they had a rabbit hole on the island, its under the NCRP now.

Joline: I was asking about wildlife monitoring program. its on EMAB website. I asked if they have fish tasting. Do they have caribou tasting?

Janelle: Hottah Lake caribou tasting. Left jaw, measured fat on back, took kidney and its fat and took the poop. Also took home caribou meat. Male Youth got to learn how to butcher the caribou at beaver lodge. It was interesting.

Joline: Harvest caribou as part of training. Take samples of caribou cow to see how doing. ENR officers go with ENR students. How come don't do that for mining industry?

Janelle: Dianne told us they watch caribou and observe it and document it. But no butchering. Used to harvest at Daring Lake to teach but even that program can't hunt to teach anymore.

Joline: Couldn't do it last year as no caribou in the area though.

Joanne: There are ideas out there, that we can transfer to the mine site. Around water, scat, animals, etc. On-site monitoring from a TK Perspective. This scat discussion is obvious to me. Hearing Louis yesterday about different smells and what can cause them is important. There is something that we could do.

Kathy: Do we use this as a basis for the water and the animals? Less scientific, use it for other stuff.

Janelle: Monitor insects at Daring lake. Maybe we could do that here.

Joanne: Science or elders? Have elders collect bugs? Is there something with it that elders could look at?

Joline: If you go from plants to bugs and up the food chain. From water, bugs, insects in water, then plants, plants on land, animals and bigger animals. I know there are studies Georgina from plants. Dust is really probably a big impact on plants right now. When we were out there you could see the dust from the vehicles on the big road. You could see the wind taking it.

Janelle: Would you use this plant for traditional medicine? Can they find plants used for traditional medicine and bring them back to the area?

Joline: Dust sampling. Does Diavik do this already?

Colleen: Diavik does dust sampling for particulates and quality, and they also monitor dust on vegetation plots to see if species or growth changes as a result of dust on snow (resulting in a darker colour snow that melts earlier and promotes plant growth). Diavik also does a lichen and soil sampling program to determine metals

levels on lichen and soils near and far from the mine, up to 40 km away.

Bobby: Id' like to see results and documents on samples collected by Diavik over the years. Sometimes we don't get to see these results that Diavik gets. Dust, air, all of it. I'd like to see that. That data that Diavik has collected will help us by giving an example of two different ways of doing things a science and TK way. Scientists are highly paid individuals working for companies and more lean to data collecting from a science point of view. TK assessments are sometimes set aside b/c of science way. We should at least be looking at both more often. Work with mining companies and put things in annual reports. I would really like to see that on the data collection from Diavik. There can be conflicting ways of doing things. From a TK point of view, I've known all along, just like Louis, who says we need to look for more ways of doing things. I know they've been doing it all along but I don't see these reports very often. TK is looking, smelling, feeling and it can be hard for science to understand.

Joanne: Assess monitoring methods and results if have Diavik reports? Yes.

Joline: So the Panel only meets once a year and there is plans to continue to meet until closure and maybe after closure?

Colleen: Yes.

Joline: Going back to morning session of what was covered, the stuff that was completed and reviewed, we haven't taken a look at the updates on it. What DDMI completed is PKC, revegetation, etc in each session. They said they completed all these. If we look at those, we want to see if its working. U of A revegetation research – what are the results? Going to the test pile and comparing that against the other side. The test pile said it's been there for more than 6 years and it doesn't have a lot of vegetation. When I look around, I see disturbance. There aren't a lot of seeds to blow onto it. The NCRP is closer to the tundra so maybe more vegetation. How will that look at the end? We don't want to leave this place rocky and grey.

Janelle: We said natural vs man-made vegetation on the NCRP, but it takes longer. Hopefully plants will grow faster with global warming. Gord's presentation could have been more elaborate.

Roger: It would be nice to see all the analyzed information from the lake bottoms and monitoring results from fish sampling programs.

Kathy: That's an on-going monitoring program. So from Day 1 they've been testing and they see how things change over time. What are the differences we've seen from Day 1 to today? We want to know to determine how we want to watch. We need to understand this in order to build a good watching program.

Roger: Would give elders a better view on how to provide knowledge.

Joanne: TK Panel to assess monitoring results to know what kind of monitoring to do in the future.

Roger: Sometimes the words are a little technical for the elders, too. Try to use ones that elders can understand. Use visual cues, pictures.

Janelle: Place names, terms, etc can be provided to translators in advance to help with information. As well as giving them presentations in advance. Interpreter translator program. One on health terms, legal terms, etc. Maybe provide this if it already exists (general mining terms interpreter workshop from years ago).

Kathy: So you want them [Diavik] to respond to the recommendations? They've done that on the sheet.

Celine: Who is doing the monitoring?

Joanne: Right now, Diavik does a lot. Some independent people come in. Also involve elders in some programs. TK holders in some programs. On a smaller scale, single event. I remember hearing about Fred Sangris with lichen sampling and dust.

Joline: Were archaeological surveys done?

Celine: Re-vegetation plots - what is happening?

Colleen: Yes, archaeological surveys were done during the Environmental Assessment for the whole mine footprint and other areas around the mine. Another one was done before the wind turbines were put up as well. The re-vegetation plots had another full round of sampling this summer, which was year 10 for the first round of plots. The full set of results will be written up around the end of 2018 and that will allow Diavik to determine what worked best – types of plants, soil, amendments, etc.

Bobby: I have conflicting feelings about collars on animals and taking animals apart without permission from elders. Scientists don't believe in what elders say about condition of animals. They put on collars, tags, harass animals. There has to be a TK way. It's

always been set aside. We need to come up with a better way. When we try to work with scientists, we have been trying to say that science is not always best. TK has to become more of a priority – look at elders way of doing things first. They have not lived with these animals.

Joanne: More positive ways of dealing with that could be to say that Diavik should consider methods used and alternatives to finding answers with TK Panel members.

Janelle: Science is as bad as mining. Following and chasing animals. Helicopters stressing and scaring animals. Louie noticed collars with hair and dry blood on them. And they're heavy. Research is digging into the decline and making caribou go away even more. Very little respect to their natural way of life.

Bobby: Animals don't act naturally after being collared. It's doing something else. We have to teach these things to youth. We need to look more closely at the scientist's ways. They should not be doing all these things without talking to elders first. They just want to study it themselves without knowing what to look for.

Kathy: Right now they tag dogs so you can find and locate them. Its just a little injection of a chip. Why not do that with caribou instead of these big collars?

Colleen: Going back to Joline's comment regarding the work of the Panel, one of the challenges with wanting an overview of how TK Panel recommendations have been implemented is that it's mostly all forward looking plans on paper vs actual implementation. The NCRP re-slope is a great example. Understand frustration and wanting to see tangible results but this is a lot of forward-looking planning.

Bobby: Plants on the ground might look ok but roots on the bottom could be different and may be changing over time. Roots act the same way as blood in a human. Once they start to clog, it dies. Same with trees. Impacts may take time to show up so we may not see impacts now.

Celine: There must be plant life around here. I saw them on and under boulders. Its beautiful. I thought someone planted them. But the flowers are growing and they're growing on rocks. I saw some green moss growing. I never saw them before, but they are growing and coming back. Seeing those flowers makes me feel hopeful. If these can grow here with just rocks, that's good. When I saw them way over there, it was good. We can't give up, we have to have hope. I know its hard but life has to keep going. We all have each other

for that hope. We all have to hang onto each other, no matter who we are or where we come from. I know its hard, but don't give up hope. My husband told me that on his deathbed. And it was hard but I do have to keep going because of my grandkids and my daughter. Its so hard to say I would. He'd say 'I never heard your answer yet'. The last week, I said OK. 2 days after that, he was gone. He wanted to hear me first. So no matter where or who we are, we need to continue going on. He taught me that. We have to be strong for each other.

Joline: Priorities in monitoring. Right now we have AEMP with fish every 3 yrs. We should start off with a mixture of youth, elders, scientists. Youth gather info from elders. I find in our communities and regions, when they come like industry and report on what's happening, when they report to our people its hard for us to trust what they're saying. So we throw mean stuff at them, very negative, if they are non-Aboriginal or science focussed. When we have our people trained, I see a difference. When I started working with Tlicho Government, I tried to read materials and have people help me understand. Who do they trust? Outsiders, or our own people. I would take information from outsiders and present it to the community. If you did this, it would build trust. They pick up both ways. Our own people would understand. Guides youth in a way that is supportive. Showing them opportunities.

Kathy: Make sure youth are trained on how to take good notes.

Janelle: Diavik's is very similar to the Tlicho model for the AEMP.

Joline: Ekati has a similar program for Jay but they don't have interest in using Diavik's model for the fish TK program.

Theresa: The basic ideas I have are down. I'd say it if I had anything different to add. What is being monitored and who does it, is that what we're talking about? We're planning for after the mine is closed, right.

Joanne: Yes. In order to slowly build the scope and capacity. So that when Diavik leaves, we have something ongoing.

Roger: I don't hear much about birds. When there is something wrong, they are the first to fly away. Don't see many reports on which ones come.

Joanne: There is some bird monitoring now. Do you want to learn what is happening?

Joline: One of our ENR grads had to do a thesis for their diploma. He was doing falcon research. He compared data from the mine sites and Daring Lake. Quite separate areas and he was looking at differences from disturbance and Daring. No difference in results, egg size, etc.

Bobby: Plant life is our medicine. We need to keep them healthy for our children and we need to teach people about the medicine. Not only plants, but other things in our culture such as bugs and worms and maggots. What would people think of maggots? Its medicine to me. They are things we need to live. Cotton balls, moss, flowers, berries, moss, bark, everything. They will be disrupted for now and I don't know if they'll come back in the future. My nephew works at Lupin and has seen coloured snow on his way back to Yellowknife.

Break

Joanne Barnaby: Our group was really on the ball.

Theresa and Roger to present for Group 1

Roger Catholique: We started off from the questions

1. South Country Rock Pile is in the middle of a major caribou corridor- avoid using it area all together, use PKC Area

2. Yes to pathways for wildlife, slope the whole thing – natural like an esker

   Yes South Country Rock Pile should be smaller

5. Cover building foundations and areas that held hydrocarbons

3. Cover PKC after removing slimes

4. Use material to extend the north end of the North Country Rock Pile and slope it

7. Keep it smooth (like test pile)

8. Add boulders to test pile and monitor natural re-vegetation and snow accumulation

6. Use South Country Rock Pile smooth road edges and other built up areas like the airport

9. Pathway should follow caribou migration corridor

10. Water should be tested by both science and traditional knowledge before releasing into Lac de Gras – where needed use moss and other natural filtration.

Tyler Akeeagok to present for group 2

1. Build pile to be caribou and wildlife friendly, we don't know if they will come back, but we want it ready if they do.
2. Have water collection for the first while to make sure its good before reconnecting to Lac de Gras.
3. Drain the pond under where the South Country Rock Pile will go before putting it there
4. Keep the pile low as possible
5. Make it less rugged on the side
6. Slope the sides down so its gradual all around for on/off access

Natasha Thorpe: Thank you to the youth for presenting. Anything anyone wants to add.

Joanne Barnaby: I think between the two groups we came up with very strong recommendations.

Natasha Thorpe: The other subject we want to talk about is what we want to see for watching / monitoring. Today I was really impressed with the similarity in findings between the two break-out groups.

Colleen English: After hours and the front desk is closed, if you have issues with your room key, see the commissary or baker.

Nancy Kadlun: If there is an emergency what number do we dial.

Joanne Barnaby: Tomorrow morning start at 9:30am

END

Joanne Barnaby: Good morning everyone. We have assembled the priorities for the next sessions.

Next steps Slide

Colleen English: Next steps slides – Where do we go from here. Future topics, sessions – DDMI Interests

1. PK to underground – include an underground tour along with the open pits
2. Updates on PKC closure update (if the #1 happens)
3. North Inlet
4. Closure details – building demolition, metal disposal, waste disposal, contaminants, lay down areas, airports, roads, etc.
5. Closure inspection criteria

2018 Aquatic Effect Monitoring Program (AEMP) traditional knowledge camp

Joanne Barnaby: Is the list fairly complete? Is there anything missing that the panel needs to focus on in the future?

Roger Catholique: These are for future. At a few meetings I had before the concern was about dust. Dust travels far in the air and I always wanted to have lichen and rocks sampled in case there is anything wrong because since you are here but the animals are way out there, they might stumble upon something we don't know about. There are barely any trees in the barren land.

Joanne Barnaby: Maybe we can get a response on that?

Gord Macdonald: I think that is a really good topic to put in. I know you are probably thinking more in operations than in closure but I think we could link the two under monitoring: how we monitor lichen during operations, are we doing the right monitoring on the science side but is there anything the traditional knowledge holders can do on their side and see what are we seeing now.

Dust and closure monitoring.

Kathy Arden: I was wondering if we could - and this is on the pretense that we are going to put the slime into one of the pits - can we get a drawing or sketch what it would like at closure, the South Country Rock Pile, North Country Rock Pile, the sloping and how the PKC could look if that is what happens? So we can have a look at what it would look like with it all gone. I don't know if you can have it for this session but maybe for next session.

Gord Macdonald: I know we didn't give you good visuals for this time but I think once we have what you give us we can do that for next time.

Joanne Barnaby: Questions?

August Enzoe: The underground for the future after everything is finished underground what is going to be done there? I want the people to think about that for the future.

Gord Macdonald: I actually think that is best to leave to talk about with the underground session, then when we will do a tour of the underground and we will try and identify for you all of the things that will be left, not only PK.

Kathy Arden: Maybe for us scaredy cats like me maybe you could have someone videotape so we can still see the underground.

Gord Macdonald: Let's take that as a good idea.

Bobby Algona: Closure details – I think it would be really nice to see everything in a list, of all the things that are in those categories, types of metals and all the details of metals that are put in the landfill. Building demolition materials and what might be considered to go underground.

Gord Macdonald: That's good, the more you tell me the better prepared I can be.

Wayne Langenhan: On the demolition of this camp, myself personally I would like to see as much that can be salvaged as possible and for that material to go to the communities to be used for construction within those communities.

Gord Macdonald: So before we even get to the demolishing what is the process we are going to go through to identify items that might be reused in the communities and what is our plan to engage with the communities?

Modeste Sangris: As we are talking about the reclamation I think it would be good to do a good reclamation, reduce the height of the North Country Rock Pile. On our tour yesterday we saw where little flowers grow on top of the hills. I was thinking about why the flowers were growing there and he was talking about how the dust particles can be blown in to the distance and once they reduce the slope maybe put some till on the rock pile and if there is only rock then nothing is going to grow but if there is till as well then it might grow.

Joanne Barnaby: Anything that you can share with us about the dike design?

Gord Macdonald: I can but it is a pretty big topic.

Joanne Barnaby: Is that a presentation that could happen at another session?

Gord Macdonald: Yes and then we could get one of the engineers to come and talk about it.

Joanne Barnaby: Design, construction, operation, and then closure.

Bobby Algona: Concerning the dike, again maybe before they start pumping the water out I would really like to see the water. In my mind something might be left behind, plants, or fish, or seeds. I would really like to see the water before it is pumped out to the lake.

Gord Macdonald: At closure?

Bobby Algona: No before the water is pumped out of A21.

Gord Macdonald: That would have to be right now because pumping will start in a month. Will everyone want to go or just a few? We might be able to get down there with a truck but we won't be able to get down with the bus.

Bobby Algona: The reason I want to see is it was one of the bays in the past that was one of the areas that my dad and I stopped to fish. It's one of the areas where we have caught really big fish. In my mind I believe that there might be more fish in there. What I am hearing is that there were very little fish in that area.

Gord Macdonald: One of the reasons there may not have been as many fish is because it has gone through two years of construction so its been actively being constructed in there for two years and the dike has slowly been closing so fish have had a chance to get out of there and I think most fish would probably want to get out of there and may have already left and it was only those that were trapped behind when we finally closed the dike that we are removing out of there. I don't think it represents what fish might have lived there in the past.

Kathy Arden: Did DFO use an underwater camera?

Gord Macdonald: No, it's based on catch per unit effort, tracked over time. It was fished out.

Wayne Langenhan: I just wanted to say that people that aren't familiar with the fish out, what you said is exactly how it happens, but the final say of when they quit is up to Fisheries and Oceans. It is not up to the mine.

Gord Macdonald: I didn't know that was going to be a question but we can certainly put what was done and what was found for a future discussion.

Bobby Algona: I may never have a chance to look at the pump out, there are a lot of other little things that we see in the water and those things should be saved as well. The little microbes should be saved as well, before I lose this chance to see it. When you look at things from a distance it's really hard to put in perspective what exactly is going on to the construction.

Joanne Barnaby: Maybe we can check around the room to see who is interested in going to see down to the water so maybe we can if we can get trucks.

In terms of what we address next, there was a suggestion that we do the underground tour and the option of moving the slime underground next.

PKC – Spring

Gord Macdonald: The updates on PKC at a later date.

Joanne Barnaby: adding topics to the slide

Natasha Thorpe: I was just going to see while Colleen is updating the slide is there anything that is season specific?

Gord Macdonald: I think the demolition one can be done at anytime and also does not need to be done at site.

Wayne Langenhan: I think that some of these things like the meetings could be shifted into spaces when the youth are on their breaks from school. I think the meetings should be arranged somehow to coincide with their time off.

Kathy Arden: I think one of the other things we have talk about is run off in the spring, testing of the run off.

Gord Macdonald: More to the future to understand runoff to the lake?

Kathy Arden: I think you are right that we spoke about that to look at it at closure.

Dora Migwi: What the youth had said about the dust that it goes way far away. When we are in Gameti and my late husband said that he was traveling on the land and on the lake there was dust flying and the dust came from over here. The youth had said that the dust can travel far, we see the big trucks on this island, maybe all the dust is going to all the vegetation, and lakes and ponds. The youth is right in saying the dust travels far.

Joanne Barnaby: Comments, suggestions, topics?

Roger Catholique: On the dust monitoring in the springtime, because that is when there is a lot of snowmelt and run off, that is when the plants come back to life, that is when you see everything that has built up over winter it all builds up and then you see it in the spring time.

Bobby Algona: This one is for the 2018 AEMP maybe we should focus on the rivers, and go look at the rivers as well, the one on the north side and on the south side and the one that goes to Kugluktuk, maybe make it a priority to look at before the J-pipe goes in.

Gord Macdonald: Yes I understand your concern and we will take it on as a challenge to get everyone to those locations.

Natasha Thorpe: Any other technical questions?

Gord Macdonald: Slide – Possible mineral waste schedule for A21

If you think about mineral waste these are the big things going on site, we will always be producing more PK that has to go somewhere either the PKC or underground. The other waste is the A21 rock, and is going to start in 2018 until 2021.

A418 mining is going to go at the same time frame to 2021. We can't put anything back in A418 until after 2021, at which time PK could go straight from the plant to the underground. If that happens we may not have to raise the dams around the PKC higher. When is A418 available, when are we producing rock out of A21, how long will we be producing rock out of A21.

Slide of the carrot

Pipeline from the PKC to the pit and it would settle PK on the bottom and water on the top.

Natasha Thorpe: 2 questions, how long does it take to drive to the bottom of the pit?

For the quantity of PK Slimes how high would they go in the carrot?

Gord Macdonald: 20 mins approx. to get to the bottom. We are still trying to figure out how much the slimes will compact. We think they would stay in the black zone, but we really don't know yet. Once we get to the point where the water is high enough we will put in a pump in order to pump out the water.

Kathy Arden: The PK sediments will also seep in to the tunnels because they are all connected.

Gord Macdonald: Yes, which is why we would build blocks called bulkheads to stop the water and slime from going to the other (A154) underground.

Kathy Arden: After all the PK is in there and the seepage comes in there is it going to be constantly seeping water or is the pressure from the PK in the tunnels and the carrot enough to keep the water from seeping in.

Gord Macdonald: That is one of the technical things that we are trying to sort out, as long as we have the water level below the lake level, water from the ground wants to get in.

Tyler Akeeagok: What is the freezing point of slimes?

Gord Macdonald: I think 0 but it won't freeze because of the temperature of the earth down there.

Tyler Akeeagok: What about the pipeline?

Gord Macdonald: We use heat trace on land but we would probably have two pipelines running so that if one freezes we still have the other one.

Ekati has been doing this for the last four years there and those are the kinds of things we are trying to figure out.

They put all of the PK straight from the process plant to their pit/pond.

Natasha Thorpe: Any other questions for Gord?

Break

Colleen English: This is the best we can do for samples at this moment (pictures). The old jars were lost and we are working on getting new ones for you.

Natasha Thorpe: We are going to spend the rest of the day talking about watching, so we are going to watch a video on this program that has been happening for a number of years.

Video on Watching: https://coastalguardianwatchmen.ca/network-communications (Eyes and Ears on the Land and Sea)

Joanne Barnaby: I hope this puts us in the mood about what we can do here. Focus first on this mine site and how things evolve.

Bobby Algona: I have a cd that is almost similar to what they are doing there. My family and I do a lot like that out on the land. I have always wanted to show you this. It would be something for our groups to do to. If we could someday see this video as a group.

Joanne Barnaby: Yes we can certainly look at fitting it in.

Lunch

Presentation – Developing a watching program

Natasha Thorpe: This presentation will give you a background and also ideas related to monitoring or "watching."

When we were out looking at the proposed site for the South Country Rock Pile Louie was saying that the rabbit poop didn't smell right. This is an example of the kinds of ongoing watching that people carry on which is grounded in traditional knowledge.

Louis Zoe: The rabbit poop turns into sticks like when they eat sticks. When we are out in the tundra, we see a little bit of cranberries now that the cranberries are falling off and after that it gets dry. When we went out yesterday we saw some rabbit poop and I said we eat that kind and I gave her a couple of the poop, I don't know what she did with it. When we used to work with our parents, we use to go out with the snowshoes and there were watchmen so they know the landscape and they know all the area, they watch what they

kill and they try not to waste any meat. Now that we are trying to keep our knowledge, but we are still pushing to keep our traditions alive, we have lots of ancestor's trails that don't get disturbed by the industry. We had survived on berries even in wintertime. It gets so dark and our parents would go out and get candles then we would have a little bit of light, and they would go out and trap and now today we have everything, there is a lot of money, it wasn't like that before it was a struggle, but us elders on the land we see the development is destroying the land so as elders sitting on the panel it is good to get help.

Nancy Kadlun: I really like the watching, because we all wouldn't be here for our mines there will be more mines in the future. I am always so happy that Diavik brings youth to the meetings and the will be here after we are gone. This will be the first mine closing so we are learning a lot. I was happy that Nunavut Impact Review Board and KIA works hard to keep our land clean. It's just the beginning to try and save our land I am so happy that Diavik brings youth because it makes them strongest for the future.

Bobby Algona: I still don't have the fish stories CD. Which talks about how fish and their bones tell a story about their life and how humanity got started. I still don't have that CD. Everything comes from the rock grows from the rock. So those are the stories that we need to push what we are and who we are. Earth was just a rock coming from somewhere in the sun, and the sun carried all our jeans and everything, it might be a ball of fire. The sun before it blew up it contained everything we have as humans. Everything comes from the rock. We would really like to express our feeling in this way, telling stories, the meaning of stories that we tell as elders. These are good things to watch and I hope that we can keep up the good work that we have been doing trying to tell our stories and we need to keep it up as long as we can for our children. I have said it before it is not only from industry but also from natural environments as well, our natural weather and industry is also causing the natural phenomena. Industry has to make more because of everything that the natural phenomena is destroying industry has to make more.

Natasha Thorpe: Thank you for that. One thing that I did hear was telling stories and how that is important. That is one thing that was missing off of the list for the future when we were talking about watching.

- Fish and water in Lac de Gras
- Dust

· Collection ponds
· Flowers growing on the pile

Joanne Barnaby: Info previous discussions on watching

You have already identified a lot of things that should be watched and we want to identify more clearly and could grow in the future. I want to talk about the approach the Dehcho did, building on the traditional system of always watching when you are out on the land, always watching and always sharing what you see, hear, touch, taste, smell when you come back. Continue to share that so we can take action when necessary. What they did in that region, we are going to decide in each of our communities with who we are going to share this information with, then everyone will know who to share their information with when they come back. Its modernizing the traditional system meeting today's needs. Each one is building on their cultural ways you have a lot of direction provided already and bringing it together and put in to practice some of these ideas.

Natasha Thorpe: This is not the only time we will have to talk about monitoring, we were planning more time but spent more time on South Country Rock Pile, so we will most likely have a session just on watching in the future.

Kathy Arden: Diavik has already done a lot of watching, bug, fish, animals, water, vegetation and dust. One of my questions on those watching would be what was one of the first plants that came back after the destruction of the island, lichen takes a long time but some plants don't. Maybe if they have information on their studies, we could use that in ours to see if that is the kind of plant that is coming back more quickly.

Colleen English: I know naturally fireweed.

Joanne Barnaby: Can we think in terms of the fish camp. That involves the health of the fish and the health of the water. Using our traditional knowledge are there other activities you would like to see in place that you are involved in to expand that monitoring?

Janelle Nitsiza: I just would like to share what we have been doing in the Tli Cho region, we have an aquatic effects monitoring program, I believe it is in its sixth or seventh year and it rotates to each community and you spend about a week or so sampling fish and water with scientists and elders. I think it is next week and Louie is going to be hosting the next one in his community at his camp. But there are reports and videos on it, that would be good examples. I

was never part of it but just seeing the videos and talking to my peers and elders about their experience and the knowledge gained from young people it is pretty amazing. And then the elders shared the differences in the fish that they are seeing. You never use to see tumors on the fish but now you see them lots. Some said their scales are different. After they do this program the scientist will come back to the community and will report to youth and elders the findings and their research. I think it was two weeks ago I was co-facilitating a strategic planning session with the higher ups in the Tli Cho government, and one of the things that came out from it was a quote from Ted Blondin; there is a need for our people to build an army of environmental monitors and they need to be utilised with the mines and around the region because who else knows this land better than us right? That really stood out for me. We need to build an army of environmental monitors. What I got from that and what our government got from that is overall our leadership needs to work on building these environmental monitors but also building stewardship in our people. Taking it upon ourselves to be the monitors if you are being paid or not we need to be there to protect our land we need to lead by example and we can't be the ones to destroy our land...

Joanne Barnaby: You are starting to hear that more from the communities, we've always said that it is our values. We have started to get weak: we need to take back that responsibility.

Modeste Sangris: I want to share with you about traditional knowledge, our traditional knowledge has come far behind, today it has mostly fallen behind. In the 1950s we never talked about the mines and there were no regulations. I was trapping with my dad until I got married, and I never went trapping again. I experienced an accident during a community hunt where I shot my foot so I have never went hunting again, I had surgery and couldn't work for a long time. Just in the past two years I started hunting on the land for caribou.

In Lutsul k'e we used to work together, but recently it seems we have all gone our separate ways. That is how I see it. I still want to maintain my traditional knowledge. I still want to keep my treaty, that is the only thing that keeps us strong is our treaty. My dad was a chief for 31 years and he worked for $25 per year but that was how strong their knowledge was for the land and the treaty. Today with regards to the treaty, this treaty money that we receive and we will not be prohibited from hunting but today everything is changing. He was correct in saying in the past no one mentioned about the water being ruined or the wildlife being ruined or the

fish being ruined, just recently ever since the existence of the mining companies that come into play it destroys the land and water and the fish and they make lots of money and they should be helping with money. I mentioned this earlier that we don't get paid enough. If they are going to open up another mine they should tell us that, today when they make a mine and extract the minerals then they was us to help them with the reclamation. When I think about it we as elders as aboriginal people it seems like you are speaking, we have minutes for the meetings but we don't know how to read and write. I went to school only one year but I understand a little bit of English but I don't know how to read and write. When I went to school, my father came and picked me and took me out on the land. Today there are a lot of changes that are taking place I don't think that we will regain our traditional knowledge but we still have to practice it wherever we go.

Joanne Barnaby: I think it is very clear that one of the recommendations needs to be that the honorarium needs to be increased. Other comments on what we should be monitoring and how we can do that.

Roger Catholique: I just want to share with you that I worked with Ni Hat'ni Dene Program for a summer student for the past few years and from what we did is that we went out on the land and sometimes we approach tourists around the lake and make them aware that we are there and give them a survey about how many fish they catch, and see why they are out there and how long, it is up to them to fill it out but most are willing to fill them out. It is important for us our people in various communities to have programs like these. Technology is growing fast especially in the Dene world. We did a lot from fish sampling and water sampling. The fish sampling is more like observations, the temperature around the lakes and from what I understand our program which is the same as other communities what they had on the lake is that Lutsul k'e covers a large area, water body area and usually you have two crews that monitor Crusty Bay and McLeod Bay. We just observe the land and wherever we camp we pick up garbage and observe birds and anything we haven't seen before we report. We do weather observations. That is most of what we do in the program.

I also worked as a youth caribou monitor a few years back and during the winter for three months, a week in week out rotation and our people welcome other cultures to come to our side as long as they respect the land to let them know not to waste any caribou, what they leave behind, we report anything that is suspicious which it's not very much because we let the people know a head of time to respect the land and bring their garbage with them. Nature is

powerful and we need to respect nature and nature knows when you respect it or not. As you can see from all the reports around the world we keep that as a strong value for us in passing down the traditional knowledge and stories from what we hear from our elders. We learn from the other cultures and teach one another, that is how we keep everyone strong: by respecting each other. Nowadays we have to keep our youth going. I also work with fish biologists and I like to learn what they want to teach me about the fish and water.

Keep a sense of a strong culture because the land can't speak for themselves. To make sure to take care of one another. Keep strong faith in our land as we have for many years.

Joanne Barnaby: You give me a lot of hope. Thank you.

Dora Migwi: Thank you Roger, I am very thankful from the bottom of my heart. Working out on the land and keeping the land and making sure there is no damage on the land and also for the habitat of the wildlife and everything that has been said. Maybe they do those things in Behchoko but I have never heard about it. I am very thankful with the videos and the information that is being shared here. If that keeps up within our communities just ask Louie and myself, we lived off the land and our parents taught us how to do our daily chores and since 14 years old we tend to work harder, we make snow shoes and dry fish and sewing and today the youth that are growing up today are not able to sew. I am very impressed with the videos that are being developed but none of that is happening in our community, maybe if our leaders changed but I thankful that you share all this information. With the youth talking I am thankful, and if you keep talking that is how you will become a leader, today it seems like people don't listen to one another in Behchoko. We have to teach our children and our grandchildren. It seems like they just don't want to be employed, I have a lot of grandchildren and I want to teach my grandchildren I have all the sewing kits and everything but I never see them. And all the of the teenagers go to college and that is important. I am thankful that the things that you mentioned and it seems like we can be united as one. Because I am experiencing pain in both my legs I am 80 years old next time I might not be here. This is the first step is sharing here, I am thankful. Where I come from the land I live on I have to pay tax, and also pay for the wood, if we want to cut wood we have to get a permit. But there is plenty of wood but there are lots of white people they come to our land and take all the wood they need but sometimes when we drive around my community less

and less people are burning wood, maybe things will change pretty soon and have a discussion with each other.

That is how I live in my community.

Louis Zoe: A lot of things have been the priority for protection of the land and water, our priority would be the water and the animals. We survive by water so water is very important to the animals. Water is very important for the animals and the people so that should be monitored closely.

Joanne Barnaby: Some really good feedback and input. Break into groups after the break.

Break

Small groups

Nancy Kadlun: The program we had in the summer time [AEMP], that really works. We mentioned the birds that eat off of the water, shore birds, we should really watch them because they eat right by the water.

Wayne Langenhan: The shore birds because they eat the bugs that might contain something and drink the water around the island.

Tyler Akeeagok: I think the first question we need to ask is what on the island do we want to watch.

Natasha Thorpe: Monitoring shore birds, fish in Las de Gras, water quality. We also hear from Louie that priority is water and animals.

Modeste Sangris: Water is very important all over the world. The wildlife live off the water, I know it, all over the world even the water, the fish, the caribou they all use the water. Water is priority even during closure and reclamation. How long is the monitoring going to take place? We have talked about this in the past at the AEMP camp, checking the fish, cooking the fish, boiling the fish and also cooking it in the pan and we used to drink water. All the wildlife live with water, we don't know what will take place with the water in the future as we sit here as the elders, the youth will be working out on the land in the future. It's not too bad now but we don't know what is going to happen in the future so the water, its best to monitor. We have never done the testing

ourselves. We use water as our livelihood, even us people, we consume water every day and it is important.

During the winter months we would travel out on the ice and even out on the lake we would use the boat to get to cabin (I made) out on Wool Bay, this summer along the shore was the boat that I made and I saw a squirrel on top of the boat drinking water. I have never seen squirrel drink water before, as I witnessed the squirrel drink water I think all the wildlife drink that so it would be good to monitor the water for a long time after.

Natasha Thorpe: The scientists have collected water and they send it to the laboratory. But in 2032 when these youth are the ones doing all the watching of the water what do they need to watch and look for?

Modeste Sangris: We live off the water and some of the youth don't know about these things, and they never heard about how the water is important, the youth are here amongst us and some of them know how to read and write and are aware about these things. They probably understand from their reading materials but we know that water is important for people. God created the water and everything we live off God created. If we didn't drink water for the day then we would become thirsty. The young people don't know about the importance of water. We only have one youth here from our community. Maybe we need to teach them more about the importance of water.

Louis Zoe: As my friend talked about, I have attended a meeting in the north and we had a meeting with teachers and principals all the students, about 1400 students and during the school year. They are taught different subjects and they were taught about how the mine is developed, in operation and closure and the reclamation and those are the things that are being taught and that is how the teachers were explaining the curriculum to us. If the youth understand these things and know how to read and write then they youth would be very successful in their chosen career in the mining industry. They can gain employment and earn and income.

Rose Betsina: You are correct in talking about the water; all over the world it is important. In this area the water is pristine. What will happen to the fuel tanks if they leave it behind? Sometimes there is a fire. There could be a spark and start a fire. We can't leave any infrastructure on this land. Are they going to take some of the infrastructure out of the mine site or it seems like they are going to bury it in the ground? They should do a good reclamation, they should slope the North Country Rock Pile and have

crushed gravel on the top. It doesn't look like there is going to be any flowers growing on it.

Natasha Thorpe: They have to take everything away or bury it to make it look as much like it was before. It was suggested that maybe they leave a building here to be used by the watchers. Is that a good idea?

August Enzoe: I was looking at the notes, what on this island do we want to watch. Years ago I was on the fish camp and we were talking about the water and the fish. When you used to come here we would see ground squirrels all around, now we don't see anything. We are just like we are in jail here we don't go out. When we are here we don't go outside at all. We should get out and walk around the island and go see what is there and see if there is any sign of ground squirrels. They have boats and motors here we should be out on the water and see and walk all around the island.

Natasha Thorpe: Here or at the AEMP?

August Enzoe: No not at the AEMP, when we come here next time as a group.

Berna Martin: This is 4 and half days what is the most important, what is priority? This is an opportune time, if we don't say anything Diavik is going to think that we aren't thinking about it. What is important, the water, the wildlife, what's important on the land, just ask Modeste 3 years ago we did the AEMP, the boiling of fish, cooking the fish, made tea with water from the shore, how was the taste of the tea. Those are the things that we have to talk about. Today is the opportune time to say that. Next year monitoring of fish and water is taking place. Climate change is taking place, so every three years it would be good to have this monitoring in place. What is important you should talk to this.

Dora Migwi: A lot of things that are important to us, the land, a lot of development is happening on this land, human lives by water and so does animal, plants, birds, they eat flowers, grass, and everything grows with water. We are here to discuss what is our priority. Does the fish still taste right? We want the fish healthy so we can eat the fish. Some of traditional knowledge panel here would like to see some of the buildings left here for the communities to use for hunting. We would like to have healthy animals; and the trails not to be disturbed. Some of the animals break their hooves because of the boulders. We have a good cup of tea so I guess the water is still good.

Natasha Thorpe: Gord said that it will be much easier to recommend that a couple buildings stay behind for a watching program instead of a hunting program.

August Enzoe: We did mention that way back a few times, like the airport as well. We would go on the bus and then go up to the North Country Rock Pile and wanted to look out on the land, but I wasn't allowed because they won't let you go up on the rocks.

Tyler Akeeagok: What should we prioritize? I think the best one is that we should prioritize to monitor what we live off, the resources that we could use so that everything is healthy, from the water we use to boil to cook and the animals that we eat and also use as clothing.

Natasha Thorpe: I think that is really powerful. Monitoring what we live off.

Wayne Langenhan: I think you got us off in the right track here about the buildings. We need a camp for monitoring, that should be number 1. You can't do monitoring sitting in a little tent I don't think. We need buildings and we need communication. I think that should be the number 1 things we start at. As far as the monitoring, is this going to be yearly, seasonal, how many months a year is this island going to be monitored. We need to find out who we need as monitors, it can't be youth by themselves, they have to have someone else with them to show them how to monitor. As far as what we are going to monitor on the island, the little birds, check for the bugs, if there is none then maybe something is poisoning them. I think that this should be a year round project.

Tyler Akeeagok: Why a year round project?

Wayne Langenhan: Because there are different animals around at different times of year. The standing water from around the berms could be leeching out into ponds in spring. And you could have more access to animals and see if animals are dying on top of the snow in the winter. What types of explosives they used to make these pits and drifts might leech up from down below.

Tyler Akeeagok: I think year round is great because there is a seasonal effect.

Louis Zoe: Yes what they are talking about I am in agreement with what they are saying. The airstrip would be important if an airplane was in distress and needed to land. It would also be good to have emergency fuel there and with the water issue, if they pump water

back into the open pits with the winter season and the water melts and the snow melts into water, it would be good to have year round monitoring of the water. It would be good for the wildlife and also the people. In our country in Ray Rock, there use to be a lot of people that were alive but since the Ray Rock Mine, there is less and less people living amongst us because they were affected by the mine. And so I am very pleased that you are talking about the water and I am hearing good things from this meeting. Monitoring and watching things will prevent things from happening to our water.

Tyler Akeeagok: Who should be the monitors? Should there be students involved, should there be people from down south, that's my question.

August Enzoe: Adults always take the youth with us and it should be the same, adults paired with youth. If we are gone they will be working for the future.

Tyler Akeeagok: Have a professional with the youth and the elders so they all know what is going on. What I mean by professional is someone who has the scientific side as well.

Modeste Sangris: Once the closure of the mine maybe there will be reclamation and after talking about the airstrip, it would be good to leave the airstrip behind, but once they mine all the diamonds and leave this area, if there is no money available, it would be good to know if there is any money available for maintaining the airstrip. It would be good to have money available for the reclamation.

Wayne Langenhan: If we had this monitoring in place year round, there would have to be machinery left behind to maintain the airstrip, it would need a bit of maintenance. I am sure they wouldn't fly a chopper up that distance but they might. You would have to bring up food, I don't think they would build a road because it cost them way too much, it would be cheaper to fly in. I don't know if they would want to maintain the airstrip or whether they would just leave a little machine to clear a helipad. I don't know what the company would go for.

Natasha Thorpe: When you say it would be interesting what the company would do. We are talking about when the company is gone. They have closed, they have done 7 years of monitoring and now they have moved on, so it is back to your rights and responsibilities and your land and then the question is who would pay for the monitoring or what would it look like.

August Enzoe: That is what I was going to say, where is the money going to come from?

Wayne Langenhan: We have no idea where this money is coming from do we. How many years is this planed to go on for after the mine is completely pulled out of here and they are no longer responsible for that land.

Natasha Thorpe: That is up to you guys. The mine is suppose to be done in 2032, so how many years after that does everything need to be monitored. 5, 10, 15, 100.

Tyler Akeeagok: Could it be every 2 to 3 years so every year we are not wasting money?

August Enzoe: Year round watching, no one can stay that long. Two weeks in the winter. It depends on the money, money talks.

Tyler Akeeagok: Could it be seasonal. Winter then spring then summer then fall. Could be for two weeks each time.

Natasha Thorpe: The other thing to think about is you have the Metis, Inuit, and Dene . . . and you have all these other groups to work together. I just heard August say that it is a lot for one. It might not be a lot when you think of all the different groups involved.

Nancy Kadlun: The airstrip in our community it wasn't use for a few years and the grass grew up right away on it. When it's not being used the grass grows very quickly and it might need to be cleared out.

Dora Migwi: We are talking about funding for the monitoring program. Sometime they go out with a chopper, ENR goes out to the migration routes, we should have fuel in place here, we can always have ENR to check everything but we need to be the watchmen but maybe ENR can help with the fuel.

Wayne Langenhan: I was under the impression that we were just going to do the last part when the mine was shut down and the mine was going to be monitoring and we would be doing our own watching as well. I didn't realize that when they pull out in 2032 that the monitoring was going to be taken over by the entities around the table. So it is from 2032 on when they are completely gone. So it couldn't be year round that would be too expensive, maybe 2 weeks in winter, 2 weeks in spring, 2 weeks in summer, 2 weeks in fall. Seasonally.

Natasha Thorpe: We could say ideally year round but cost dependent. There is an example with Daring Lake it is an ENR run camp, they run the tundra science camp each summer.

Wayne Langenhan: If you said year round it would leave the door open, it doesn't have to be but it could be. Depends on funding.

Natasha Thorpe: In Cambridge Bay the government just spent millions of dollars building a research station: the Canadian High Arctic Research station. So that is another idea that you could think of this as more than just for your monitoring you could build it out. It would be a way to make money.

Wayne Langenhan: This is fine when we have a liberal government because Trudeau loves to spend money but the thing is when he gets out of power, who are we going to get in there and what are they going to allow?

Natasha Thorpe: Diavik is gone at end of 2032 and then it is up to you guys. But we want to start thinking now so that you are trained and experienced as monitors based in traditional knowledge and science. We want to start building that up now so that in 2032 you are trained and ready to take it over. You could suggest that there are some small projects that you have already suggested that you could start with before the mine closes. Start small so we are building up to 2032.

Wayne Langenhan: I would like to make a recommendation for someone to go around and see what plants are now growing back on the disturbed land and see what plants are growing and not growing and why.

Louis Zoe: After closure if there are people that come out to check the water, the water is most important. But before the closure if there things we think needs to be monitored when the winter season comes the things would be hauled out. At this one mine now there is nothing at the mine now they had to hauled everything back south. Even big steel, barrels. Some of the mine clean up I went over there and I stayed there and watched a lot of things being torn down so it could be hauled down south. It would be good if they could do similar things here.

Modeste Sangris: It is not only us that will benefit from it. If we want maybe the pilots can use it for emergency landings but later on I don't know what the youth will think. If it is not maintained it will deteriorate.

Natasha Thorpe: I really like this we should monitor-watch what we live off. How would it work between the different groups, would you have a group like the TK Panel with everybody mixed.

August Enzoe: The question you just asked we can't answer right now. Probably one group all mixed together.

Louis Zoe: Last year during the summer there was an accident on the water in Behchoko and one young man drowned in the water. There were 3 people in a boat at another time and a big wave came. So if you are going to go out on the lake and the land, it would be good if they are taught how to travel on the water and land.

Natasha Thorpe: Thank you if I add safety for traveling on the water.

August Enzoe: We have a program running in Lutsulk'e right now for June, July, August and the people watching the land.

Natasha Thorpe: Could we recommend that Ni Ha Dene and the Tli Cho train those that don't already have the training. Its only 3 months even in the winter even if there are no caribou they still go and watch.

Break

Roger Catholique and Janelle Nitsiza: Presentation

Priorities

Water – dust impact on water and plants and food chain

Animals – Scat – smells – comes from diet and you can tell if the animal is healthy

Traditional knowledge Panel should get monitoring results to understand what impacts are being documented now and until closure (birds)

Traditional knowledge panel needs to assess monitoring methods and results to help us determine what and how we should monitor in the future

Diavik should provide an overview of what they have acted on traditional knowledge panel recommendations by topic

Vegetation – Diavik should share the results of the 10 year overview and results of the re-vegetation research

TK needs to look at traditional medicine

Research or monitoring methods that are offensive should lead to getting alternative native method advice from elders

Impacts may take a long time to show up ie. Plants may look healthy now but not later on

We all have to work together and support each other to be strong

Youth together with elders and scientists should work together in future monitoring – this helps to develop - two ways of knowing – two eyes – strong like 2 people - the traditional knowledge camp is a good model of this

Joanne Barnaby: Does anyone need to add anything.

Tyler Akeeagok: Presentation

Watch-Monitor what we live off

-watch everything – water, wildlife, birds(shore), bugs, rodents, weather, climate

-Check everything

-good for the people-job, well being

-need buildings here (airstrip)

-need strong communication sharing – exchanging – stories

-need to train who will be watchers (eg, LKDFN) – ideally year round watchers – always adult paired with youth, must be an expert, open minded youth, should have scientist as well – two worlds, safety – skills: travel on water and land etc.

- money must be available

Natasha Thorpe: I know we are going to have a lot of work to do pulling all this together.

Joanne Barnaby: As I am leaving in the morning I just wanted to say thank you for your work. I want to thank the youth for coming out and participating fully.

Kathy Arden: Maybe on behalf of the group we would like to say thank you for guiding us, she is always positive

Colleen English: Last day tomorrow. Check out process and times.

Natasha Thorpe: Joanne and I worked together to put together the recommendations and we will go through those first thing and make sure that we get the words right.

Colleen English: Introductions, Alison Rodvang from EMAB, Diavik's new President, Patrick Boitumelo.

Patrick Boitumelo: I came here to meet you face to face. Before I actually met most of you I met Peter, and we had a chat and as we were talking I realized that he didn't know who I was. Which means we need to do a little more work in terms of introducing myself and getting to know most of you. My name is Patrick Boitumelo. I joined Diavik 2 months ago, before that I was with Kennecott in Salt Lake City, I was the general manager for engineering and projects. Originally I am from Africa, Botswana. DeBeers that owns Gahcho Kue and Snap Lake, they have most of their diamonds come from Botswana, probably 70% of the diamonds that DeBeers sells comes from Botswana. Botswana has two of the largest diamond mines in the world. In fact I worked for DeBeers before as a strategy executive for DeBeers and I worked for them up until 2011 and then I joined Rio Tinto in South Africa and I worked there for 4 years. The first two years I was part of Rio as General Manager for one of the Rio Tinto operations, Rio sold that mine in 2013 to a Chinese consortium, and I was there for 2 years until I then moved to Salt Lake City in 2016. From a Diavik perspective I am very new, trying to understand how they work and their stakeholders. This is one of the main reasons why when I heard you are here, I decided to come and meet you face to face right away. Having said that I just want to welcome you here and let you know that I am looking forward to the outcome of what you are discussing today. From Botswana, the set up is fairly similar and their mines are also set up around communities. It is very important that the mines relationship is very sound with the communities they are in and work around. That we have the same objective in mine and we come to a conclusion that has the best interest at heart. Please do not take what you are doing today lightly, because whatever decision you make has an impact on the communities and it is important that when you live here that you believe you have done the best for your community and the mine. Thank you very much and I wish you a productive week.

Kathy Arden: This is my second time on the traditional knowledge panel, I have learned a lot through our elders and also remembering things that I learned from my parents on the land. Thank you for coming and welcome.

Nancy Kadlun: Thank you, nice to meet you face to face, you come from so far. I am from Nunavut a small community. It is nice to have people who work so hard.

Patrick Boitumelo: Thank you

Modest Sangris: My name is Modest Sangris, we arrived here on Thursday and all the things that we talked about, it is all written and the recommendations are put forward. You probably know about these things if you read the stickers on the walls. We put forward some important issues with the mine that is situated here. We want the reclamation work to be done. It is good for the future generations, we the elders may not live long but for the future generations, the youth of tomorrow it is good for them to work amongst the people and in the mine and we want our people to be employed at this mine site. With regards to the migration of the caribou, I want you to make sure it is protected and taken care of. We use to live off the caribou and also this is an island with the North Country Rock Pile and the South Country Rock Pile that is proposed it would be good to have that similar to that of an esker, so that maybe in the future the caribou might roam in this area so we need to do good monitoring of the water. And also working on the closure and do the reclamation after closure and you probably know of the recommendations and take a look at the recommendations. Thank you.

Berna Martin: I know you take your work seriously, coming from Africa there are different indigenous people over there, like us and you know where we are coming from. From your experience in the mine and the destruction they do to the people and the company they just go and leave and maybe you experienced those things in your country, and maybe they didn't do the reclamation in your country that we are talking about here and how our Dene people here love the land so much, we grew up here, we were born and raised here, our ancestors or elders had been raised among this place and there are burial sites all around this place and everywhere you can imagine. So we are pleading with Diavik to take care of the land while they are working and leave it as it is.

Patrick Boitumelo: Thank you very much for that comment. I think I just want to mention a couple of things. One is that being raised in a tradition environment myself it resonates with me pretty well. In an African context you also have the same kind of set up, where the mines operate within numerous communities, but however one thing I can be open with you about is having learned what happens at Diavik so far, I haven't seen a company that does it better. Because what has happened here today is a partnership, it is not

an audit. A lot of mines are different in that way, they have environmental plans, reclamation plans, closure plans and the community only gets told, and they receive whatever the mine is saying. But with Diavik it is something different completely. With Diavik the mine doesn't move forward until the community is in line, and I really like that partnership, and it has been a great learning experience for me. Not only with you but with other things as well. I have met most of your Chiefs, I have been to Kugluktuk, I have been to the Tlicho. Last Friday I met the CEO of Denesoline, I know what the issues are and I think regardless of the differences between here and Africa, there is one fundamental principal that should always prevail and the principal is that there is a partnership between the communities and the mines and that the mines are actually working with the communities around them and addressing that interest on a continuous basis from the inception of the mine until closure. That is the fundamental principal, not just in environmental, it is also in business, also in how we contribute to the communities. As long as you continue like that you can't go wrong.

Louis Zoe: Thank you I don't want to speak to long but our land, our forefathers they use to work in this area with dog teams and they never had decent food to eat at that time and they worked on this land. How the mining has displaced all the ground and we are trying to do the reclamation well. We love our land and this island is called Ekati, the east island. This is the migrating route for the caribou and that has been said on many occasions. Today the mine is situated and the NCRP has been piled and how in the future the caribou will migrate and those are the things we discuss. We are elders, but for the future generations we don't want anything to be damaged, the environment, fish, animals, our food source, if the water is contaminated it is not going to be good for our health. That is what w are discussing as we gather.

Patrick Boitumelo: Thank you.

Bobby Algona: My outpost camp is just up here 70 miles north of here, I have been living there my entire life, I have been coming down to these parts for many years. When the migration comes slow sometimes over the years we come down to Lac de Gras we would come down and meet the migration when we needed food. It's not all years that they do that, sometimes they come fast and right to camp. Because my camp is on the migration route, I live on the caribou route, they have taught me very well how to live off the land, my parent have tried to keep us out on the land as much as possible because the communities can be very disruptive to some youth and

disheartening to live in. Because you don't deal with nature as much anymore. I made my own family and come back up to Pellet Lake and I kept them out there as much as I could, until I had my back problem and now I can't go out on the land any more. My children have been raised out on the land, and they are very lonely to be out on the land, and I tell them that I showed you how to be out there so its your turn to be out there. We have lived there and you enjoyed that, you need to develop ways to get up there on your own. I showed you the trails. You know where it is so you need to go.

Also I am part of the traditional EMAB panel, I am one of the traditional knowledge panels with EMAB as well. I help as much as I can in my words and hope for industry to listen. I am really thankful for the new mining act that just came in recently and that is why we are doing all of this where in the past mining companies, none of this ever happened, all the garbage was just left. And we don't want any bad contaminates out on the land.

Patrick Boitumelo: You mentioned a very important part about how you taught your children how to live in that environment and I just want to appreciate everyone in this room because to see the elders taking responsibility and accountability for the future of their people and their communities and their children is something truly to be proud of because I can see very few young people in the room. It is more elders that are picking up and leading the pack going forward. I just wanted to say thank you very much for that.

When it comes to closure, reclamation yes the reputation of the company is important but what is critically important for me, the reputation is not number one, what is important for me is the livelihood of the communities that we operate in because once the damage has been done you can't reverse that. Yes the repercussions of it may probably be the reputation of the business but ultimately it's about the people. So we put the value on the people, the same as we put the value of people with safety and health in the operation as well. Diavik started the journey of closure right from inception. I don't know anyone else that has ever done that, so right when they started the mine they said we know when we are going to close and we are going to design the mine and spend money as we continue to mine to make sure there is less liability at the end of the mine and also that the closure is managed well with minimum impact to the communities. So that is something that I hold very dear. I think they have done something there. They have been quoted as one of the best practices in closure out there so other companies come here to see how we have done it.

With that, thank you, I wish you the very best for this week. I appreciate you coming here.

Natasha Thorpe: One eye in traditional knowledge and one eye in science. Thank you for the ongoing support.

Break

Natasha Thorpe: Is everyone clear where we all need to be.

What we didn't get done was the presentation from Diavik on the responses on the recommendations from session 9. Which is why we printed it out for you to look over it.

Presentation Session 10 Recommendations

Wayne Langenhan: Diavik mentioned that the North Country Rock Pile might take a different shape so these ramps may have to be changed, but the slope 3:1 would stay but the shape might change.

Colleen English: Do you mean if they add more to it, or if they change the PKC. If that happened then we would have to revisit as a group. You would have to look and say if that still okay.

Natasha Thorpe: You raise a good point; maybe we should change the word to say current.

Tyler Akeeagok: Instead of going to specific, we could say we are concerned with the slimes being released into the environment.

Second last bullet (reword)– The Traditional knowledge panel would like to have the results...

We recommend the slope should be 3:1...

Wayne Langenhan: When we saw that map of A21 they pulled out the top of the lake, they pump the water out then they get the ground out. Where is that going to be put?

Colleen English: The till will be used (if they get approval) on the North Country Rock Pile. It is also a good soil for re-vegetation.

Wayne Langenhan; The two other pits had the same thing. Where is that now?

Colleen English: The till pile is beside the North Country Rock Pile.

Wayne Langenhan: It was used all up.

Colleen English: No it is still in the pile.

Wayne Langenhan: Is there enough there to put a cover over here (on the SCRP) for vegetation.

Colleen English: There probably would be, the downside is it is a lighter material. Till is subject to loss by erosion, wind without a cover.

Wayne Langenhan: I meant for this to be a cover on top of the cover. Not just that material alone.

Colleen English: It is challenging to leave as a cover because it will blow away, wash away; it is a lot lighter then the rock so that is why with the NCRP they put till first, then rock.

Bobby Algona: We are always looking to reseed the top of the piles. Putting the rock on the top is one thing and put it in a bowl and let it sit there. Keep it from seeping under it, make a hard cover before we put the till on top. Where we could at least have some seeding be able to grow in there. If it is in a bowl it will probably not blow away.

Kathy Arden: I think that is kind of going backwards on what we had already agreed to and asked for. What we had discussed was there are all the big boulders underneath, then a finer, then the till, then the finer stuff for the caribou to walk on. We have all been up there, we have seen the growth that till underneath helps with the growth, and also keeps the pile frozen. If we start creating bowls then we get water which is what we did not want.

Natasha Thorpe: Kathy you are reiterating what the group spent a lot of time talking about last session and I think the expertise behind the bowl is a good one but we have talked at length about it and Kathy has articulated it very well. My suggestion is that if the panel wants to apply the same recommendations from the NCRP to the SCRP we wouldn't go with that approach.

Presentation continued...

Kathy Arden: Its sort of conflicting with bullet two, first we are saying minimize, then we say make it larger and shorter. Diavik had said as soon as rock comes out of A21 it will be hauled to the North Country Rock Pile, then what is left in the end once the NCRP is sloped and what not then the pile that is left behind (SCRP) can be 2 layers which would be a larger base and low or go three layer which is higher but smaller base.

It is a timing thing but I think that is one of the things that we said for keeping it lower because it would be better for sloping.

Tyler Akeeagok: The fourth bullet restates the second bullet and then after the comma there that is what makes it confusing. So why not just take out the fourth bullet?

Natasha Thorpe: Is everyone in favor of Tyler's edit.

Presentation

Tyler Akeeagok: Change

Colleen English: You would prefer the rock that would typically go to SCRP to go to NCRP for cover.

Bobby Algona: Going back to the 4th bullet. You could add if all permits are approved.

Tyler Akeeagok: I don't like the word should.

Wayne Langenhan: What about will.

Natasha Thorpe: Ultimately recommend is stronger, that is my opinion.

Kathy Arden: I don't think will works because they don't have permits yet.

Natasha Thorpe: You have the ability to make recommendations, they don't have to agree.

Natasha Thorpe: How the tundra heals itself and I wasn't in this. I think keeping moss in highlights the traditional.

Kathy Arden: That bullet came out of a session when we were talking about when there is nothing left there. Some of those little run offs or creaks. The elders said that why don't we use moss to help. A21 when that water is ready to be released into Lac de Gras, there is a creak in there.

Tyler Akeeagok: Okay

Bobby Algona: I was thinking a little bit about what Diavik said about using other material from the land and there was a challenge about putting seeds and sand and gravel from the natural places and that is going to disturb another area taking some from other areas to move to another area. I think it would be a challenge for Diavik

to do that. Because you are going to disturb another part of the land.

Natasha Thorpe: Keep moss in there or just say use natural filtration methods.

Bobby Algona: Maybe this came up in another meeting.

Tyler Akeeagok: The second point states to just slope it can we add to allow caribou movement.

Colleen English: I have a question, is that assuming the slimes are gone? [Yes.] We should clarify that.

Natasha Thorpe: Watching program slides.

Tyler Akeeagok: The first point instead of saying it, can we say water.

Janelle Nitsiza: I don't think it should just be plants for medicine it should be all plants and plants for medicine.

Natasha Thorpe: Did we miss any start up projects?

Joline Huskey: I was just thinking about what we were working on yesterday in the group about watching and monitoring and in our group we brought up the importance of fish camp with the elders and when we develop a monitoring program and make it a priority for our youth or our young participants to be involved in the environmental programs, instead of them coming out every few years maybe they could come work with the environmental department then they could learn what they are collecting and how they analyze it. So that way when they come back to our community and also work within our own departments and give that information back. I stated that it's better to hear information from our own people when they are involved instead of when industry comes to present they don't really listen to them and they don't have any trust in them. So having the participants, one of our own, even once a month.

Natasha Thorpe: You are thinking starting now. Recommend starting now to job shadow.

Joline Huskey: Like a train the trainer program.

Wayne Langenhan: I don't think that bringing people up for one weekend a month, I think one turn around a month.

Natasha Thorpe: How about we put starting with this. I think what Jolene was thinking is the rooms are free on the weekends.

Joline Huskey: I think starting small and working up is good.

Bobby Algona: They might send that to the communities training programs. Some of their responses I was reading last night, we would have a whole lot more time training in the communities.

Dora Migwi: In the past all these mines existed and these kinds of words we have talked about this before. For the future all the existing mines may use this frame work and that is good for future generations. Not only today, I have never heard of any mine working with communities

Natasha Thorpe: Can that be turned into a recommendation? I know when Joanne at the EMAB meeting a couple of months ago there was a lot of discussion celebrating the work of the Traditional knowledge Panel, as a best practice. We could put that in as a recommendation which might help us promote this for other mines in the future.

Wayne Langenhan: I don't know if this should fit in that perhaps Ekati the partnership to keep the airstrip open so that both mines have to be monitored, that way so that the cost would be cut in half.

Natasha Thorpe: …through the region and other mines.

Wayne Langenhan: I think that would give them a better option to use the airstrip.

Kathy Arden: You had mentioned region but maybe surrounding area.

Celine Marlowe: I have a question about the people doing the fish testing, is that a different project.

Kathy Arden: At the camp over here.

Celine Marlowe: Why can't they put that with the TK

Natasha Thorpe: The AEMP has been in effect for numerous years and the communities choose which elders and youth go. It is not up to Diavik or Joanne or myself.

Colleen English: The other thing is that when Diavik only uses the Panel for everything, Diavik gets a lot of pressure to use many community members not just the same few all the time.

Natasha Thorpe: Making a video is one way you can bring the experience back to your community. They also have to be comfortable climbing over rocks, and in and out of boats.

Kathy Arden: Was that in reference to the good and bad rock.

Natasha Thorpe: Yes and no, it was also about the collaring of caribou.

The other thing to think about is sometimes Diavik doesn't have a choice - they have to follow what the regulators tell them what they have to do.

Future topic sessions

Colleen English: The first one is the most time sensitive. (PK to Underground)

Wayne Langenhan: This slime that we are thinking about pumping in to the pits maybe we should just think about asking on our next meeting if there has been any new technology that will allow them to make the slime more solid.

Colleen English: I think it is good to keep asking that question.

Natasha Thorpe: Next topic PK to underground

August Enzoe: Next year will it be the same time or later.

The next one should be later.

Kathy Arden: When do you think we would have answers back on the closure of the North Country Rock Pile and whether they are going to put the A21 on the North Country Rock Pile.

Break

Recommendations Presentation to Gord

Tyler Akeeagok: This was my first traditional knowledge panel. It went fairly good exchanging all the knowledge and stuff that we discussed among ourselves. I think we did a very good job of putting all of our recommendations down and putting it together.

Roger Catholique: This week was a great week. I learned a lot from my elders. I hope you all have a great trip back home.

Gord Macdonald: This is my real opportunity to make sure I understand your recommendations properly. Because that will help me explain it within Diavik and help me because by the next panel session we owe you back a response to these things. I want to make sure I understand what you are recommending so I can make sure I get the right interpretation and response back to you. First I want to say

I really like the way you have presented this in particular the monitoring side. Which to me looks like a very logical framework, concepts then how to specifically start moving it forward. That is a big step in thinking versus just a specific program. I think there is some really good advice in there.

Thank you for saying that it is working. Getting positive feedback is always good.

I think I understand what you are saying here except the very end. I'm not clear what the link is between the slimes and the NCRP and SCRP.

Natasha Thorpe: The thinking is that not withstanding timing challenges that if one way to reduce the overall size of the SCRP would be move those slimes into the pit.

Gord Macdonald: Oh I see putting the slimes in would make room in the PKC to put SCRP rock.

Natasha Thorpe: There for they like the idea of you looking at it. Ultimately the goal is to keep those pills small.

Gord Macdonald: Then there isn't a link with the NCRP then. That is probably what confused me.

Natasha Thorpe: I think you were here the other day, ideally everything from the SCRP could be used elsewhere and there would be no new disturbance that would be the ideal.

So you really want to make the SCRP all accessible versus only specific routes.

Natasha Thorpe: To clarify it's that without knowing exactly what the SCRP will look like people weren't ready to indicate caribou pathways. So once that plan moves farther ahead the Traditional Knowledge Panel can revisit and provide guidance on the caribou pathways. In the in term what is known from traditional knowledge can inform your planning for the SCRP until they verify.

Gord Macdonald: Fair enough. I think that can work quite well.

For my benefit what is the thinking behind draining the pond. What is the reason for draining the pond?

Natasha Thorpe: I might let Louie expand, we asked the same question and Louie was ahead of us thinking about volume. If you removed the volume of water it would allow for more waste.

Gord Macdonald: Ok.

Louis Zoe: With the North Country Rock Pile that is high the caribou may not roam on that area but the caribou may go in this area again but because this is a caribou migrating route and once the South Country Rock Pile if the height of the pile is to high, just to reduce the foot print of the height of the South Country Rock Pile they could drain the water and displace it with the SCRP.

Wayne Langenhan: This rock pile I think all of us realise that it is a different type of rock and is more friendly towards the remanufacturing of this island and it is not anyway harmful so it doesn't really need a cap on it but also I think what Louie was saying about draining the pond that is only if the need arises. If it can be left and everything is low enough it is just an alternative.

Natasha Thorpe: I think the value is protect the water protect the land.

Wayne Langenhan: I was wondering sort of a scale of 1-10 what would be the number of the chance of the airport staying. Teaming up with the other mines?

Gord Macdonald: We had the same idea that we wouldn't be scarifying it, we should be taking it down. The problem is that someone has to own it. So the biggest challenge with all of this is that even if we leave a camp here or something who owns it. So what we have to try and do is, we are hearing what you are saying we have to find a legal way to have someone to own it, maybe it is the GNWT. Maybe it is a community, but someone has to own it in order for it to stay as an airstrip. Because you can't leave an airstrip that is not maintained because then it becomes a safety hazard.

Even if we provided the money for a camp and the airport but someone has to own it.

Wayne Langenhan: Could the owner be the Traditional knowledge panel?

Gord Macdonald: Could be but who owns the traditional knowledge panel?

Gord Macdonald: I honestly don't think you should worry about the, you have made it clear what you want now it is up to us to find a solution.

Natasha Thorpe: The panel has some good ideas of governance.

Gord Macdonald: I want to make sure I know what Patrick knows what was the question you asked him that he gave an answer to.

Tyler Akeeagok: It was a statement that he puts the community first to come along with what is going on with Diavik.

Gord Macdonald: Perfect, I thought it was something completely different.

Louis Zoe: And with regards to the airstrip it seems like the ownership of Diavik leaving the airstrip behind. There is going to be monitoring continuing to take place well beyond once Diavik is gone from this place. When the monitors come back they may be able to access the boat and motor, and also the infrastructure, the buildings and the airstrip to do the monitoring and for those reasons the airstrip should be maintained and left behind and even if there is an airplane that is in distress and needs an emergency landing that is how we talked about it. Also just like Colomac the airstrip is still there and I was involved in the reclamation there and how we did the reclamation work. The monitors that is going to be taking place with the wildlife and the caribou and the water and do the monitoring the airstrip should be left behind and people can access these programs and it will be monitored well into the future.

Gord Macdonald: That is all I had, other than, thank you again for your time and efforts and your work on the weekend.

Colleen English: Just before we move into the closing circle I was wondering if Alison would be okay with talking to the group for a minute about what EMAB is working on right now.

Alison Rodvang: I am an environmental specialist with EMAB which is the environmental monitoring board for the Diavik project. Just recently we had some members of the traditional knowledge panel come to our board meeting in June and we heard a bit about the work that the panel is doing and the sessions they have done in the past and the sessions they are working on. So for us that is good information to know and I noticed that a session coming up you want to work on putting the PK underground, and figuring all that out so that will be something that EMAB is also interested in so it will be good to hear the opinions from the Traditional knowledge panel on what you feel about that.

I guess just in terms of what EMAB does in general, so what we are trying to focus on more is reviewing Diavik's environmental monitoring and management plans so that involves the Closure plans, the air quality monitoring, wildlife monitoring and also the Aquatic effects monitoring program. And something that has been big on our plate lately is the closure of the North Country Rock Pile as well as the most recent closure plan from Diavik that

covers all of the mine components. With those we usually contract out consultants to help us with the reviews because they are quite technical and then we prepare comments for Diavik that are submitted to the regulators on all of those plans. We have been reviewing the most recent closure plans and we have had three consultants helping us do the work on that as well. We will be submitting the comments and recommendations to the land and water board and then those will go to Diavik and Diavik will respond to those comments and recommendations.

Some of the issues we are concerned about in Diavik's closure plan, the bigger parts that we are looking at is the stability of the PKC area at closure. With the possibility of the slimes being left on surface or putting them underground, we are interested in that and it research. Also the North Country Rock Pile we are concerned about the quality of the see-page coming off that pile and looking again at the re-vegetation of the site. Those are the bigger issues we are looking at.

Gord Macdonald: We were talking earlier this week about a workshop coming up, I think EMAB is going to be attending the workshop and I think you can use EMAB as a way of getting information about what is going on at that workshop or providing information to EMAB about how you might want to be represented.

Alison Rodvang: We would also put those forward to the WLWB just to support the work of the TK Panel so that is something we could do for the workshop as well.

Natasha Thorpe: Thank you so much for making the trek up today. You will be around until we fly out so if anyone has any questions you can find Alison.

Closing Circle

Nancy Kadlun: Thank you to Diavik for bringing us here again. I would like to say thank you to the cooks because we can't move around without food in our stomach. We have a comfortable place to be in for a weekend. Big thanks to the ladies that have been with us all week.

Bobby Algona: It is always nice to get in to a family. We are always a family here as a group we are a family no matter where we come from that is what I like about sessions like this. We are making a goal

that we all need to work on and we will all be happy at the end of the day just like every other session. We come out happy and we always look forward to the next session. Just we pray to our creator, we want a goal to be set right and we need to be looking at the every day and we have been doing that. I thank Diavik for doing all of this for all of us and our facilitators and interpreters and all the people that are working for us here. Camp cooks, camp maintenance they keep us clean while we are here. Thank you.

Kathy Arden: When I first got word that we were going to be meeting again I got really excited because I was hoping to see all the faces again that I have become so familiar with in this group and after the days are done and we look back at all the recommendations that we give to Gord to take away to Diavik I am always in awe at the amount of work that we have all done together to keep a good watch on what is going on and what we want to see in the future. And our youth here I am so proud of you guys. You have done a wonderful job of presenting and putting in your pieces too. So I am very thankful for that and the accommodations, the food, the people here have been absolutely wonderful, I am so grateful to be a part of this. Thank you

Wayne Langenhan: I would like to thank the facilitators they did a real good job here, we lost one today but she will be back I guess. I would also like to thank the youth for showing up they did a real great job I think. I would like to thank the mine for letting us go out and take a look at this lay down area for the new proposed A21. It was a good tour actually one of the best I have been on since the start. I would like to thank everyone that attended, I would even like to thank Gord and perhaps that 5 can go to a 10. God speed to you and hope you have a safe journey home.

Rose Betsina: Thank you until we see each other next time. We don't know what the future holds for everyone it is up to our creator, we are under our creators hand.

Celine Marlowe: I just want to thank everyone for being here and having me here. I wish that we all have a safe home trip, it has been just about a month since I took off from Lutsulk'e so I am really anxious to go home to do my hide smoking and all that.

Dora Migwi: We had a tour on the bus and we saw all the mine site, I am happy with that. We have been taken care of very well in this building. We sleep well, we eat well and I want to thank the interpreters and the youth I would like to thank you. We had good

communication among each other. I pray that we have a safe travel home. We ask the creator for all of us that we have good health and I would like to say thanks to the Diavik staff and all the people that help here.

Alison Rodvang: Thank you to the panel and Natasha and Colleen and John as well for inviting me to the last to hear the panel's recommendations. It is useful for EMAB to be able to take this information back and just make sure that our board members are hearing it as well.

Janelle Nitsiza: First off I would like to thank Gord, a big thank you to the elders for their willingness to teach the young people, and I thank the youth for being brave enough to talk and share their opinions. It is our duty as youth to learn from our elders, traditionally that is how we grew up. The young people would stay with the elders and learn. That is how I grew up and I have the utmost respect for our elders and their opinions and how they feel and I hold them on a really high pedestal because they are so amazing. I would like to say that us young people we are in our first few chapters of our volumes of knowledge but our elders are volumes and volumes of text books, they know so much and they don't have to write it down, they have it in their heart and in their brain and that just amazes me. Big thank you to all the facilitators and to Diavik for inviting us here. Just like everyone else said the accommodations, the food and everything was great. I am really excited for the gifts later.

Joline Huskey: I would like to say thank you that this is my second year and I hope to continue again. I am really grateful that our youth and our elders are participating and also me too I am learning along with them. I have been working with the Tli Cho Government for about 16 years now. And also working with the elders and learning our traditional knowledge through them starting off with the Tli Cho land use plans so I am really grateful and thankful that you invited me here and also for the elders who participate a lot of information and knowledge is pasted down just like Janelle said even for the youth to be involved and seeing them. I feel like I am the middle person between elder and youth but I am still learning so I am really happy and grateful that the hospitality that Diavik has given us. Thank you

Gord Macdonald: Thank you and apologies to the interpreters for all the challenges that I give them in particular with speaking too quickly with all kinds of acronyms. I think you do an amazing job of translating everything for everyone.

August Enzoe: Thank you, I have been on this board I don't know how many years now. I quit counting. I know Wayne and I have been here a long time. We use to have meeting in Yellowknife and then we asked Diavik if we could move down here it would be better for the board to see all around the mine. And they said yes that's why we come here now. I am happy the youth are here. I hope everyone gets home safely tonight and tomorrow.

Louis Zoe: Thank you for the interpreters. Through the interpreters we communicate and understand one another through the meetings. We have talked about many things sometimes we go through difficulties but with the help of our creator we may go through difficult moments but until the next time we meet again. I am thankful for the recommendations we have put forth.

Modest Sangris: Thank you we had a good meeting about some of the things out there. Once the closure of the mine it would be to have the recommendations that have been put forth. This is the migrating route of the caribou it would be good to have the NCRP and SCRP to be wildlife friendly but not only for me but for the future generations. Before the mine was sitting here this was a major migrating route for caribou but once they work on the recommendations they may come back. I am thankful for being invited here.

Theresa Lynn: Thank you to everyone here I learned a lot this weekend.

Roger Catholique: Thank you to the facilitators and workers in the back, interpreters especially for the elders pulling them from their families and homes, friends just to be here to exchange knowledge and putting good input into the traditional knowledge panel. The youth also to learn from the elders. Wish everyone have a safe trip home, take care of one another.

Berna Martin: Thank you to Colleen and Natasha and Joanne for talking to the people about closure and Gord as well, and to Pido Production and Janet.

Perter Huskey: I would like to thank the facilitators for inviting me back to interpret and I am very thankful for Pido Production for providing the services for interpreting. Thank you to the youth, it is very important for the future generations to gain knowledge from the elders and also to Diavik, thank you for inviting the traditional knowledge panel to your annual meetings here. It is good to see how the mine is progressing. One of the elders that passed on once said that if we see it with our own eyes then we understand what is taking place so that is how we can provide our

knowledge and work with the science part of it so that is a good thing. Thank you everyone for putting in their input. I am supposed to stay neutral as an interpreter so that is all I have to say.

Ryan Dempster: I want to thank the interpreters Peter and Berna and Janet and Natasha and Colleen for making my job really easy. I really enjoy being up here with you guys so thank you for bringing me back.

Natasha Thorpe: I was just going to say that I am so inspired by your commitment and by your courage. It is amazing to work with a group for so long and for you to keep coming back and I am really grateful to Diavik also to have the courage and commitment to really tackle this challenge of how to meaningfully integrate traditional knowledge. So I was really inspired by Patrick, in that chief to chief came to meet you and speak to you. I was also really inspired to see the way the elders bring all the youth into their care it doesn't matter if it is Inuit, Tlicho it is all one family. When I think about your watching programs into the future I am inspired to think that, that spirit, friendship, kindness will continue and who knows who will be around in 2032 but the future looks really bright. Thank you again for trusting me to help you with your process and I am really missing Joanne today it feels strange to not have her strength and wisdom and skill and courage and commitment to support us.

Colleen English: How do I go last, how do I top all that. Thank you to everyone, I appreciate you giving up your weekends to come up here and work with Diavik to impart your knowledge and make things better in terms of the plans that are being put in place for closure. I love seeing the youth who are already leaders to their peers and will be future leaders in their communities I don't doubt. I would also like to take a moment and acknowledge past Panel members who are no longer with us for all their past contributions to bring us to where we are today.

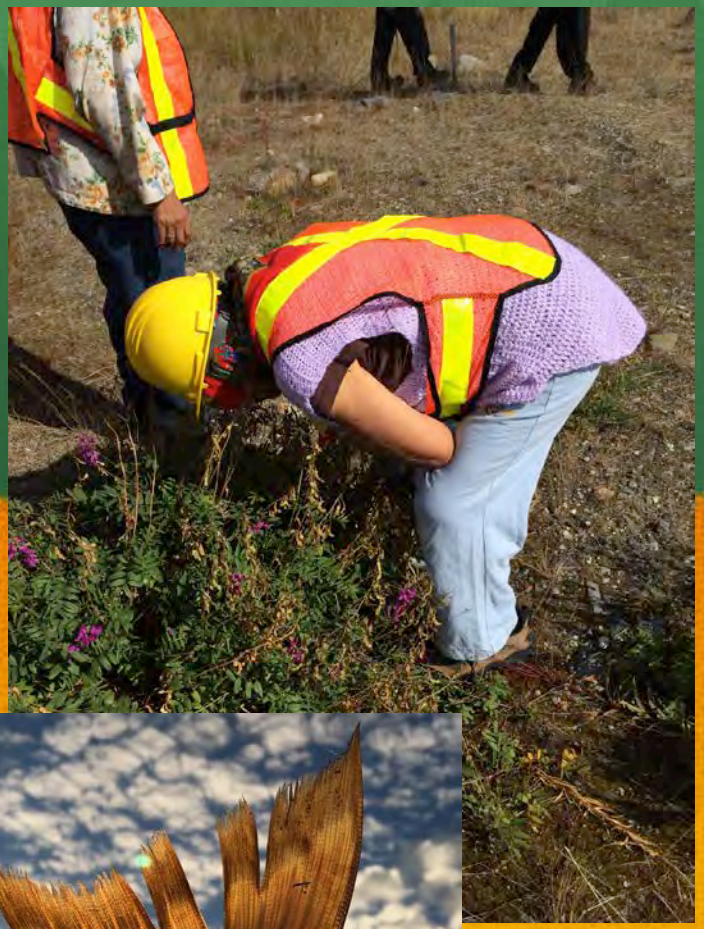
Celine Marlowe: Closing prayer

Appendix E

TK Panel Recommendations on Monitoring / Watching from Previous Sessions

Presented to the TK Panel
TK Panel Session #10
September 16, 2017

Developing a Watching Program at Diavik



Why are we talking about watching?

- TK Panel requested more time to talk about a possible monitoring program
- Timing is good in terms of planning for closure planning at DDMI

Responsibility for Watching …

- We can't have rights without responsibility. If we assert rights to caring for land and monitoring the water and the fish, we have to do it too. (Stephanie Poole in SVA Consulting 2016: 18)

Watching Is Not New …

- Indigenous peoples have been stewarding and managing their lands and water since time immemorial. Guardian work is not something new, though the present day organization and expression of this role is. (TNC 2016: 11)

Monitoring? Watching?

Monitoring is scientific word. I like the word watching, our ancestors are watching with us. I am so happy to be here and listen to everything. We are all teaching each other so let's keep this going. When we use traditional knowledge it's about our ancestors. When we go home we should sit with our elders and our leaders and talk to them.
(Georgina Chocolate, June 6, 2017 in BCRP 2017: i)

Local Watching

- Local watching at Diavik can be expanded across the region
- Diavik will be first mine to go through closure: important to 'get it right'
- Others will follow the Diavik example (regulators too! Just like the TK Panel)
- Lets do it … and do it right!

Current Scientific Monitoring

- What does DDMI monitor today?

TK Panel Recommendations to Date

- 1.3 The TK-Science camp at the mine site is an important place for developing skills and capacity in cross-cultural caribou monitoring
- 1.13 Utilize Aboriginal terms/concepts as identifiers
- 9.14 Focus monitoring on wildlife health and safety and possible impacts of other mines in the Lac de Gras area.

TK Panel Recommendations to Date

9.18 Focus monitoring to determine if steps taken/closure and reclamation actions are working the way they were intended, through the following measures:

- Slopes for safe passage of wildlife, boulders for keeping wildlife out of areas, the use of natural water filtering systems, the use of video cameras to detect wildlife presence, the testing of water from the North Inlet and PKC area, understanding ecosystem dynamics and the linkages between components, cumulative effects
- Include plant growth, plants dying, fur & antler condition, and presence/absence of injuries or spots on the side of caribou as some of the indicators of caribou well-being
- Caribou presence identified on cameras, collars, and sightings would trigger monitoring
- Other animals can be indicators that the land is not healthy (e.g. smaller rodents, birds, fish can tell of change happening in larger animals like caribou, bears, etc.)

TK Panel Recommendations to Date

2.5 Seasonality of monitoring must be taken into consideration when planning for post-closure monitoring.

7.2 Study vegetation east and north of the Island to understand good caribou habitat.

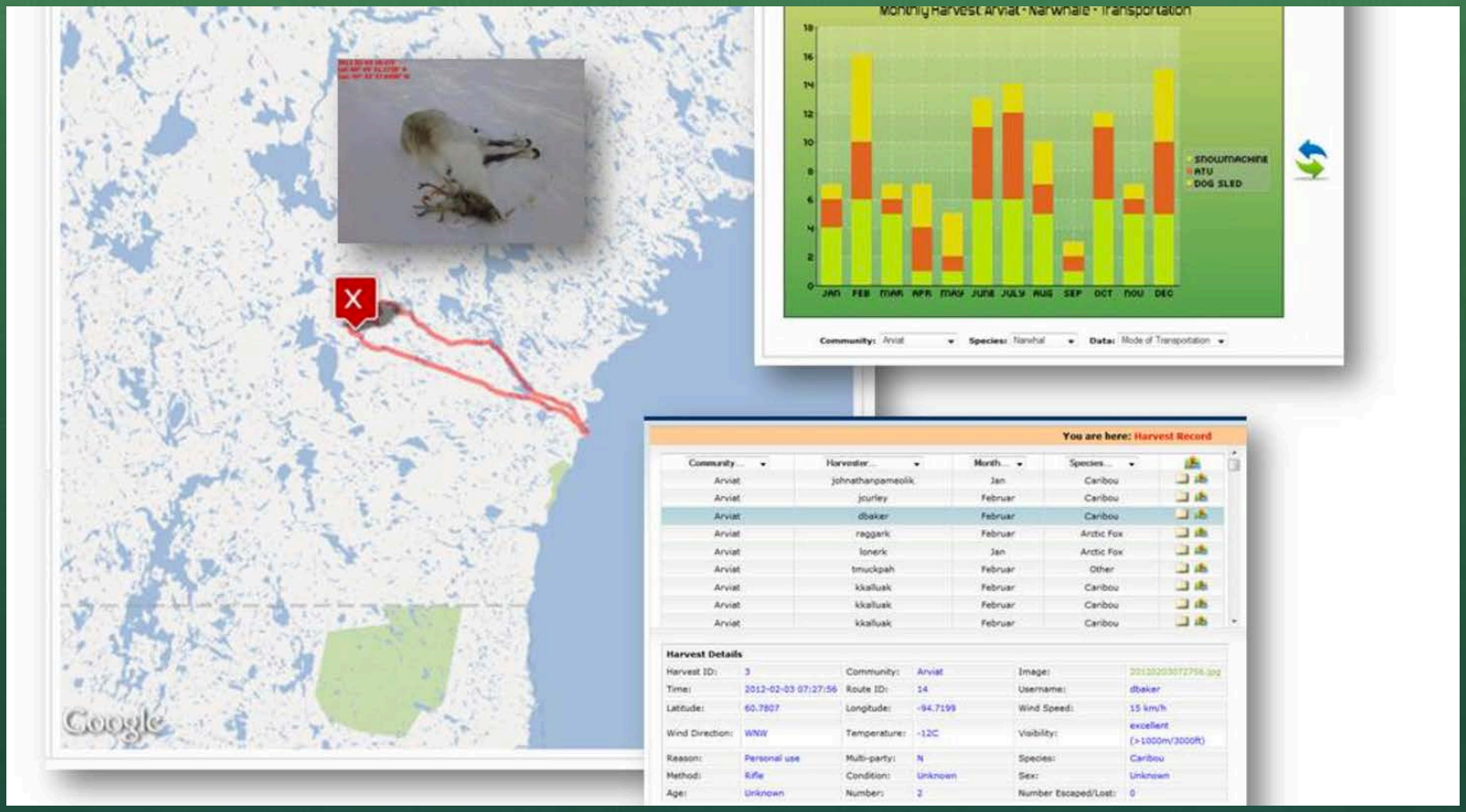
TK Panel Recommendations to Date

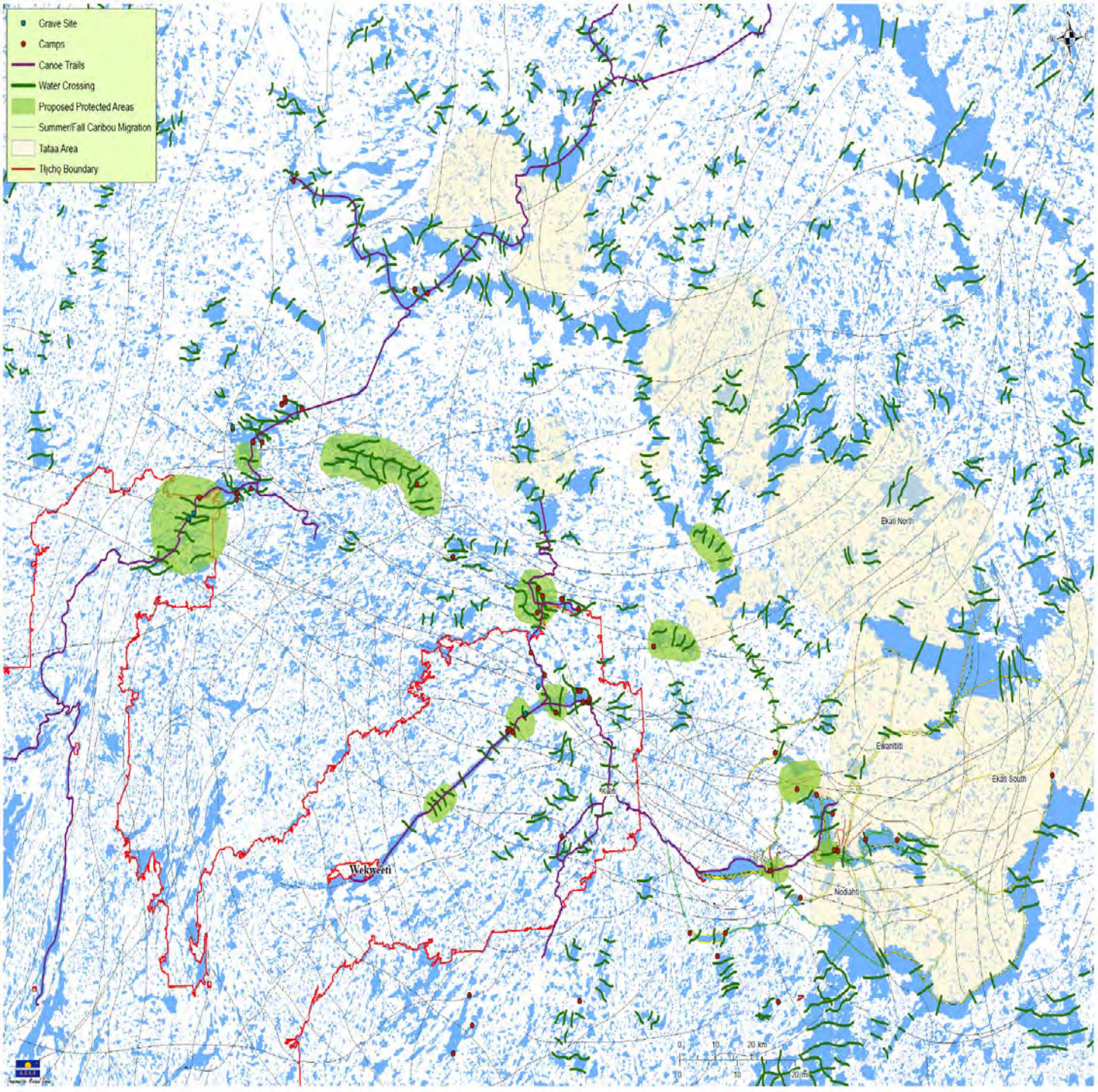
8.18 Monitor water in late May and early June as these are critical times (i.e. melt). Regularly measure water quality in all bays, drainage and run-off. Annually check for algae growth around shorelines as too much can be an indicator that there is less oxygen for the fish.

Examples of Watching Programs

- LKDFN - Ni Hat'ni Dene Watchers of the Land (Thaidene Nene)
- Tlicho - - Boots on the Ground Caribou Monitoring
- Dehcho K'ehodi – Taking Care of the Land
- Haida Watchmen – Coastal Guardian Watchmen Network
- Nunavut Wildlife Management Board – Community Based Monitoring Network
- DDMI – Aquatic Effects Monitoring Program

NWMB - CBMN


Monthly Harvest Arviat - Narwhale - Transportation
SNOWMACHINE
ATU
DOG SLED
JAN FEB MAR APR MAY JUNE JULY AUG SEP OCT NOV DEC
Community: Arviat
Species: Narwhal
Data: Mode of Transportation
Google
You are here: Harvest Record
Community... Harvester... Month... Species...
Arviat johnathanpameolik Jan Caribou
Arviat jourley Februar Caribou
Arviat dbaker Februar Caribou
Arviat raggark Februar Arctic Fox
Arviat lonerk Jan Arctic Fox
Arviat tmuckpah Februar Other
Arviat kkalluak Februar Caribou
Arviat kkalluak Februar Caribou
Arviat kkalluak Februar Caribou
Harvest Details
Harvest ID: 3
Community: Arviat
Image:
Time: 2012-02-03 07:27:56
Route ID: 14
Username: dbaker
Latitude: 60.7807
Longitude: -94.7199
Wind Speed: 15 km/h
Wind Direction: WNW
Temperature: -12C
Visibility: excellent (>1000m/3000ft)
Reason: Personal use
Multi-party: N
Species: Caribou
Method: Rifle
Condition: Unknown
Sex: Unknown
Age: Unknown
Number: 2
Number Escaped/Lost: 0



Tłı̨chǫ Ndek'awoo

Tłı̨chǫ Government

Ekwo Trails and Tłı̨chǫ Trails

What makes watching programs work well?

- A good plan
- Learning from others
- Start small and scale up
- Steady funding
- Good governance – "bones"
- Buy – in from governments, industry, funders, supporters, etc.
- Youth engagement
- Participation, accountability, transparency, commitment, organized, secure data management system

Value

- Indigenous guardianship work in Lutsel K'e and the Dehcho region: for every $1 invested, around $2.5 of social, economic, cultural, and environmental value has been created. (SVA Consultants 2016: 5)

What does Watching Look Like?

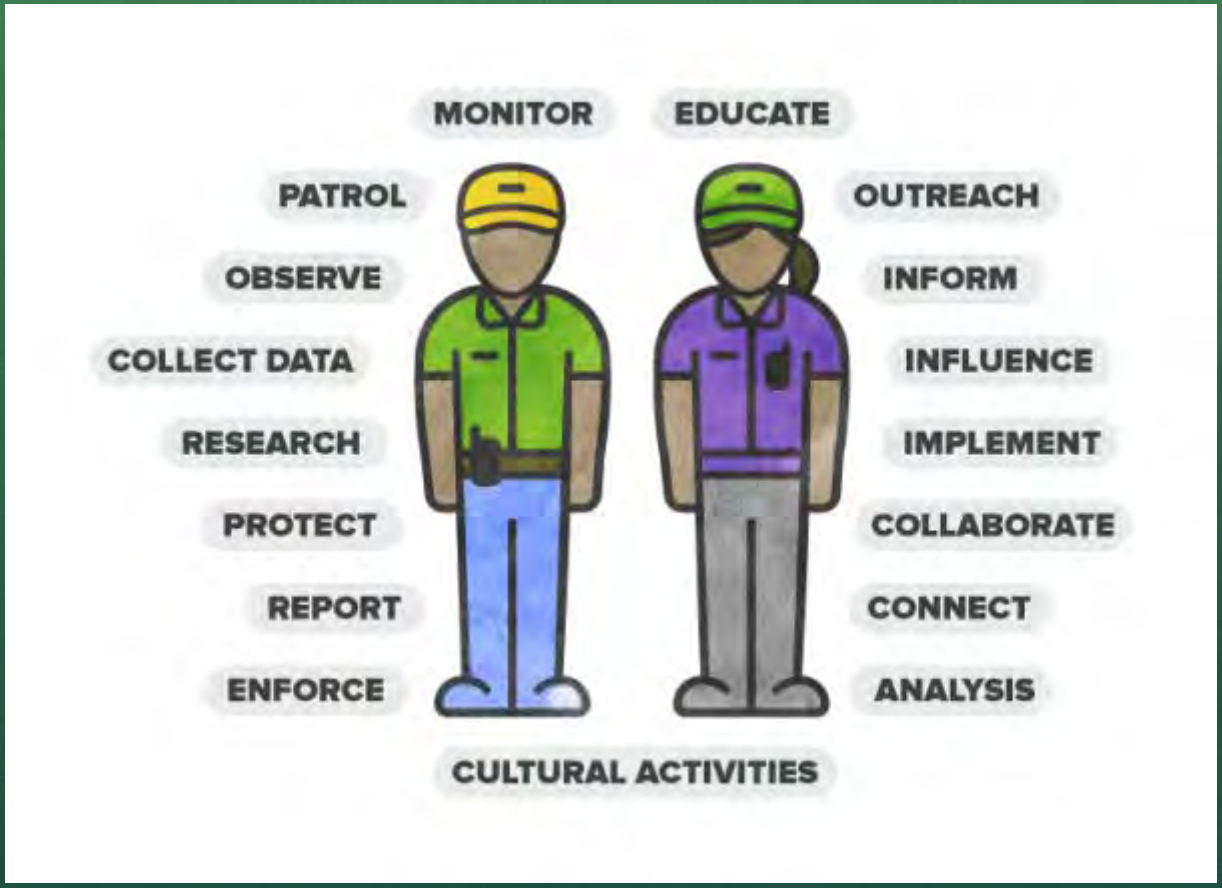
1
Build a vision

2
Set strategic priorities

3
Create an operational plan

4
Evaluate the program

What do Watchers Do?



Starting small …

- "A guardianship program may seem overwhelming but remember it might be linked to other initiatives that you're already involved in. You may not have to start from scratch. You likely have relationships established with key players or partners on other topics and now you could be broadening that to include monitoring and Indigenous Guardians work. Build on these existing initiatives and relationships." (Kate Cave, Centre for Indigenous Environmental Resources in TNC 2016: 20)
- We need to just do it! (Dehcho K'ehodi 2015)

Starting small …

- Haida Guardian Watchmen collected data on wildlife, trap and boat sightings, impacts to cultural sites and suspicious activities. (TNC 2016:115)
- Now they are part of the Coastal Guardian Network, Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, Haida Heritage Site
- Began in 1981 informally

More than just a ‘job’…

- We rarely do just a monitoring program but are also always asking: how am impacting the quality of life today? Can we create employment? Can we support mental health? We think about how we collect the sample as much as collecting the sample itself. (TNC 2016: 109)

What to Watch ?

- Cultural Knowledge and Skills Development on the land
- Impact monitoring and Mitigation
- Ecological Monitoring
- Protected Areas Management and Operations (Dehcho K'ehodi 2015)

- Ecological, cultural, compliance, effectiveness (TCN 2016)

Visioning the Future …

Let's talk about watching at DDMI …

- Who?
- What?
- Where?
- When?
- Why?

Appendix F

Presentation on
Community-Based Monitoring / Watching Programs

RioTinto

Closure and Reclamation Plan (CRP Version 4) Overview

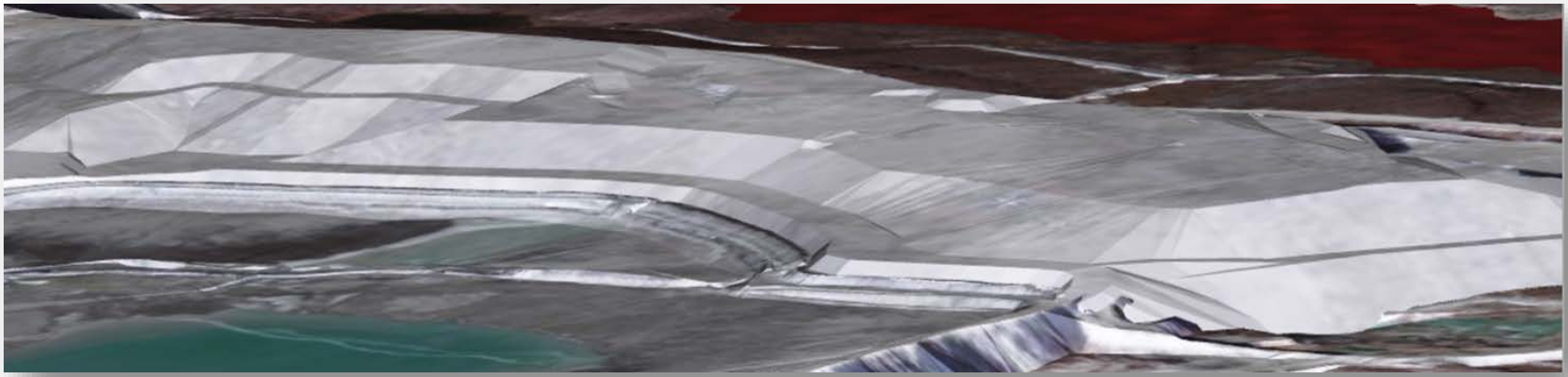
TK Panel

15 September 2017

Status of Diavik's Closure Plans

- The NCRP Final Closure Plan was submitted to the WLWB for review; it has yet to be approved
- The site-wide Closure and Reclamation Plan (Version 4) was also submitted to the WLWB and is under review, with a workshop planned by the WLWB for this fall

Review of the NCRP Final Closure Plan

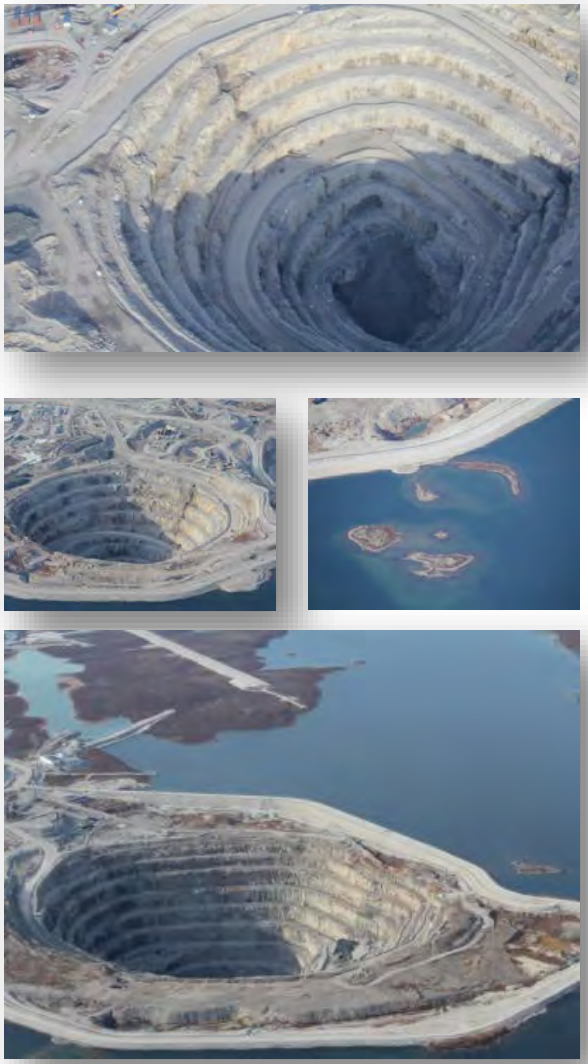


- Your hard work paid off!
- Community organizations that reviewed the Plan felt the Panel's recommendations and DDMI's responses were valuable and meaningful
- DDMI met with leadership from each of your organizations to review the Plan and your contributions; your recommendations were echoed and supported by leadership

Closure Plan by Area – CRP V4

1. Open Pits & Underground
2. North Country Rock Pile
3. Infrastructure
4. North Inlet
5. Processed Kimberlite Containment

1. Open Pits & Underground



CRP V4

- Flood piping/fill options
- Inert waste to pit option
- PK to underground/pit option

TK Panel Recommendations on Open Pits & Underground

- Do not breach the dikes until communities are satisfied that the water quality is okay
- Leave the lake bottom between the dikes and open pit as-is; plants that have grown will help re-growth after flooding; do not build reefs in these areas
- Leave the dikes as they are; do not modify the slope
- Vary the depths of reefs built within the dike areas
- Ensure good habitat for rearing, feeding and resting inside dikes
- Stock water with bugs to improve quality
- Break up 1 km cliff on A418 pit wall
- Leave current road into pits

2. North Country Rock Pile

CRP V4

- NCRP cover construction
- SCRP not included
- Re-sloping work has started

TK Panel NCRP Recommendations

- Do not allow water to pool on top of the pile; include a domed top to promote water drainage
- Have a ‘moat’ around the pile to collect and monitor water coming off/out of the pile
- Focus re-vegetation on the base of the pile, around the ponds; allow the rest to naturally re-vegetate
- Simulate an esker for the final shape of the pile
- Ensure safe wildlife access for all seasons and soft material for caribou feet
- Keep the height as low as possible while ensuring contaminants are contained
- Cap materials with the best material for biodiversity

TK Panel NCRP Recommendations Cont'd

- Consider using wetlands for filtering runoff/seepage water around the base of the pile
- Slopes similar to that of the test pile so it is safe for wildlife
- Long-term scientific monitoring to ensure the core remains frozen
- Place a limited number of large boulders on top of the pile for wildlife shelter, and place boulders along the edge between the PKC and NCRP to deter wildlife
- Study wind and snow accumulation on wildlife pathways prior to finalizing slopes and cover

NCRP Re-sloping Underway

3. Infrastructure

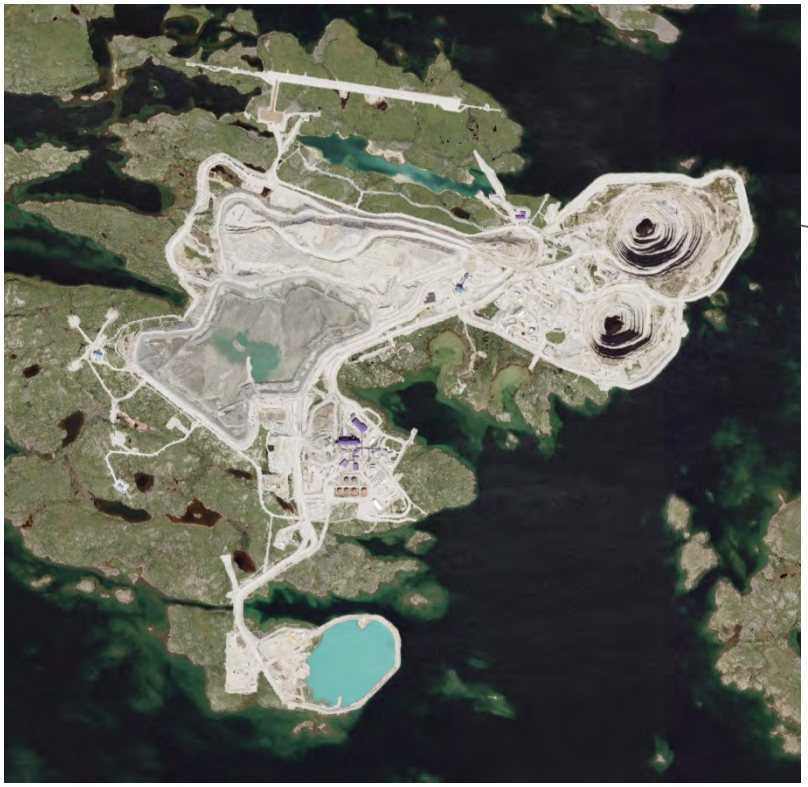
CRP V4

- Updated building inventory
- Updated re-vegetation information
- Updated timing for building demolition

TK Panel Infrastructure Recommendations

- Ensure meaningful employment for communities to be involved with closure work
- Create safe passage for wildlife at the site after closure; evaluate ways to keep animals away from certain areas
- Add rock cover and do not re-vegetate areas that were used for waste or hazardous materials storage (e.g. fuel bays, waste transfer areas, etc.)
- The TK Camp and airstrip should remain after closure
- Create safe slopes on the sides of roads and the airstrip, similar to test pile surface
- Do not disturb new areas, except where re-sloping would assist with safe wildlife movement
- Remove equipment, unused buildings, pipes, toxic materials and non-biodegradable items from site
- Scarify (roughen) the surface of old plant sites to support re-vegetation
- Re-vegetate certain areas of the site

4. North Inlet



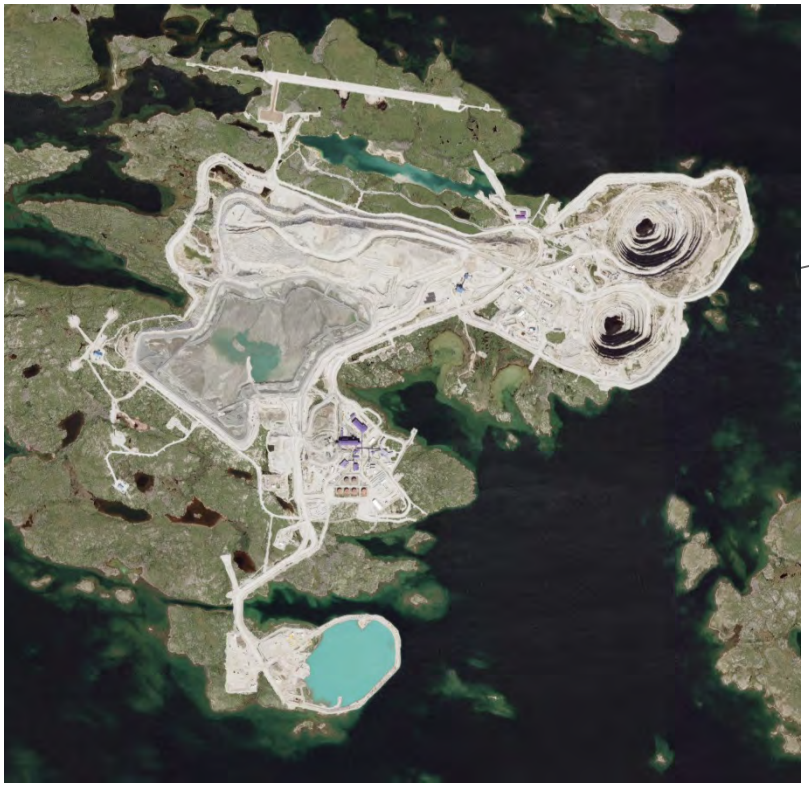
CRP V4

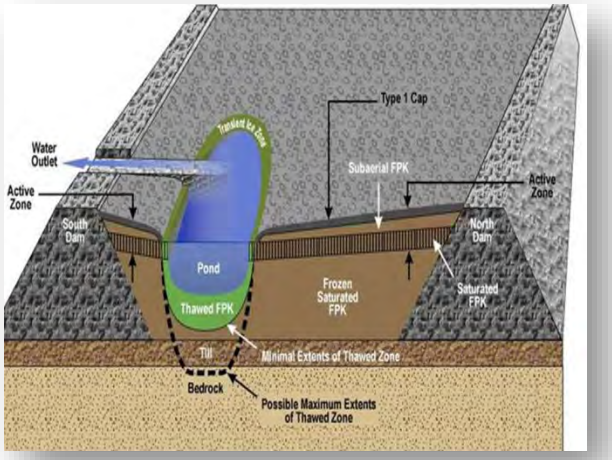
- Evaluated hydrocarbon option
- Change default plan to limited breach

TK Panel North Inlet Recommendations

- Further consideration is required to determine if this area would be a no-go zone for wildlife, or if wildlife use would be encouraged in this zone
- Do not reconnect the North Inlet to Lac de Gras unless the sediments and water are of the same quality as the lake

5. Processed Kimberlite Containment





CRP V4

- Updated to approved closure concept
- Option to go to underground

TK Panel PKC Recommendations

- Cover the area with sand and soil and promote re-vegetation, restore eskers, create wildlife habitat and marshy areas and plant willows
- Return the PKC lake and shoreline to their natural condition, line the lake with rock, re-vegetate with water plants and re-stock with bugs and fish
- Provide safe access for wildlife over the dam by re-sloping and open some sections of the dam to re-create water flow to Lac de Gras
- Leave some areas steep to encourage denning for wolverine, bear, foxes, etc.
- Remove the PK slimes from the mine site at closure
- Conduct toxicological testing on the PK slimes to determine if it is harmful

TK Panel PKC Recommendations Cont'd

- Create barriers to prevent wildlife from moving between the NCRP and the PKC, e.g. steep slopes, boulders
- Filter streams flowing from the PKC by using mosses; monitor this water
- Place a circle of boulders around the PKC pond to deter wildlife from accessing the pond and unstable shore

Additional Questions?

RioTinto

South Country Rock Pile (SCRP) & A21 Mine Overview

TK Panel

15 September 2017

South Country Rock Pile Design Plans & the A21 mine

- The A21 mine and its associated South Country Rock Pile were approved as part of Diavik's Environmental Assessment
- The Water License requires that design drawings and a Waste Rock Management Plan be submitted prior to construction
- Regulatory review of the WRMP document is happening now

SCRP Design

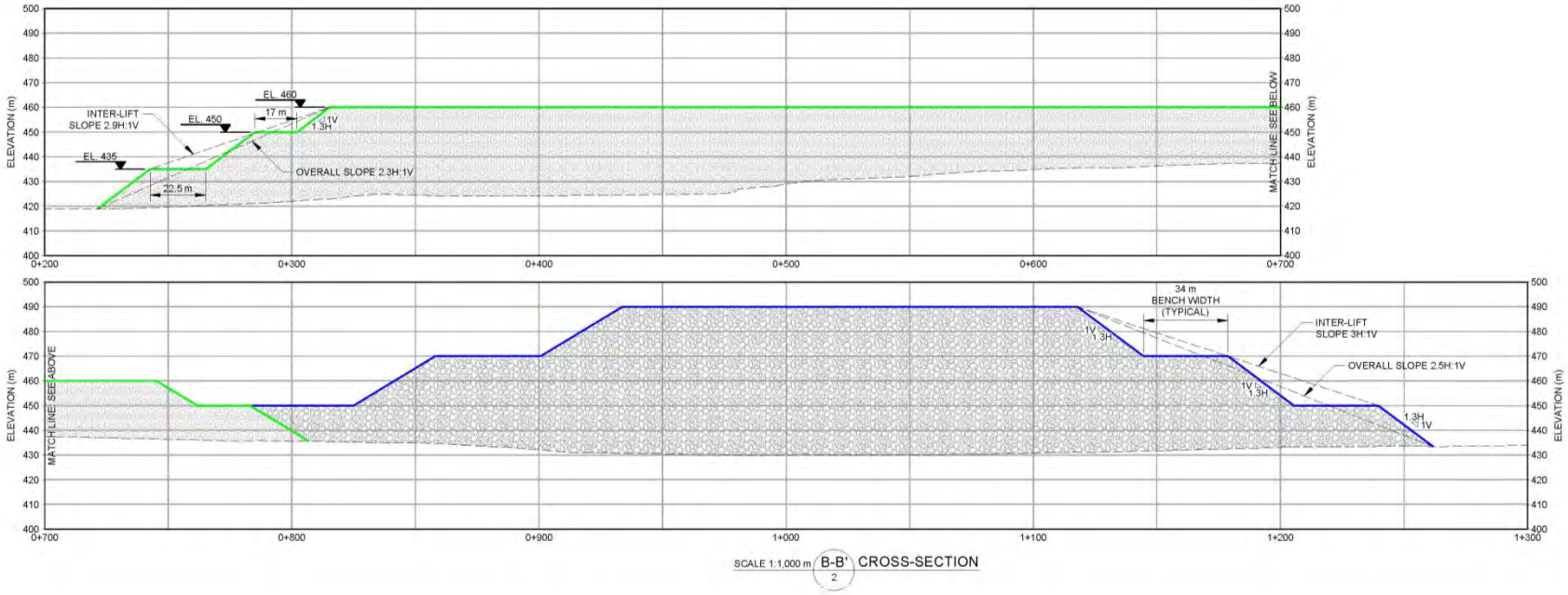
- Current SCRP design assumes all waste rock from A21 will be placed here

- Approval of the NCRP Closure Plan may result in a smaller pile

SCRP by Numbers

			SCRP - Design Capacity	SCRP - NCRP Cover Subtracted	NCRP
Rock Pile	Capacity	cu.m	16,411,000	12,779,000	65,362,000
		tonnes	33,453,000	26,049,000	133,238,000
	Footprint	sq.m	501,000	-	1,422,000
	Height	elevation	490	490	497
		m (from footprint centroid)	57	-	50
Till Pile	Capacity	cu.m	3,942,000	1,610,000	2,353,000
		tonnes	5,367,000	2,191,000	3,204,000
	Footprint	sq.m	149,000	-	83,000
	Height	elevation	460	460	470
		m (from footprint centroid)	31	-	37

SCRP Design


ELEVATION (m)
INTER-LIFT SLOPE 2.9H:1V
EL. 460
EL. 450
EL. 435
17 m
1V 1.3H
22.5 m
OVERALL SLOPE 2.3H:1V
MATCH LINE SEE BELOW
MATCH LINE SEE ABOVE
34 m BENCH WIDTH (TYPICAL)
INTER-LIFT SLOPE 3H:1V
OVERALL SLOPE 2.5H:1V
1.3H 1V
0+200
0+300
0+400
0+500
0+600
0+700
0+800
0+900
1+000
1+100
1+200
1+300
SCALE 1:1,000 m
B-B'
2
CROSS-SECTION

SCRP Rock Management

- Unlike the NCRP, the waste rock from A21 is all ‘clean’ rock and lake bottom sediments
- These materials can be used for closure, e.g. NCRP cover, re-vegetation, PKC

SCRP Area

SCRP Closure Plans

- Creation of a wildlife pathway with smooth surface, similar to test pile & NCRP plan
- No cover required as all clean rock
- With the exception of the wildlife pathway, currently no plans to smooth or re-slope the pile
- Runoff and seepage water would flow to Lac de Gras
- Re-vegetation is not planned for the pile, similar to NCRP

Key Questions for the Panel

- Should there be a wildlife pathway over this pile?
- If so, where should the wildlife pathway be located at closure?
- Is it ok for the surfaces of the SCRP to be a rough surface?
- Are there any water quality or flow concerns or questions?
- If NCRP Closure is approved and the SCRP pile becomes smaller, how should the shape of the pile change?

Appendix G

DDMI Presentations on Closure and Reclamation Plan Overview and South Country Rock Pile

Traditional Knowledge Panel Guidance and Recommendations

Session #10: SCRP and Monitoring
September 14 - 18, 2017

Guidance

North Country Rock Pile

- After viewing on September 16, 2017, the TK Panel is pleased with and supports the current 3:1 slope on all edges and caribou ramps of the NCRP.
- Lessons learned from planning, constructing, closing and monitoring the NCRP should be applied to the SCRP.

Slimes

- There is a concern if slimes were to be put into a pit that they may be released into the environment.
- As long as there are no chemical contamination or physical suspension issues (i.e. the slimes don't mix with the lake water), the TK Panel generally supports Diavik researching this alternative for disposal of the PK into the pits. The rationale for this guidance is that the TK Panel wants the SCRP and disturbance of the tundra footprint to be as small as possible – move slimes out of PKC and use SCRP rock in PKC area.

Process and Logistics

- Elders honoraria rates need to be reviewed and raised.
- Copies of presentations need to be provided to interpreters in advance.
- TK Panel members would like to have more time out on East Island to watch with their own eyes the state of the land, water, wildlife, etc. This includes quiet time on the tundra.
- Respectful language should be used such that the rock should not be called “good” or “bad” as everything is understood to be as gifts from the Creator.
- The TK Panel would like to have the results of the 10 year overview of the re-vegetation research.
- TK Panel should get all monitoring result presentations to understand what impacts are being documented now and until closure.

Recommendations

South Country Rock Pile

- Avoid disturbing new areas (e.g. tundra) with A21 material at the SCRP as much as possible. The proposed SCRP area is part of a major caribou migration and feeding corridor and should not be disturbed.
- If this area must to be used, minimize the size (i.e. volume/amount) and height of the SCRP and slope all sides like an esker so that animals can easily walk over it. We recommend the slope should be at 3:1.
- If the SCRP is large, designated pathways become more important and must follow caribou routes known through TK.
- We recommend that rock from A21 that could go to SCRP be used to cover the NCRP.

South Country Rock Pile

- Drain the pond that would be covered by the SCRP before using the proposed area.
- Have all SCRP water tested (both science and TK) before releasing into Lac De Gras
- Use natural filtration methods in areas where water will run off the SCRP on site.
- Diavik must plan for the same values, principles and goals held by the TK Panel for the NCRP, to the SCRP (e.g. maintain low height, 3:1 slope for caribou).

Helping Caribou and Other Wildlife

- Diavik must return East Island to a caribou-friendly state (as defined by the TK Panel and Elders), other than those areas identified as ‘no-go’ zones. Caribou pathways should follow caribou corridors identified through traditional knowledge.

A21 Pit

- Consider alternative uses for A21 material:
  - Cover the Processed Kimberlite Containment (PKC) area after removing slimes.
  - Assuming the slimes are gone, slope the south face/wall between the North Country Rock Pile (NCRP) and the north end of the PKC to allow for caribou movement.
  - Extend the west end of the NCRP and slope it for caribou.
  - Cover areas that may have been contaminated after clean-up like the hydro-carbon containment area.
  - Smooth edges of roads, airport and building areas

Watching Programs (Possible / Priority Watching)

- Some start-up watching projects might look at:
  - what plants are growing on disturbed ground and why/why not;
  - presence of grounds squirrels on the East Island;
  - health of the shorebirds on the water (as an indicators for health of water);
  - snow accumulation and natural revegetation around boulders atop the test pile;
  - watch and monitor dust impacts on water and plants as an important part of the food chain;
  - animal scat, this should be part of a TK Watching program;
  - look at possible impacts on plants, with special consideration for those used for medicine

Watching Programs (Framework)

- Pair every adult with a youth monitor. Scientists should also be involved. Consider the TK camp as a good model, bringing elders and youth together with scientists.
- Ideally, watching would occur all year round. At a minimum, watching must occur in all seasons.
- Watchers should be trained by trained monitors from existing guardianship programs (e.g. Ni Hat'ni Dene, Tlicho, Dehcho). From there, trained watchers will train new watchers through a pay-it-forward model.
- Be designed for long term watching/monitoring as impacts may take a long time to show up (i.e. a plant may look healthy now but in the future it may not be strong if dust or contaminated water affect it).

Watching Programs (Framework)

- Watch and check everything (water, wildlife, birds, bugs, small mammals, plants, weather, etc.)
- Ensure long-term, ongoing and significant funding.
- Be grounded in strong communication and traditional laws around sharing, exchanging and stories
- Start training for watching programs during mine operations by inviting community members to site, i.e. train-the-trainer program. For example, bring up people to work with Environment dept, starting with one weekend a month and scaling up over time

Watching Programs (General)

- Diavik should support and encourage the TK Panel to assess and review existing monitoring methods and results to help us determine what and how we should monitor in the future
- Encouraging all of the communities working together and supporting each other long into the future will give us strength. Diavik has helped us do this and we must continue into the future.
- Diavik should plan to leave some buildings (and possibly the airstrip) to support Watching Programs for this and other mines in the surrounding area
- Diavik should support the development of a 'best practices' document that explains the Panel's approach to integrating TK into mine closure planning

Cultural

- Research or monitoring methods that are offensive to elders (e.g. caribou collars) should lead to getting alternative method advice from elders. Diavik should check with the TK Panel as to whether any aspects of the current monitoring program is offensive and revise them accordingly.

Next Steps

- PK to Underground session
- Timing of next session should be after Diavik has an answer on NCRP closure and all the information needed to on the PK to underground option
- Male and female youth for future sessions

Appendix H

TK Panel Session#10 Recommendations Presented to DDMI

RioTinto

Diavik Response to TK Panel Session 9 Recommendations

TK Panel

14-18 September 2017

Response to Session 9 – Focus on Caribou

Supported

- Focus monitoring on wildlife health and safety, and other possible impacts from other mines (9.14)
- Focus monitoring to determine if reclamation activities are completed and working the way they were planned and intended (9.18)
- Confirm that Ekati has a wildlife camera at the Narrows (9.20) – confirmed
- Study wind/snow effects on NCRP wildlife trail to determine if conditions are safe for wildlife in all seasons; should be done before cover is finished (9.3)
- Ensure a gradual slope down the center of the NCRP for drainage (9.4)
- Arrange for a tour of the underground and open pits for TK Panel members that are interested in seeing this receiving environment (9.25)
- Healing ceremonies to be incorporated into the closure process for the mine (9.22)
- Allow time and place for TK Panel members or other community members visiting site to feed the land and/or water (9.23)
- Employ community members in meaningful roles that include closure construction (e.g. building caribou ramps, covering the PKC/NCRP, etc) and environmental monitoring (9.16, 9.17)

Response to Session 9 – Focus on Caribou

Modify

- Sponsor or co-sponsor contest for youth to develop ideas to make caribou strong (9.5)
  - Diavik feels this is something better suited for communities to organize themselves – DDMI can possibly support through PA Implementation Committees
- Contribute to healing events being planned by communities for caribou (9.6)
  - Diavik can possibly support these through PA Implementation Committees
- Support capacity building and training programs for community monitors that teach science and TK monitoring (9.9, 9.13, 9.15)
  - Diavik supports the Mine Training Society and the Aurora College BEAHR monitoring training and Environmental Monitor Certification programs; the company does not conduct independent training programs, other than on-the-job training

Response to Session 9 – Focus on Caribou

Pending

- Use wildlife cameras for closure monitoring and determine locations for use with communities (9.19)
  - Diavik is interested in using this technology for closure monitoring; cameras are not real time and are labour intensive so the purpose would need to be clearly defined and linked to location selection
- Work with other stakeholders (industry, government, communities) to develop a long-term, post-closure monitoring program for caribou and cumulative effects monitoring (9.10, 9.11, 9,12, 9.21)
  - Diavik expects that the development of regional monitoring programs will be an important topic for all parties in the future; DDMI is currently interested in defining site-specific closure monitoring programs
- Re-vegetate around the ponds at the base of the NCRP (9.1)
  - DDMI has yet to develop detailed closure plans for the collection ponds
- Place a limited number of large boulders on top of the NCRP for wildlife shelter (9.2) and between the edge of the NCRP and PKC to deter wildlife (9.7)
  - Diavik has not included this in the initial NCRP closure plan, but it has been identified as a possible follow up action, based on community feedback

Response to Session 9 – Focus on Caribou

Pending Cont'd

- Place a circle of boulders around the PKC pond to deter wildlife (9.8)
  - Diavik is researching other PKC closure options that could change the current design
- Keep areas that may contaminate Lac de Gras separate; do not reconnect them with the lake, i.e. North Inlet and PKC dams (9.24)
  - Diavik is exploring closure options for these two areas; regulated 'containment structures' would not be favorable to maintain after closure

Appendix I

Presentation of DDMI Responses to TK Panel Session #9
Recommendations and Next Steps

Next Steps

Session	Original Plan (2013)	Completed & Revised Plan
6	PKC	PKC
7	Re-vegetation	Re-vegetation
8	Review of Closure Landscape	Fish Habitat Design & Water Quality
9	Post-closure monitoring: Wildlife & Water	Post-closure Wildlife Monitoring
10	Fish Habitat Design Reviews	**Closure Plan Update, SCRP, TK Monitoring Plan**

Reached the end of the topics you'd originally suggested

Need to plan for future sessions – 1/year is realistic

RioTinto

Future Topics/Sessions – DDMI Interests

PK to underground – including a tour underground

Updates on PKC closure options

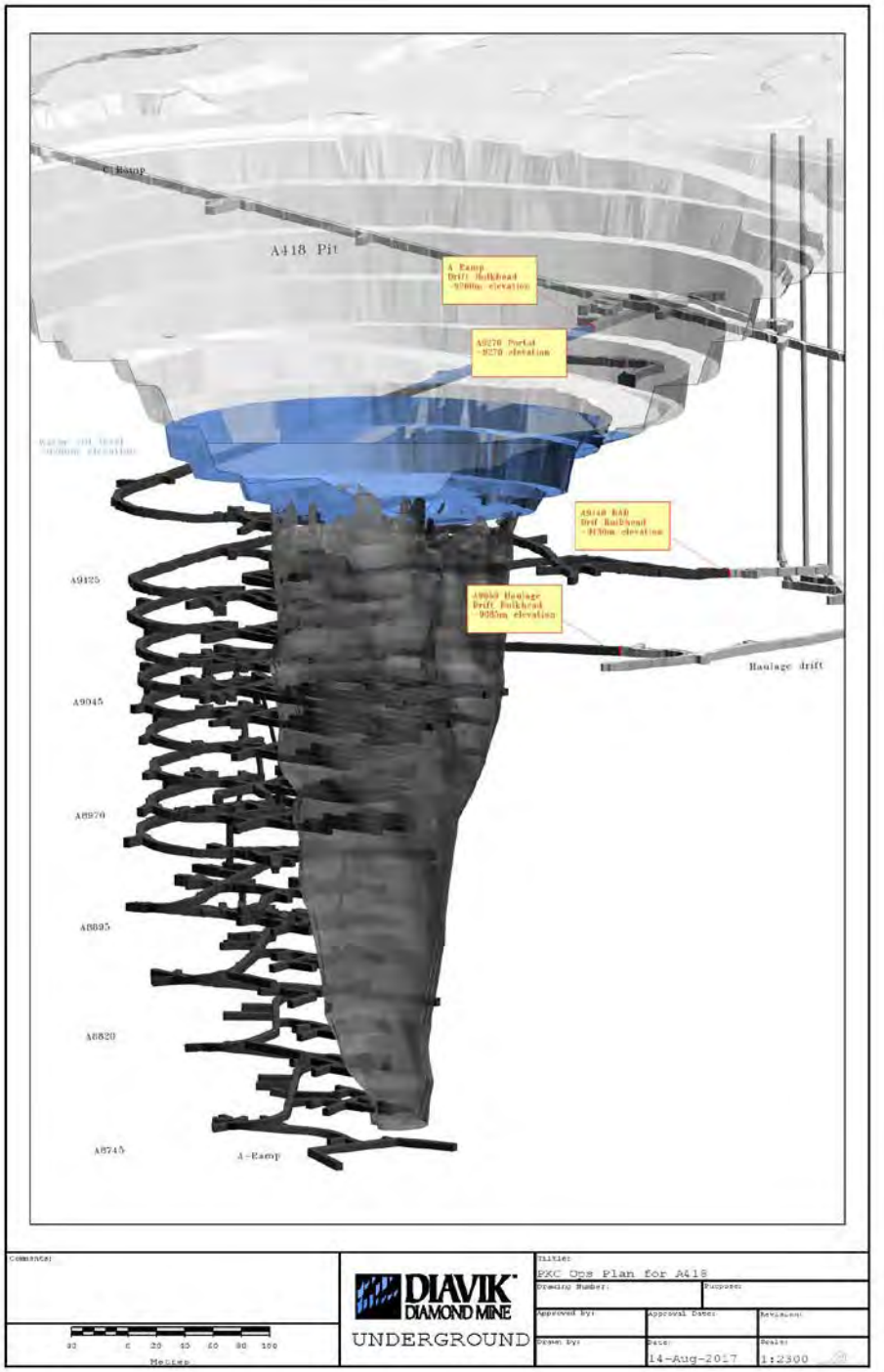
North Inlet

Closure Details: building demolition, metal disposal, waste disposal, contaminants, laydown areas, airports, roads, etc.

Closure inspection criteria

2018 Aquatic Effects Monitoring Program (AEMP) TK Camp

PK to Underground



Appendix J

TK Panel Session #10 Evaluation Summary

2017 Diavik TK Panel, Session 10: Evalution Form Summary

Question	Very Good	Good	Neither Good nor Poor	Poor	Very Poor	Total Responses	Comments
How would you rate the session for working and communicating together?	9	1	0	0	0	**10**	
How would you rate the session for mutual respect among participants?	7	3	0	0	0	**10**	
How would you rate the recording and documenting of TK during the session?	7	3	0	0	0	**10**	
How would you rate the facilitation of the session?	6	4	0	0	0	**10**	Very, very good Better than very good
How would you rate the outcomes and findings of the session?	9	1	0	0	0	**10**	
How would you rate the venue and food for the session?	7	2	0	1	0	**10**	Excellent Too much Don't like the lunches
How would you rate the logistics for the session (e.g. hotel, travel, honoraria)	2	1	6	1	0	**10**	More money for honoraria Very good for travel but poor for honoraria
Overall, how would you rate the session?	9	1	0	0	0	**10**	

Question	Too long/ many	Enough	Too short/few	Total Responses	Comments
How would you rate the opportunities for you to share your knowledge and experiences?	1	9	0	**10**	
How would you rate the amount of time to discuss the topics during the session?	1	8	0	**9**	1 blank response

What were the strengths of the session? What did you enjoy most about the session?

- Sharing of stories, exchange of knowledge, learning about scientific stuff that elders and youth didn't know about, good explanations
- Keeping us on track, prioritizing discussions
- Always enjoy the laughter & sharing of TK
- Elders want more honorarium - they say the current rate is not enough & want an increase to match their government
- More people are involved, which is good
- Help with communities support to be strong
- Enjoy session
- Went very good; mutual respect
- Love all our facilitators, love the interaction between elders and youth
- Elder's knowledge of the land and animals, water was passed on to the youth
- I just love the elders speaking in our language
- Our voices taken wisely; I enjoy the meeting

How could the session be improved?

- Maybe more days and less time; more breaks; elders get tired
- Recognize the past Elders who participated in this session and give them a plaque
- More fresh air
- You all do a super job and so fortunate to have you all as our facilitators, and Janet is the best transcriber going
- Would find it better sitting around tables - easier for cups and snacks to set on and to write on a pad
- Worry about elders - seem they get tired in the afternoon; other then that, its good
- Interpreter rate goes up as Elders do, travel day paid, too
- Too much seated, more breaks, we're tired
- This one couldn't be improved
- Index sheet/information sheet for proper translation
- Allow space in talking for effective translation, lots lost in translation

Appendix IV

Letters from EMAB and Diavik on the Wildlife Monitoring Program and Air Quality Monitoring Program Recommendations and Responses

May 12, 2017

Gord Macdonald
Diavik Diamond Mines Inc.
P.O. Box 2498
5007-50th Avenue
Yellowknife, NT X1A 2P8

RE: Diavik responses to EMAB Recommendations on the 2014 & 2015 EAQMP Consolidated Report

Dear Gord:

Thank you for the responses to EMAB's comments and recommendations on the 2014 & 2015 Environmental Air Quality Monitoring Program (EAQMP) Consolidated Report received on October 19, 2016. We completed a review on the adequacy of Diavik's responses, including a technical review (attached) by Arcadis Canada Inc. (Arcadis).

In general, EMAB and Arcadis were pleased with the quality of Diavik's responses. However, EMAB would like to draw Diavik's attention to the following items that we will be looking for in Diavik's 2016 EAQMP Annual Report:

- Calibration certificates and reports to validate the operational performance of monitors and resulting data
- QA/QC measures
- Discussion of exceedances
- Explain how dustfall and snow core data was analyzed and presented
- Explain why the BC dustfall objective was changed from a monthly average to a yearly average
- Discuss differing trends in TSP monitoring data if these discrepancies continue under the new TSP Monitor SOP

In addition to the recommendations above, please review the technical memo prepared by Arcadis and provide any requested information in the 2016 EAQMP Annual Report. EMAB feels including these items will help quality of reporting and validate results of the monitoring program.

EMAB would also like to highlight a recommendation in our original letter (dated August 12, 2016) that Diavik did not respond to. The Air Quality Monitoring Plan (June 5, 2013), stated that the TSP monitoring would be assessed after the period of a year and recommendations would be made regarding any changes. Given the extensive comments and recommendations in our review, and ongoing issues with data quality, EMAB recommends that a formal assessment of the TSP monitoring be conducted as soon as possible. This review should address the comments and recommendations made by EMAB and our

consultants on the 2013 report and 2014-15 consolidated report, as well as any comments from other reviewers.

Sincerely,

Napoleon Mackenzie
Chair

Cc EMAB members (by email)
Parties to the Environmental Agreement (by email)

Environmental Monitoring Advisory Board
PO BOX 2577 YELLOWKNIFE, NT X1A 2P9
Ph (867) 766 – 3682 Fax: (867) 766 – 3693 E-mail: emab1@northwestel.net

Diavik Diamond Mines (2012) Inc.
P.O. Box 2498
5007 – 50th Avenue
Yellowknife, NT X1A 2P8
Canada
T (867) 669 6500
F (867) 669 9058

Napoleon Mackenzie - Chair
Environmental Monitoring Advisory Board
PO Box 2577
Yellowknife, NT X1A 2P9

17 July 2017

Dear Mr. Mackenzie:

Subject: 2016 Environmental Air Quality Monitoring Report Submission Extension Request

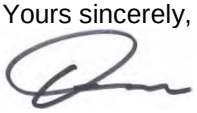
Please find enclosed the Environmental Air Quality Monitoring Program (EAQMP) Report for 2016. The report includes each of the following points identified in your 12 May 2017 Letter:

- Calibration certificates and reports to validate the operational performance of monitors and resulting data;
- QA/QC measures;
- Discussion of exceedances;
- Explanation of how dustfall and snow core data was analyzed and presented;
- Explanation why the BC dustfall objective was changed from a monthly average to a yearly average;
- Discuss differing trends in TSP monitoring data if these discrepancies continue under the new TSP Monitor SOP.

DDMI is currently working with our Air Quality consultant to review and assess the EAQMP and expects to complete this work by late Fall 2017. An update will be provided to EMAB at that time.

Should you have any questions regarding the EAQMP please contact the undersigned at 867-669-6500 ext 5536 or david.wells@riotinto.com .

Yours sincerely,



David Wells
Superintendent - Environment

Cc.: John McCullum – EMAB Executive Director

August 21, 2017

Gord Macdonald
Diavik Diamond Mines Inc.
P.O. Box 2498
5007-50th Avenue
Yellowknife, NT X1A 2P8

Dear Gord:

Re: Review of Diavik's 2016 Wildlife Monitoring Program Report and 2014-2016 Comprehensive Analysis Report

The Environmental Monitoring Advisory Board (EMAB) thanks Diavik for the 2016 Wildlife Monitoring Program (WMP) Annual Report (Report) and the 2014-2016 Comprehensive Analysis Report (CAR). The Environmental Agreement mandates EMAB to make recommendations to achieve the purposes and guiding principles in Article I. EMAB retained Management and Solutions in Environmental Science (MSES) to review the WMP Report and CAR and provide a technical memo (attached). MSES's technical memo makes 16 recommendations relevant to Diavik and describes them in more detail in the review. MSES also included a table in their review which summarizes how Diavik has incorporated recommendations from the 2015 WMP Report, and others that still need to be addressed. After a number of discussions following the review of this Report, EMAB would like to highlight the following issues and make its own recommendations to Diavik (below).

Vegetation

In the 2016 Comprehensive Vegetation and Lichen Monitoring Program Diavik found that dust deposition is higher closer to the mine and higher in years with above-ground mining. Diavik has been completely underground since 2010, but this changed in 2016 when construction of the A21 dike began, and will continue until 2023 when mining of the A21 pit is completed.

Recommendation: Diavik should include a discussion on how potential project effects on vegetation abundance and composition could be mitigated.

Diavik also found that metal levels in lichen close to the mine were lower in 2016 compared to 2013 and 2010. Based on this information Diavik did not feel it was necessary to complete the last part of this analysis which was to assess whether metal concentrations in lichen are safe for caribou. The last time Diavik did this assessment in 2010 they found there was no risk of negative effects to caribou if they consumed lichen near the mine; however EMAB had some concerns about the way the 2010 risk assessment was carried out.

Recommendation: Diavik should provide additional information to show that concentrations of metals in lichen are safe for caribou.

Diavik proposed to reduce monitoring vegetation and lichen from once every three years to every five years. EMAB does not agree with this program change and feels that with open pit mining beginning again in 2018 dust deposition and metal concentrations in lichen are likely to increase.

Recommendation: Diavik should continue the three-year monitoring schedule to capture changes in vegetation and lichen parameters. With a return to above-ground mining activities scheduled for 2018, dust deposition and metal concentrations in lichen are likely to increase again.

Zone of Influence

Environment and Natural Resources started a Zone of Influence (ZOI) Technical Task Group (TTG) in 2014 to help decide when aerial surveys should resume, or if other studies would better address caribou ZOI. There is now a four-year gap (2013-2017) between caribou movement data collection as participants wait on the results of the ZOI TTG. There is no indication from Diavik or ENR as to whether aerial surveys will resume, or if the ZOI prediction for Diavik Mine will continue to be tested and monitored.

Recommendation: Diavik should continue to monitor and test predictions on the ZOI while they wait for ZOI guidance from ENR. This could include gathering more aerial survey data, analysis of all caribou collar data available to the present time and additional analysis of existing data, and looking at other factors that might affect caribou eg. habitat or changing mine activity.

Diavik's new analysis of caribou ZOI indicates there is no ZOI or that it is smaller than could be detected. There are several aspects, described in MSES' Report, about that study that require further information to allow an assessment of the results.

Recommendation: Diavik should present the reasons for the type of analysis they used and information on the power of the data to detect an effect. Future analyses using caribou density should include habitat associations and changes in mine activity, and other potential confounding factors. Non-linear relationships should also be considered.

The available information on the status and future direction of the ZOI leaves EMAB uncertain as to whether the objective – to determine if ZOI changes in relation to Mine activity – has been adequately tested, or what actions Diavik is considering to manage the ZOI.

Behavioural Studies

Since 2012, Diavik has indicated it does not have enough near-mine caribou behavioural data to assess how caribou behaviour changes with distance from the mine. EMAB would like to emphasize the importance of collecting and analyzing these data to understand the influence of the mine on caribou and guide caribou management and mitigation actions. EMAB would also like to recognize that this study is being done in collaboration with Ekati. The tables below summarize the number of caribou behavioural observations with distance from Diavik and Ekati.

Number of Caribou Behavioural Observations collected by Diavik from 2012-2016

Distance from Diavik mine (km)	2012	2013	2014	2015	2016
< 2	-	1	1	-	-
2-8	2	-	-	-	-
8-15	17	-	-	-	-
15-20	11	4	-	-	-
20-30	11	-	-	-	2
>30	45	85	8	38	-
Total caribou	**86**	**90**	**9**	**38**	**2**

Number of Caribou Behavioural Observations collected by Ekati from 2012-2016 (all less than 2 km)

Less than two km from Ekati mine	2012	2013	2014	2015	2016
Total Caribou	**69**	**40**	**3**	**8**	**32**

Recommendation: Please provide details on the methods and data collected by Diavik and Ekati both close to and far from the mines, including sample sizes, group sizes and group composition. Please explain how Diavik determines how much data are needed to do an analysis, and provide a power analysis to support the target sample size. As well please explain why there is such a large range in the number of observations per year and provide details on how Diavik decides when to collect behavioural data at distances greater than five km from the mine.

Recommendation: Diavik should analyze caribou behavioural data from Diavik and Ekati Mines from 2012 to 2016. This type of analysis is important for guiding caribou management and mitigation actions at the Diavik mine. Diavik should consider use of non-parametric analytical techniques. Diavik should include a discussion of limitations that might result from pooling data across years.

Distribution

For the past three years, caribou collar data has indicated that some caribou are moving west around Lac de Gras during the southern migration which does not support predictions. Diavik states that across all years, 63% of caribou travelled east during their southern migration which provides general support for

the prediction. EMAB suggests Diavik's analysis to test the accuracy of the caribou migration prediction may be flawed and would like Diavik to expand and provide more information on this study.

Recommendation: Diavik should re-do its analysis of the southern migration of caribou using collar information up to the end of November, to take into account changes in migration timing. Diavik should discuss why some caribou are not following the predicted southern migration, including a large majority in the last 6 years; EMAB's review indicates that since 2011, 48 collared caribou went west during the southern migration while two went east. Diavik should also discuss potential response actions to the departure from the prediction regarding the southern migration of caribou and changes to the timing of migration.

EMAB also notes that substantial numbers of caribou that are understood to be from the Beverly-Ahiak herd were seen at or near the East Island over the past winter.

Recommendation: Diavik should explain how it will include Beverly/Ahiak caribou in its caribou monitoring program.

Grizzly Bear

In 2015 ENR agreed to organize a one-day carnivore monitoring workshop by January 2016 to develop standardized methods for carnivore monitoring, including the frequency of grizzly hair snagging. This workshop has not yet taken place due to the fact GNWT-ENR is still waiting to analyze data from the Diavik-Ekati wolverine hair snagging study. EMAB will be making a recommendation to ENR to organize a workshop with Diavik and Ekati and all interested groups to provide direction on standardized methods for carnivore monitoring, including the frequency of grizzly hair snagging surveys.

Diavik has also been experiencing increased grizzly bear observations and days where deterrent actions must be used on East Island.

Recommendation: Diavik should include a discussion of the possibility that grizzly bears may be becoming habituated and their presence on site may be on the rise.

Wolverine

Diavik did wolverine snow track surveys in 2016 and completed a full analysis on data collected from 2003-2016 to look at indirect Mine-related effects. The results showed that wolverine occurrence in the study area is increasing overtime, but Diavik could not determine a definite reason for this.

Recommendation: Diavik should explore the reasons for higher levels of misdirected food waste in the A21 Area as this may be contributing to wildlife (particularly wolverine) presence and possible habituation near the Mine site.

The last hair snagging survey that Diavik completed in partnership with Ekati and ENR to determine wolverine abundance and distribution in the study area was in 2014. The analysis for this study is still not done. EMAB is concerned that Diavik is not meeting this WMP objective because they are waiting for guidance from ENR on how often this this program is to be carried out. EMAB will be making a recommendation to ENR to complete the analysis of the wolverine hair-snagging survey at the earliest

possible time, and then organize a workshop with Diavik and Ekati and all interested groups to determine the future of this program.

Recommendation: Diavik should describe alternative plans for evaluating wolverine abundance in the study area as per their WMP objective if they are not anticipating the analysis of the wolverine hair-snagging program to be complete in 2017.

2016 Recommendations that Diavik has not addressed:

1. Diavik should discuss adaptive management actions regarding changes to caribou migration patterns as this indicates a potential mine-related effect.
2. Diavik should propose adaptive management measures to mitigate the 14 km ZOI since this area is larger than predicted.
3. Dustfall could be falling out onto vegetation that caribou eat. Diavik should analyze how much caribou forage area has been lost due to dustfall.

Please respond to each recommendation in MSES's technical memo, and to the bolded questions and comments in the body of their review. Please provide a response to the above recommendations as well. We look forward to your response.

Sincerely

Napoleon Mackenzie
Chair

Cc EMAB members (by email)
Parties to the Environmental Agreement
Monica Wendt, Environmental Assessment Analyst, ENR
Land-Environment Managers, Affected Communities

Review of Zone of Influence Analysis in "Analysis of Environmental Effects from the Diavik Diamond Mine on Wildlife in the Lac de Gras Region"

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Introduction

The Environmental Monitoring Advisory Board (EMAB) and Environment and Natural Resources (ENR-GNWT) recently requested for us to comment on a caribou zone of influence (ZOI) analysis conducted by Golder Associates as part of the Diavik Diamond Mine (2012) Inc. wildlife effects analysis (Golder 2017). As we understand, Golder (2017) undertook this analysis in response to a particular question posed by EMAB (2015), which asked Diavik to "*Please consider the interpretation of the 14 km ZOI. The 14 km distance may demonstrate a group of caribou that would not exist without the Mine*". MSES Inc. (2015:8) originally posed the question while reviewing Diavik's annual monitoring reports and we learnt that the question arose from considerations of Boulanger et al.'s (2012: Fig. 2) graph of the odds ratio and Fortin et al.'s (2013) paper on the response of boreal caribou to human-caused habitat changes (P. Comer, MSES, pers. comm., 23 June 2017). Fortin et al.'s (2013) paper described how boreal caribou changed the location of their home ranges relative to clear-cutting and roads. Specifically, boreal caribou within 2.5 km from a clear-cut or a road moved to re-establish their territories approximately 4.25 km from the nearest clear-cut or road, but caribou already located greater than 2.5 km away did not shift their home-range location, leading to an increase in caribou density at about 4–5 km from the disturbance.

While we recognize that Golder (2017) undertook their analysis in response to this particular question, we would like to provide several comments on the methods and conclusions. Golder (2017) analyzed the relationship between density of caribou in aerial survey transect segment cells and distance from mine using a simple linear regression model. Their analysis compared the estimated density of caribou at 14 km from the mines to the average density of caribou at closer distances to the mines. From this analysis, Golder (2017:11) stated that they did not detect a change in density relative to distance from mine and from this concluded that there is *"no zone of influence or that it is smaller than can be detected in this analysis".*

We suggest that this analysis has several issues that make the conclusion that there is no ZOI problematic. We also suggest that the authors have misinterpreted various aspects of the ZOI analysis of Boulanger et al. (2012) and therefore some of the comments regarding potential biases of our analysis are not correct.

Review of Golder (2017) analysis

We now summarize our concerns with this analysis:

1. *The analysis does not account for the influence of habitat or change in population size on density of aerial survey segments and therefore cannot estimate a zone of influence***.** The density of caribou in any aerial survey segment cell will depend on habitat suitability within any segment. These associations were modelled as part of previous ZOI analyses including those conducted by Golder (Johnson et al. 2005, Golder 2008, Boulanger et al. 2012, Boulanger 2015). In addition, during the time that surveys occurred (1996 to 2012) the Bathurst caribou herd, as indexed by estimates of breeding females, declined from 151,393 to 15,935 caribou (Boulanger et al. 2016) which affected the relative number of segments with caribou present as well as the density of caribou in segments. The issue here is that the Golder analysis does not consider any habitat or population trend factors (beyond removing water habitat from cell areas) and only includes distance from mine as a predictor variable in the simple linear regression model. In other words, the Golder model assumes that distance from mine site is the only factor influencing caribou density in aerial survey segments. By not accounting for any of the habitat and demographic factors influencing density, the analysis lacks any resolution to detect or estimate a ZOI around the mine areas.
2. *The prediction of higher densities of caribou at 14 km as a test of zone of influence is problematic.* One of the original rationale for this analysis was a study of boreal caribou that predicted higher densities of caribou at ZOI boundaries (Fortin et al. 2013). We dispute whether this analysis provides a true test of the extent of ZOI as estimated by Boulanger et al. (2012). First, as mentioned previously, the Golder (2017) analysis lacks a base model to describe variation in density based on habitat, which is an integral part of the Fortin et al. (2013) analysis. Second, the ZOI relationship as estimated by Boulanger et al. (2012) describes a gradient of habitat selection as opposed to a discrete boundary or edge (such as clear cuts in the Fortin et al. 2013 analysis). Given this, it is unlikely that an abrupt change in density at the 14 km boundary would occur or would be detectable.
3. *Density as opposed to presence/not detected as the response (y-axis) variable is problematic in that more factors than just habitat selection (or the effect of the mines) will affect density.* Caribou are gregarious and caribou in a given group are not likely independent of each other as discussed in Boulanger et al. (2012). In other words, a larger group size might not really reflect higher habitat quality or greater selection for a given habitat patch/aerial survey segment. For example, caribou aggregate into large groups to escape insect harassment, which is one method in which herd size is estimated (Rivest et al. 1998). In this case, the density of caribou does not depend at all on habitat or distance to mine and in this context using density as the response variable is potentially misleading and adds additional variance to the analysis. If density is to be used, then the statistical model should contain terms to describe factors that cause variation in density. Failure to do this blurs the relationship between density and distance from mine therefore reducing the ability to detect a change in density (as a function of distance from mine).

4. *The simple linear regression model used in the Golder analysis is not estimating or testing a threshold at 14 km or any other interval.* The previously mentioned concerns make it highly unlikely that the Golder analysis can discern or detect a change in density. However, beyond these issues, the linear regression model assumes that density changes linearly with distance from mine across the entire range of distances from mine; therefore, it cannot detect a threshold. Previous analyses have used non-linear regression models(Golder 2008), segmented regression models (Boulanger et al. 2012) or generalized additive models (Fortin et al. 2013) that estimate a threshold rather than assuming a linear increase.
5. *Using mean yearly densities of caribou in segments further reduces the ability of the analysis to detect changes in density.* Unlike previous ZOI analyses, the Golder analysis uses mean density over an entire year for each segment as the response (y-axis) variable. This reduces sample size and masks likely seasonal variation in the use of habitat around the mine area.
6. *The Golder report misinterprets various aspects of the ZOI analysis of Boulanger et al. (2012).* The assertion that Boulanger et al. (2012) "*defines presence as caribou detected at least once during any of the repeated surveys in a given year*" (Golder 2017:11) is incorrect. Boulanger et al. (2012) used detection/not detected in individual segments in each survey conducted as the sample unit, as opposed to pooling data for a year. No pooling of data across years occurs in the Boulanger et al. (2012) analysis.
7. *The assertion that the probability of detecting caribou in segments depends on the relative number of segments at different distances from mine is incorrect.* The probability of detection of caribou in any segment has no relationship with the number of segments at different distances from mine as suggested by Golder (2017:11). The transect segment (which is nested within the transect) is the sample unit for the analysis and therefore the ZOI regression model considers the distribution of segments as a function of distance from mine and accounts for the fact that there will be lower sample sizes of segments at closer distances from the mine. The distribution of segments will influence the power to detect a ZOI but it will not influence or bias the ZOI analysis/estimate.

Summary and conclusions

While Golder's (2017) analysis is in our opinion flawed and their conclusions could cause confusion, we note several things that will help in understanding the implications of this analysis.

1) We suggest that based on our comments above, the 2017 analysis is unlikely to detect a ZOI and therefore is not a robust test of whether there is a ZOI around the Ekati and Diavik mines. We suggest that all parties involved in ZOI research should collaboratively determine the most appropriate approach to measuring the ZOI relative to the questions being asked. ENR's collaborative Zone of Influence Technical Task Group provides a venue for this discussion.

2) We suggest that as Golder is already a participant in the Zone of Influence Technical Task Group, which is developing an approach for measuring the ZOI, that the task group complete their draft report on measuring ZOI. In particular, the task group should provide a review of the pros and cons of using

presence/absence or density data relative to the questions being addressed. There have been several analyses measuring the ZOI and there are also studies describing the theoretical basis for a ZOI. We suggest that the technical working group complete the annotated bibliography on the ZOI and provide a plain language summary of findings from this exercise.

Literature cited

Boulanger, J. 2015. Estimation of zone of influence of mine sites on caribou populations: New analysis methods and sample size requirements. *in* T. C. Z. o. I. T. T. Group, editor. Draft guidance for monitoring the zone of influence (ZOI) of anthropogenic disturbance on barren-ground caribou. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, NWT.

Boulanger, J., B. Croft, J. Adamczewski, H. D. Cluff, M. Campbell, D. Lee, and N. C. Larter. 2016. An estimate of breeding females and analyses of demographics for the Bathurst herd of barren-ground caribou: 2015 calving ground photographic survey. Environment and Natural Resources.

Boulanger, J., K. G. Poole, A. Gunn, and J. Wierzchowski. 2012. Estimating the zone of influence of industrial developments on wildlife: A migratory caribou and diamond mine case study. Wildlife Biology 18:164-179.

EMAB. 2015. Annual Report 2014-2015. Environmental Monitoring Advisory Board for the Diavik Mine, Yellowknife, NT.

Fortin, D., P.-L. Buono, A. Fortin, N.Courbin, C. T. Gingras, P. R. Moorcroft, R. Courtois, and C. Dussault. 2013. Movement Responses of Caribou to Human-Induced Habitat Edges Lead to Their Aggregation near Anthropogenic Features. The American Naturalist 181:827-836.

Golder. 2008. Analysis of environmental effects from the Diavik Diamond Mine on wildlife in the Lac De Gras region--Submitted to Diavk Diamond Mines Inc.

_____. 2017. Analysis of environmental effects from the Diavik Diamond Mine on wildlife in the Lac de Gras Region.

Johnson, C. J., M. S. Boyce, R. L. Case, H. D. Cluff, R. Gau, A. Gunn, and R. Mulders. 2005. Cumulative effects of human developments on arctic wildlife. Wildlife Monograph 160:1–36.

MSES. 2015. Review of the 2014 Diavik Diamond Mine Wildlife Monitoring Report. Prepared for Environmental Monitoring Advisory Board. April 2015.

Rivest, L. P., S. Couturier, and H. Crepeau. 1998. Statistical methods for estimating caribou abundance using postcalving aggregations detected by radio telemetry. Biometrics 54:865-876.

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Environmental Monitoring Advisory Board

PEER REVIEW OF THE 2016 ENVIRONMENTAL AIR QUALITY MONITORING REPORT

DIAVIK DIAMOND MINES (2012) INC.

October 2017

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PEER REVIEW OF THE 2016 ENVIRONMENTAL AIR QUALITY MONITORING REPORT DIAVIK DIAMOND MINES (2012) INC.

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CONTENTS

1 INTRODUCTION

As requested by the Environmental Monitoring Advisory Board (EMAB), Arcadis Canada Inc. (Arcadis) undertook a review of the *2016 Environmental Air Quality Monitoring Report* (AQMR) [ERM 2017a] prepared by ERM Consultants Canada Ltd. for Diavik Diamond Mines (2012) Inc. (DDMI). The report summarizes the air quality monitoring activities conducted at the DDMI diamond mine during 2016. The components of DDMI's AQMR include the following:

- total suspended particulate (TSP) monitoring;
- dustfall monitoring;
- snow core sampling program;
- National Pollutant Release Inventory (NPRI) reporting; and,
- Greenhouse Gas (GHG) reporting.

The aspects of the AQMR contained within Arcadis' scope of review specifically included:

- Implications resulting from A21 Kimberlite Pipe and associated construction and operational activities;
- Adequacy of monitoring locations;
- Effectiveness of dust suppression techniques;
- QA/QC practices and Standard Operating Procedures (SOPs);
- Integration of meteorological data and operational information;
- Modelled versus monitored Total Suspended Particulate (TSP) and dustfall;
- DDMI's discussion of exceedances and lack of data from the TSP monitor at A154 Dike; and
- How well DDMI addressed comments and recommendations on the 2014 & 2015 Consolidated AQMR Report.

Arcadis completed a review of each of the above components of the air quality monitoring program in place at the DDMI diamond mine, as described in the 2016 AQMR. In addition, it is understood that the Environmental Air Quality Monitoring Program (EAQMP) for the site will be re-evaluated during 2017-2018. Arcadis has provided recommendations for consideration during the EAQMP evaluation. The following sections outline the findings of the review. The report concludes with a summary of key findings and recommendations.

2 DISCUSSION

2.1 Continuous TSP Monitoring

Continuous air monitoring (CAM) was commissioned in April 2013 at two sampling locations: 1) the communications building adjacent to the accommodations complex; and 2) the A154 dike along the southeast corner of the A154 pit. The locations were selected based on the results of an updated air dispersion modelling analysis, the proximity to the Project footprint and power requirements. A beta attenuation monitor (BAM) is used to measure TSP at the CAM stations.

Our comments with respect to the 2016 continuous TSP monitoring program are presented in Table 1.

Table 1. Review of Continuous TSP Monitoring

No.	Comment
1.	**AQMR, Page 1-1: "***The predominant wind directions at the site in 2016 were from the southeast, east, and northeast, and there were also strong winds from the northwest and south, with the least dominant wind direction from the southwest (see Figure 2.1-1 in Chapter 2). The expectation is that airborne particulate matter would be deposited primarily northwest, west, and southwest of the mine."* There is a general lack of detail in the report discussing the appropriateness of the siting of the TSP monitoring stations. Based on the predominant winds discussed in Section 1, the wind rose from 2016 meteorology, and facility layout shown in Figure 2.1-1, the siting of the TSP monitoring stations may not be appropriate to capture the maximum TSP concentrations. The 2016 wind rose shows that the stations are currently set up in locations that are predominantly upwind from the mine activities. In concept, the siting of the monitoring stations should align with where maximum concentrations are expected to occur especially since the primary sources of fugitive dust (as indicated in Section 3.4, page 3-8 of the AQMR) are associated with unpaved roads, airstrip usage and construction activities at A21 kimberlite pipe. All of which are located predominantly upwind from the TSP monitoring stations in 2016. Arcadis recommends that the siting of the TSP monitors be reviewed and locations reconsidered during review of the EAQMP.
2.	**AQMR, Page 2-3: "***The location of the A154 Dike monitor and the site near the CB was selected based on the proximity to the boundary of the Project footprint and the results of the updated air dispersion modelling assessment and power requirements."* Arcadis recommends that the updated air dispersion modelling assessment, or portions thereof, be appended to the AQMR such that the statements made can be verified. Arcadis also recommends that an updated air dispersion modelling assessment be completed during review of the EAQMP to evaluate the current Site operations and update the monitoring locations, as required.

3.	**AQMR, Page 2-4:** *"Annual 24 hr TSP concentration plots were generated for each of the monitoring locations and the average annual TSP concentration were calculated from the hourly data. The 24 hr data were examined for trends and compared with predicted concentrations."* As an editorial comment, 24-hour average TSP concentrations were plotted for the CB monitoring location only, as the A154 Dike monitor was taken out of service for most of 2016.
4.	**AQMR, Page 2-4: "***In 2016 at the CB Station, TSP was greater (150.5µg/m3) than the 24 hr mean standard (120 µg/m3) on one occasion (January 29, 2016); however, the overall annual mean for 2016 (10.3 µg/m3) was lower than the annual mean standard (60 µg/m3). The average wind speed for January 29, 2016, was 8.4 m/s and the wind direction ranged from the northeast to the southeast. These values were within the typical range of observations at the site…. These results are consistent with the prediction from the 2012 dispersion modeling of two 24 hr exceedances per year."* Although the AQMR provides analysis of wind speed and wind direction for the measured exceedance (150.5 µg/m^3) of the 24-hour TSP standard (120 µg/m^3) on January 29, 2016, there is no discussion of potential causes. Given that the wind direction during this exceedance ranged from the northeast to southeast, and the CB station is currently located predominantly upwind from the site activities, it is possible that TSP concentrations could have been much higher. During the exceedance, it is unlikely that the CB monitor picked up TSP originating from the A21 construction activities as the activities are located southwest and predominantly downwind from the monitor. Figure 2.3-1 of the AQMR shows other days, particularly in December, with spikes in TSP concentration approaching the 24-hour TSP standard, however there is no discussion identifying the cause of the increased values. It would be appropriate to attempt to link such instances with an event, whether it is an on-site activity associated with mine operations, or an off-site event to validate the observed data. The meteorological data collected on-site, coupled with any record of site activities, would help to investigate the cause of the elevated TSP concentrations. Since monitored data are now assumed to include increased mine activity and impacts from the A21 construction activities it would be useful to discuss whether these assumptions are accurately represented in the 2012 updated modelling assessment. If not, the 2012 modelling assessment may need to be updated to reflect these operational changes to provide a better comparison to monitored data. As indicated by Arcadis in 2014 and 2016, there is not enough information provided in the report to compare monitored values to modelled values. The statement that monitored data agree with the 2012 model predictions cannot be verified. Arcadis recommends that the dispersion modelling report be attached as an Appendix, such that the statements made within the AQMR can be verified.
5.	**AQMR, page 2-6:** *"In 2016, DDMI implemented a frequent audit and calibration regime which has improved data completeness and the calibration records for the CB station."* A cursory review of DDMI's *2014-2015 Environmental Air Quality Monitoring Report* [ERM, 2016] reveals that the data completeness for the CB station was 44% in 2014 and 87% in

	2015. In 2016, the data completeness record was 87%, as shown in Table 2.3-1, which is the same as that of 2015. Therefore, the statement concerning an improved data completeness due to the implementation of a frequent audit and calibration regime in 2016 cannot necessarily be verified considering that the 2015 and 2016 completeness are the same.

2.2 Dustfall and Snow Core Sampling

The dustfall monitoring and snow core sampling programs were implemented in 2001 under the Aquatic Effects Monitoring Program (AEMP) as a means of collecting information on dust deposition with distance from mining activities. A summary of the 2016 AEMP results is provided in the AQMR, while details are provided in Appendix D, *Diavik Diamond Mine 2016 Dust Deposition Report* (DDMDDR) prepared by ERM [2017b]. With no local guidance for dustfall, the AQMR compares DDMI dustfall levels to former objectives used by the Province of British Columbia (B.C.) for the mining industry (1.7 to 2.9 mg/dm^2/day, based on a 30-day average) [B.C. MOE, 2016]. This is consistent with the assessments completed for the previous AQMRs.

Our comments with respect to dustfall and snow core sampling are presented in Table 2.

Table 2. Review of Dustfall and Snow Core Sampling

No.	Comment
6.	**AQMR, Page 3-1:** *"Dustfall gauges were placed at 12 stations (including two control stations) around the Project at distances ranging from approximately 25 to 4,852 m from mining operations (Table 3.1-1 and Figure 3.1-1). Each gauge collected dustfall year-round, with samples being collected for analysis every three months. The average total sampling period for the 12 locations was 369 days."* Arcadis acknowledges that the dustfall gauge sampling program was set up to satisfy the aquatic sampling requirements. In 2014 and 2016, Arcadis, identified that from an air quality standpoint the sampling frequency does not follow current guidelines and does not provide information that may be useful for an air quality analysis. While it is likely that the mean annual dustfall rate is not significantly affected by using quarterly sampling, a reduced frequency will make it difficult to analyze monthly or seasonal trends in dustfall, as well as the effectiveness of dust suppression. It is also not appropriate to compare quarterly samples against the B.C. dustfall objective [B.C. MOE, 2013] which is intended to assess the mean daily dustfall rate averaged over a one-month period. A high reading in one month that may have exceeded the B.C. dustfall objective may be counterbalanced with lower readings in the other two months of the quarterly dustfall sample. This may result in the apparent attainment of the dustfall objective over the quarter, while entirely missing the monthly exceedance of the objective level. Quarterly sampling also does not follow the ASTM International D1739-98 (2010) Standard Test Method for Collection and Measurement of Dustfall (Settable Particulate Matter). While it is understood that quarterly sampling is the agreed frequency in the current EAQMP, Arcadis recommends that the sampling frequency be reviewed and reconsidered during review of the EAQMP.

7.	**AQMR, Table 3.1-1:** *Dustfall Gauges and Snow Survey Sampling Locations, Diavik Diamond Mine, 2016* As an editorial comment, the third column heading of Table 3.1-1 (second page of table) is titled "2015 Sampling Dates" and should be corrected to "2016 Sampling Dates".
8.	**AQMR, Table 3.4-1:** *Dustfall Results, Diavik Diamond Mine, 2016* Table 3.4-1 shows that the mean and median dustfall rates observed in the 251-1000 m zone are higher than the 100-250 m zone. Page 3-9 of the AQMR mentions that in general, dustfall decreases with increasing distance from the project, however, similar to Arcadis' findings in 2014 and 2016, no explanation is provided as to why this anomalous trend is observed. It would be appropriate to discuss the likely causes for this observation.
9.	**AQMR, Page 3-8:** *"The 2016 predominant wind directions at the site were from the southeast, east, and northeast, and there are also strong winds from the northwest (Figure 3.1-1). The expectation is that airborne material would be deposited primarily northwest, west, and southwest of the mine. This is supported by the fact that Dust 10 had the highest recorded dustfall in 2016 (southwest of the Mine)"* TSP is strongly correlated to dustfall. If dustfall is expected to occur northwest, west and southwest of the mine and that this expectation was supported by the fact that the highest and second highest recorded dustfall occurred southwest of the mine then it is reasonable to expect the maximum TSP values to occur in those directions as well. Therefore, as identified in comment no. 1 and 2, the lack of correlation between the dustfall and TSP results indicate that the TSP monitoring stations may not be appropriately sited to capture the worst-case emissions from the site operations. It is important to highlight that Arcadis identified concerns with the siting of the TSP monitors during review of the 2014-2015 AQMR [Arcadis, 2016]. The results of the 2012 modelling assessment should be presented within the report to allow for the review of the modelled versus monitored results to ensure the monitors are sited correctly for current site conditions. Arcadis recommends that the 2012 modelling assessment be updated during the review of the EAQMP so as to reflect current operations and evaluate the appropriate locations for TSP monitors and assess the observed dustfall observations with predicted concentrations within the updated assessment.
10.	**AQMR, Page 3-10:** *"Fugitive dust generation is expected to be greatest during snow-free periods where and when there is site activity. It was expected that the highest fugitive dust generation and resulting dustfall occurred in areas closest to the Project footprint such as near A21 and the country rock pile between May and September."* Although the report states that dustfall was collected on a quarterly basis, there seems to be a trend of higher dustfall during the spring-summer months. As identified in Arcadis' review in 2014 and 2016, to get a better representation of seasonal trends and effectiveness of dust suppression, dustfall collection on a more frequent basis (i.e. monthly) would be useful. TSP concentrations are linked to dustfall, however, TSP concentrations recorded at the CB station do not show the same seasonal trends (magnitude) which again suggests that the locations of the TSP monitors may not be appropriate to capture the maximum impact from the site. Arcadis recommends that the frequency of dustfall collection be reviewed during review of the EAQMP.
11.	**AQMR, Table 3.4-2:** *Snow Water Chemistry Results, Diavik Diamond Mine, 2016*

	Table 3.4-2 presents the snow water chemistry results for ammonia as "n/a" with no explanation within the main body of the AQMR or as a footnote to the table. A brief explanation provided in Section 3.3.3 of the Diavik Diamond Mine 2016 Dust Deposition Report (attached to the AQMR as Appendix D) states that *"Ammonia concentrations were not analyzed for by the laboratory due to an oversight in regards to the parameter list for the laboratory analyses. This oversight was has been corrected for the 2017 program. Historical ammonia concentrations have been well below the value of 12,000 _g/L specified in the Water Licence for grab sample concentrations."* Arcadis highlights that this oversight may be in contravention to DDMI's Water License (W2015L2-0001) and recommend that the details of the corrective action be integrated into DDMI's QA/QC SOP ENVR-303-0112.
12.	**AQMR, Page 2-1:** *"The 2012 modelling predicted maximum dustfall deposition rates are to be higher on the Project site (222.2 mg/dm2/y) than off-site (4.1 mg/dm2/y) and generally greater than originally predicted in 1998. For example, 100 mg/dm2/y was originally predicted adjacent to A154 pit [Cirrus Consultants 1998]."* Monitoring data can be useful to validate or evaluate air dispersion modelling, however, there is no comparison made in the report between modelled and monitored dustfall. Based on the 2016 dustfall data, the highest on-site dustfall measurement was 2032 mg/dm²/yr which is more than 9 times the maximum modelled value. Typically, dispersion models are considered to perform well if they are within a factor of 2 of the monitored data. It would be helpful to include a discussion that compares the results of the dispersion modelling to the available monitoring data. Since monitored data are now assumed to include increased mine activity and impacts from the A21 construction activities it would be useful to discuss whether these assumptions are accurately represented in the 2012 modelling assessment. If not, the 2012 modelling assessment may need to be updated to reflect these operational changes to provide a better comparison to monitored data. As indicated by Arcadis in 2014 and 2016, there is not enough information provided in the report to compare monitored values to modelled values. Arcadis recommends that the dispersion modelling report be attached as an Appendix, such that the reader can view it when it is referenced in the AQMR.
13.	**AQMR, Page 3-13:** *"In general, average concentrations of snow water chemistry variables of interest decreased with increasing distance from the Project (Appendix D). However, high parameter concentrations were recorded at Station SS3-8, located in the 251-1,000 m zone (830 m from the project). Metal concentrations at SS3-8 were similar to concentrations at SS3-6 (60 m from the Project), which historically has had high concentrations of metals. SS3-8 is located to the southeast of the Project (Appendix D) where higher measured dustfall was observed in 2016 compared to 2015. It should be noted that the 0-100 m zone has only one sampling location; therefore, no median was reported."* The highest concentrations of copper, nitrate and phosphorous are observed in the 251-1000 m zone and concentrations of aluminum, arsenic, chromium, nickel and zinc are higher in the 251-1000 m zone than the 100-250 m zone. As mentioned on page 3-13 in the AQMR, in general average concentrations of snowwater chemistry variables decrease with increasing distance

	from the Project however, no explanation is provided as to why these trends are observed for these parameters and whether the results are anomalous compared to the historical data record.
14.	**AQMR, Appendix A Total Suspended Particulates Sampler Support Memorandum, Appendix B Total Suspended Particulates Equipment Calibration Records** The author provides what appear to be draft versions of the support memorandum and calibration records. These documents should be finalized and included in the final version of the AQMR.
15.	**DDMDDR, page 3-1:** *"The exact impact of dust suppression could not be determined from the data collected in 2016; however, it is very likely that road watering reduced the amount of dust generated at the Mine in 2016."* A review of the Annual Changes to the Dustfall Program in Appendix A of the DDMDDR shows that there were four dustfall monitoring stations added to monitor dust suppression activities at Misery Haul Road in 2016. Another five dustfall monitoring stations were added to monitor dust from the Lynx Haul Road in 2016. It appears that the inclusion and analysis of these stations were not mentioned within the main body of the AQMR or the DDMDDR and whether the results indicate the effectiveness of current dust suppression measures.
16.	**DDMDDR, Appendix D:** The collection of valid field samples is the first step in ensuring the production of valid data. A review of the Snow Water Chemistry Analytical Results in Appendix D of the DDMDDR show that select samples of nitrate, phosphorous, TSS (total suspended solids) (parameters which are of interest in the AQMR), including others, arrived to the laboratory past the recommended hold time. In regards to dustfall, it is important that the TSS analysis be completed as soon as possible as the solids may dissolve in water, especially after snowmelt. The details of these accounts, how they affect the overall results, and how they will be addressed in future monitoring programs should be discussed within the AQMR. Appendix A of the DDMDDR mentions that a similar instance occurred in 2012. Since this is a recurring issue, the implementation of a corrective action perhaps as an amendment to QA/QC SOP ENVR-303-0112 should be considered.
17.	**DDMDDR, Appendix E and Appendix F** As indicated by Arcadis in 2014 and 2016, SOPs for dust gauge collection and snow core sampling are provided in Appendix E and F, respectively, of the DDMDDR. While Section 6.3 of the snow survey SOP outlines QA/QC measures to follow in the field, including collecting duplicates and blanks, there is no mention of such QA/QC procedures in the dust gauge collection SOP. A QA/QC procedure should be adopted in the dust gauge collection SOP to ensure the field sampling does not contain any significant in-situ variability. The dust gauge and snow survey SOPs refer to an external SOP for the TSS laboratory procedure. Without the TSS SOP or detailed laboratory records, Arcadis is unable to comment on whether the DDMI laboratory uses acceptable standards/methods on par with an accredited laboratory. For example, an accredited laboratory would adhere to a filter preparation method that requires calibration of the scale traceable to a National Institute of Standards and Technology (NIST) standard. This should be part of the DDMI TSS SOP. The TSS SOP and all

	laboratory calibration certificates and/or records should be included with the AQMR to demonstrate that laboratory calibrations and laboratory QA/QC have been completed as appropriate.
18.	**DDMDDR, Appendix G Quality Assurance/Quality Control Operating Procedure (ENVR-303-0112)** The author provides what appears to be a draft version of the QA/QC SOP. This document should be finalized and used during the operation of the TSP/dustfall monitoring program. All SOP documents should be finalized and included in Air Monitoring Reports to demonstrate the finalized adoption of the SOP.

2.3 NPRI and GHG Emission Inventories

Emissions for CO, SO_2, NO_X, VOC, TSP, PM_{10} and $PM_{2.5}$ were estimated for 2016 and reported to Environment and Climate Change Canada (ECCC) under the NPRI reporting system. In addition, GHG emissions were calculated and reported to the federal system through ECCC.

Our comments with respect to NPRI and GHG emission inventories are presented in Table 3.

Table 3. Review of NPRI and GHG Inventories

No.	Comment
19.	**AQMR, Page 4-2: "***TPM, PM10, and PM2.5 levels in 2016 were greater when compared to 2015 (Table 4.2-1). The increase in dust-related variables is likely related to A21 construction activities, including crushing, material handling and road fugitive dust emissions."* Table 4.2-1 shows that emissions of TSP and PM10 have increased from 2015 to 2016 however PM2.5 remains unchanged at 65 tonnes. If there was an increase in dust related to activity on-site, and an increase in diesel fuel consumption, it is reasonable to expect that all size fractions of PM levels would increase in 2016. This apparent anomaly warrants further explanation within the report.
20.	**AQMR, Section 4 and Section 5** The results of the NPRI and GHG emissions inventories are discussed in Sections 4 and 5 of the AQMR, respectively. As indicated in Arcadis' review in 2014 and 2016, the AQMR does not include any detailed information about the emission factors or calculation methodologies used for either of the inventories and, thus, Arcadis is unable to comment on the appropriateness of the calculations used in the inventories. However, upon comparison with historical site data and other mines in the NWT, namely EKATI and Snap Lake, it was found that DDMI emissions appear to be similar in magnitude. Based on this finding, Arcadis considers the values reported by DDMI to be reasonably correct, although a review of the methods used to derive these estimates would be required to confirm their appropriateness.

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

There are several improvements that could be made in monitoring procedures and analysis noted in the review of the DDMI *2016 Environmental Air Quality Monitoring Report* and some generalizations and comments made that are not supported by the data. The main points of concern are summarized below:

General Comments

- Many of the comments provided in the previous review of the 2014-2015 Air Quality Monitoring Report were not sufficiently addressed in the 2016 report.
- There was not enough information provided in the AQMR to validate the statements made with respect to the revised dispersion modelling, the effectiveness of dust suppression activities or the implications of A21 construction activities.
- Even though there were some attempts to include QA/QC protocols and SOPs for some aspects of monitoring, based on information provided it appears that adherence to the SOPs remains an issue and the SOP lacks detailed and final QA/QC procedures for the continuous TSP monitor and dustfall sampling program, as well as the laboratory procedures used to analyze TSS.

Continuous TSP Monitoring Program

- Complete analysis of temporal and spatial TSP trends could only be supported by measured particulate concentrations at the CB as the A154 was taken out of service for most of 2016. Correlations and trends in TSP concentrations could not be validated between the CB and A154 stations.
- The AQMR provided little or no discussion about temporal variability in the TSP other than to say that there was increased TSP during operations. Detailed analysis would help to evaluate the effectiveness of dust suppression efforts at the mine.
- QA/QC issues are evident in the continuous TSP monitoring program. Calibration issues are apparent with the BAM used to measure TSP, as there were instances throughout the 2016 monitoring period where concentrations at the CB were less than zero.
- The locations of the TSP monitoring stations may not be adequately placed as dustfall monitoring suggested moderate to high values observed in the west, north and south. It is expected that TSP would follow the same pattern.
- DDMI provided no rationale as to the possible cause for one TSP exceedance. Cause and effect analysis would help to identify whether on-site or off-site activities are leading to spikes in TSP concentration and may be indicative of a potential problem with dust generation (or lack of dust suppression) at the mine site.

Dustfall Monitoring Program

- Quarterly dust gauge sampling does not follow standard reference methods and makes it difficult to examine air quality trends in the data or evaluate the effectiveness of dust suppression.
- The representativeness of the snow core sampling program is questionable as some aspects of the sampling program deviated from SOPs.

- There was no attempt to evaluate or explain temporal/spatial trends in the dustfall data or use the dustfall results to evaluate the effectiveness of the dust suppression efforts, other than to state that dustfall is highest during mine operations.

NPRI and GHG

- There was not enough information provided within the AQMR to validate the reported values to NPRI or GHG.

3.2 Recommendations

Based on the above conclusions of the review, Arcadis has the following recommendations for future EAQMP activities and reporting:

- It is recommended that DDMI include (and adhere to) a detailed summary of QA/QC practices in the AQMR for each aspect of the monitoring program, including all laboratory procedures.
- Complete and final calibration records be provided for all equipment (i.e., laboratory scale, continuous monitoring equipment, etc.).
- Final SOPs be provided for all field sampling and laboratory methods.
- The dust gauge collection SOP be updated to include QA/QC requirements similar to the QA/QC procedure used for snow core sampling (i.e., field duplicates and blanks).
- Quality checking procedures need to be added to the TSS SOP (if not already) to ensure that they meet the same standard that an accredited laboratory would meet.
- Consider returning to monthly dustfall sampling or, at a minimum, perform monthly sampling during the snow-free periods, to evaluate effectiveness of dust suppression efforts.
- The current and historical dustfall monitoring results be used to evaluate the effectiveness of dust suppression efforts.
- Available meteorological data and records of on-site activity be used to document the cause/rationale for events of high TSP concentration measured by the monitors.
- A detailed comparison of monitored and modelled TSP/dustfall be included within the AQMR.
- Details of the NPRI and GHG calculations be included, or a reference to an external document containing such details, to allow for validation of methods and quantities reported.

Arcadis recommends that the following items be considered during the re-evaluation of the EAQMP for the site:

- The TSP monitor locations be re-evaluated using historical meteorology and dustfall results, as the TSP monitor results do not appear to be correlated with the 2016 meteorology or dustfall monitoring results presented.
- The dustfall sampling frequency be reviewed and considered to be completed on a monthly basis per ASTM International methods
- The 2012 dispersion modelling assessment be updated so as to reflect current operations and be used to evaluate the appropriate locations for TSP monitors and assess the observed dustfall observations with predicted concentrations within the updated assessment.

4 REFERENCES

Arcadis Canada Inc. *Review of DDMI 2014-2015 Consolidated Environmental Air Quality Monitoring Report,* August 2016.

Arcadis Canada Inc. *Peer Review of the 2013–2014 Environmental Air Quality Monitoring Report - Diavik Diamond Mines (2012) INC.,* October 2014.

British Columbia Ministry of Environment (B.C. MOE). 2003. *British Columbia Field Sampling Manual, Part A: Quality Control and Quality Assurance.* Available at: http://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre/field_sample_man2013.pdf
Accessed on: 18 Aug 2017.

British Columbia Ministry of Environment (B.C. MOE). 2016. *B.C. Ambient Air Quality Objectives – Updated January 18, 2016*. Available at: http://www.bcairquality.ca/reports/pdfs/aqotable.pdf . Accessed on: 18 Aug 2017.

ERM. 2016. *Diavik Diamond Mine: 2016 Environmental Air Quality Monitoring Report.* Prepared for Diavik Diamond Mines (2012) Inc. by ERM Consultants Canada Ltd. Yellowknife, Northwest Territories.

ERM. 2017a. *Diavik Diamond Mine: 2016 Environmental Air Quality Monitoring Report.* Prepared for Diavik Diamond Mines (2012) Inc. by ERM Consultants Canada Ltd. Yellowknife, Northwest Territories.

ERM. 2017b. *Diavik Diamond Mine: 2016 Dust Deposition Report.* Prepared for Diavik Diamond Mines (2012) Inc. by ERM Consultants Canada Ltd.: Yellowknife, Northwest Territories.

ARCADIS Design & Consultancy for natural and built assets

November 10, 2017

Gord Macdonald
Diavik Diamond Mines Inc.
P.O. Box 2498
5007-50th Avenue
Yellowknife, NT X1A 2P8

RE: EMAB Recommendations on the 2016 EAQMP Report

Dear Gord:

Thank you for providing EMAB with a copy of the 2016 Environmental Air Quality Monitoring Program (EAQMP) Report and the opportunity to provide comments. As you know, dust and air quality at the mine site are part of EMAB's priorities, particularly in relation to effects on wildlife, fish and vegetation.

We have completed our review of the 2016 EAQMP Report, including a technical review by Arcadis Canada (attached), and respectfully submit the following comments and recommendations.

Recommendations for the 2016 EAQMP Report

1. It is recommended that DDMI include (and adhere to) a detailed summary of QA/QC practices in the EAQMP Report for each aspect of the monitoring program, including all laboratory procedures.
2. Complete and final calibration records be provided for all equipment (i.e., laboratory scale, continuous monitoring equipment, etc.).
3. Final SOPs be provided for all field sampling and laboratory methods.
4. The dust gauge collection SOP be updated to include QA/QC requirements similar to the QA/QC procedure used for snow core sampling (i.e., field duplicates and blanks).
5. Quality checking procedures need to be added to the TSS SOP (if not already) to ensure that they meet the same standard that an accredited laboratory would meet.
6. Consider returning to monthly dustfall sampling or, at a minimum, perform monthly sampling during the snow-free periods, to evaluate effectiveness of dust suppression efforts.
7. The current and historical dustfall monitoring results be used to evaluate the effectiveness of dust suppression efforts.
8. Available meteorological data and records of on-site activity be used to document the cause/rationale for events of high TSP concentration measured by the monitors.
9. A detailed comparison of monitored and modelled TSP/dustfall be included within the AQMR.
10. Details of the NPRI and GHG calculations be included, or a reference to an external document containing such details, to allow for validation of methods and quantities reported.

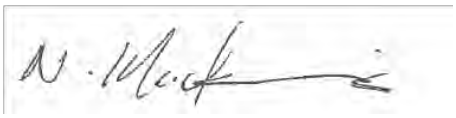
EMAB has also provided recommendations for the EAQMP re-assessment that Diavik plans to undertake in Fall 2017. In addition to these recommendations, EMAB would like Diavik to consider the air quality monitoring requirements that came out of the Jay Project Environmental Assessment in their re-evaluation of the EAQMP. It is EMAB's understanding the air quality monitoring program for the Jay Project will include the use of dust canisters and continuous monitoring. Dust canisters are retrieved and analyzed every 30 days, providing data for June, July and August. The particulate monitoring program includes a combination of partisol samplers and continuous samplers to monitor TSP and $PM_{2.5}$. The partisol samplers are collected and analyzed every six days in accordance with the National Air Pollution Surveillance protocol.

Recommendations for the 2017 EAQMP Re-evaluation

11. The TSP monitor locations be re-evaluated using historical meteorology and dustfall results, as the TSP monitor results do not appear to be correlated with the 2016, 2015 and 2014 meteorology or dustfall monitoring results presented.
12. From 2007 to 2008, two temporary dust gauges were installed adjacent to two pre-existing dust gauges. The intent of the temporary gauges was to compare results from the same location when sample collection frequency was altered. The two temporary dust collectors were established in July 2007 and analyzed monthly to determine daily dustfall deposition. The results showed variation in the temporary dust gauges compared to the permanent gauges. Based on this information, the dustfall sampling frequency should be reviewed and completed monthly as per ASTM International methods, particularly for the summer months.
13. Diavik should update the 2012 dispersion modelling assessment to reflect current operations. This assessment should then be used to evaluate the appropriateness of TSP monitor locations and assess the observed dustfall patterns.

In addition to the recommendations above, please review the technical memo prepared by Arcadis Canada Inc. and provide your responses to the comments and recommendations contained in it.

Sincerely



Napoleon Mackenzie
Chair

Cc EMAB members (by email)
Parties to the Environmental Agreement (by email)

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Napoleon Mackenzie - Chair
Environmental Monitoring Advisory Board
PO Box 2577
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21 December 2017

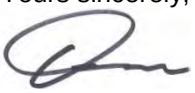
Dear Mr. Mackenzie:

Subject: **Response to 2016 Wildlife Monitoring Report and 2014-2016 Comprehensive Wildlife Monitoring Report**

Please find enclosed DDMI responses to both EMAB and ENR comments on the 2016 Wildlife Monitoring Report and 2014-2016 Comprehensive Wildlife Monitoring Report.

Should you have any questions regarding the EAQMP please contact the undersigned at 867-669-6500 ext 5536 or david.wells@riotinto.com .

Yours sincerely,



David Wells
Superintendent - Environment

Cc.: John McCullum – EMAB Executive Director
Andrea Patenaude - ENR

TECHNICAL MEMORANDUM

DATE	11 December 2017	**REFERENCE No.**	1771843-1612-TM-Rev1-5000
		WORK PLAN No.	547
		DIAVIK PO No.	D03792

TO David Wells
Diavik Diamond Mines (2012) Inc.

FROM Daniel Coulton, Jaewoo Kim, and John Virgl **EMAIL** Daniel_Coulton@golder.com; Jaewoo_Kim@golder.com; John_Virgl@golder.com

TASK DESCRIPTION **RESPONSES TO EMAB (MSES) COMMENTS ON 2016 WMP AND 2017 WCAR, AND GNWT'S ENR COMMENTS ON 2017 WCAR**

On 12 June 2017, the Environmental Monitoring Advisory Board (EMAB) issued comments on the 2016 Wildlife Monitoring Program report and 2017 Wildlife Comprehensive Analysis report. The comments provided by EMAB included the review by Management and Solutions in Environmental Science (MSES) that provided some of the same comments for the 2014 WMP and as far back as the 2010 Comprehensive Analysis Report, which have been provide been responded to previously. As per your request and in review of the comments by EMAB and MSES, Golder Associates Ltd. (Golder) has prepared the following responses for your consideration in Table 1.

On 11 October 2017, the Government of the Northwest Territories' (GNWT) Department of Environment and Natural Resources (ENR) issued comments and a technical review on DDMI's March 2017 wildlife comprehensive analysis report. As per your request and in review of the comments by GNWT's ENR, Golder Associates Ltd. (Golder) has prepared the following responses for your consideration. Responses to ENR are provided in Table 2 and to Boulanger et al. (2017) in Table 3.

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Table 1: Comments by MSES and EMAB on the 2016 Wildlife Monitoring Program Report and 2017 Wildlife Comprehensive Analysis Report

MSES Comment	EMAB Recommendation	Diavik Response
The report concludes that "the Mine is likely having local-scale effects on plant species abundance and composition". The report does not suggest any strategies that could mitigate these effects. Please consider if and how these potential project effects could be mitigated.	Diavik should include a discussion on how potential project effects on vegetation abundance and composition could be mitigated.	Local-scale residual (i.e., after mitigation) effects to plant species abundance and composition were predicted in the EER (Table 1.2-1; Golder 2017b). This included direct physical changes from the Mine footprint and indirect changes from dust deposition. Mitigation implemented by Diavik to minimize effects to vegetation included making the mine site as small as possible, and the application of dust suppressants such as watering roads. The current analysis indicates residual effects are within the predictions from the EER, which suggests mitigation has been effective.
DDMI concluded that "given that the majority of metals concentrations have decreased below concentrations reported in the 2010 risk assessment, a follow up risk assessment based on 2016 data is not required" (Appendix I, Section 3.6). However, in our review of the Dust Deposition to Lichen report (MSES 2011; also see Table 2 below), we commented that the risk assessment did not include information on any changes in the concentrations of metals present in caribou and humans pre- and post-exposure or how these levels of metals relate to the health of either caribou or humans. Given this information, the expectation that metal concentrations are within safe levels for caribou (and humans) is opinion and unsupported by data. We recommend DDMI provide additional information that would support their conclusion that concentrations of metals in lichen are safe for caribou.	Diavik should provide additional information to show that concentrations of metals in lichen are safe for caribou.	Sufficient support for the conclusions in the 2016 Vegetation and Lichen Monitoring Report (Golder 2017b) is provided by the current analysis of metals concentrations in lichen and the 2010 Risk Assessment (Golder 2011a). Effects to caribou and humans due to changes in concentrations of metals in lichen are considered to be negligible given that concentrations in lichen have significantly decreased from 2010 to 2016 at near-field sites, and that the 2010 Risk Assessment found no adverse effects to caribou health. Importantly, the 2010 Risk Assessment applied highly conservative assumptions and conditions, such as caribou would obtain all their food and water from the near-field area throughout the entire year. Based on data from collared animals, the residency time of caribou within the near-field area is much less than 6 months (even for mature bulls that may spend more time near mine sites). For example, the residency time assessment for the Jay Project indicated that collared caribou spend an average of 8.9 days during the post-calving period (6.4% of available time) within cumulative ZOIs during the baseline, which including a 15 km ZOI around Diavik-Ekati among other development ZOIs. The 2010 Risk Assessment used higher metals concentrations than those measured in 2016, which represents an overestimation of existing health risks to caribou and humans (i.e., existing health risks are even lower now). Therefore, it is considered reasonable to conclude that concentrations of metals in lichen (and subsequent exposure to caribou and humans) has not been negatively impacted by the Mine and that no further assessment of risks is required at this time.
The information collected through the vegetation monitoring program also is used to test and evaluate the predicted effects of the Mine. There are four key predictions for vegetation: 1. The predicted loss is 12.67 km^2 of vegetation/land cover. 2. Increased dust deposition may lead to potential change in vegetation. 3. No rare or endangered species or communities will be lost as a result of the proposed Project. 4. Community level richness is predicted to decrease by 14%; Species diversity and richness is predicted to decrease by 44%. The effects of the Mine remain at or below predicted levels with regards to predictions 1 and 3. Prediction 2 is also accurate and it has been found that vegetation community structure, measured as plant species abundance and richness, has likely been altered due to dust deposition. With regards to prediction 3, vascular plant species richness was actually 54% higher on heath tundra plots and 9% higher on shrub Mine plots. This unexpected outcome is likely due to a higher number of graminoid species on Mine plots in the Heath Tundra and Shrub communities. The report does not suggest any strategies that could mitigate these unanticipated effects. Please consider if and how these potential project effects could be mitigated.		The residual effects prediction noted by EMAB is in reference to Key Question 4 (i.e., a *reduction* in community level richness and a *reduction* in species level diversity and richness). In contrast, the analysis detected an increase in total vascular plant species richness on Heath Tundra and Shrub vegetation communities mine plots (but only significant for the Heath Tundra community), which appeared to be related to a small increase (1 to 2 species) in graminoid species. The ecological relevance of this result is uncertain considering the low abundance (percent cover) of graminoids in these two community types (Appendix C; Golder 2017b). Current mitigation, such as dust suppression appears to be effective at minimizing adverse effects to vegetation.

MSES Comment	EMAB Recommendation	Diavik Response
DDMI has recommended that vegetation and lichen monitoring frequency should be reduced from once every three years to once every five years. Given that above-ground mining in anticipated at the A21 Area in 2018, we do not agree with this recommendation. Results of the vegetation and lichen monitoring programs indicated that dust deposition rates and metal concentrations decreased after mining activity shifted completely underground. With above-ground mining activities commencing once again, dust deposition and metal concentrations in lichen are likely to increase again. We recommend that the established three-year timeframe be continued in order to capture changes in vegetation and lichen parameters.	Diavik should continue the three-year monitoring schedule to capture changes in vegetation and lichen parameters. With a return to above-ground mining activities scheduled for 2018, dust deposition and metal concentrations in lichen are likely to increase again.	The recommendation is based on the principles of adaptive management. Depending on the direction and magnitude of measured changes during monitoring, relative to effects predictions, the intensity, duration and/or frequency of monitoring may be increased or decreased. As described in Section 3.6 of the Vegetation and Lichen Monitoring Report (Golder 2017b), DDMI included an adaptive management trigger to resume to a three-year vegetation and lichen monitoring schedule if results from dust monitoring exceed the upper 95% confidence interval for dustfall values on mine plots during the period of underground mining (approximately 400 mg/dm^2/y; Figure 2.3-1). Based on the 2010 Risk Assessment and current results of metals concentrations in lichens, this action level or adaptive management trigger is considered conservative for the protection of caribou.
■ Has the ZOI guidance document been finalized? If so, please provide the document to EMAB for their review. If not, please have ENR explain why not and when it is expected. ■ What plans does DDMI have to address the caribou movement objective while they wait for guidance from ENR? Diavik should continue to monitor and verify the accuracy of the predictions in the environmental assessment and the effectiveness of mitigation measures (Article 1, 1.1(b), Diavik Environmental Agreement (2000)). ■ While waiting for the ENR to determine best approaches to ZOI monitoring, would DDMI consider using caribou collar data to re-evaluate the ZOI associated with the Diavik Mine specifically?	Diavik should continue to monitor and test predictions on the ZOI while they wait for ZOI guidance from ENR. This could include gathering more aerial survey data, analysis of all caribou collar data available to the present time and additional analysis of existing data, and looking at other factors that might affect caribou e.g., habitat or changing mine activity. Diavik should propose adaptive management measures to mitigate the 14 km ZOI since this area is larger than predicted.	A final version of the ZOI guidance document has not been distributed to DDMI. The intent of the ZOI guidance document is to standardize the sampling of caribou data across developments to support cumulative effects analysis by the GNWT. This was the agreed approach by regulators, mine agencies and communities at the mine monitoring workshops beginning in 2010 (Handley 2010). Diavik has already completed analyses of these data related to habitat, temporal trends and mine activity (Golder 2011b). The caribou density analysis (Golder 2017a) is an additional analysis of the aerial survey data. Boulanger et al. (2012) also examined a cumulative ZOI (i.e., Ekati and Diavik mines) for caribou using collar data. Collar analyses indicated a ZOI of 3 km (95%CI: 1.5 km-12 km), which is less than reported for aerial survey data. Due to the proximity of the Diavik and Ekati mines, the location of Diavik (i.e., on an island in Lac de Gras) and the general southern movement of caribou through the area in the post-calving to autumn period, detecting separate ZOIs from the two mines sites is likely not possible. There would likely be a large amount of overlap between the ZOIs for the two mines and an influence from Lac de Gras (Golder 2011b). The caribou density analysis in Golder (2017) suggests that there is no ZOI around Ekati and Diavik or that it is smaller than could be detected, which is less than predicted in the EER.
A regression analysis evaluated the relationship between caribou density and nearest distance to the Ekati or Diavik Mine footprint. The results showed that distance to a mine footprint explained very little of the variation in caribou density. To confirm this result, we recommend that DDMI present information on the power of the data to detect an effect.	Diavik should present the reasons for the type of analysis they used and information on the power of the data to detect an effect. Future analyses using caribou density should include habitat associations and changes in mine activity, and other potential confounding factors. Non-linear relationships should also be considered.	As described in Golder (2017a), the caribou density analysis was completed to address a request by EMAB. The analysis included 142,418 sampling units (i.e., 1 km X 1.2 km survey transect segments) through time periods of 1998 to 2009 and 2012. Bergerud et al. (2008) suggested a threshold density 5 caribou per km^2 is necessary before demographic consequences arise, which equates to the effect size of 0.25 and is associated with ecological significance (Cohen 1988). Assuming the effect size of 0.25, an alpha-value of 0.05, and the given sample size, the observed power was 1.00. There is sufficient power and sample size to detect effect sizes associated with ecological significance (Bergerud et al. 2008; Cohen 1988).

MSES Comment	EMAB Recommendation	Diavik Response
Furthermore, the caribou ZOI may shift in response to the beginning of above-ground mining activities once again (expected in 2018). With a gap in aerial data collection growing, so do our concerns regarding adequate testing of the impact prediction. This reinforces our recommendation above that DDMI continue to monitor and test predictions while they wait for feedback from ENR. Specifically, DDMI should collect new data and complete more rigorous analyses to evaluate the caribou ZOI.		DDMI has completed analyses for a caribou ZOI using different methods and data in the most recent and past comprehensive reports. Other studies have completed similar analyses, with collared animals and aerial survey data using different statistical approaches (Johnson et al. 2005; Boulanger et al. 2012). The focus in the past has been to assume statistical effects detected from occurrence data translated to the ecological scale. However, the results on caribou density indicate this is potentially a false assumption. Although not part of the Diavik Mine WMP, further analysis using these data and density metric will include available habitat and the potential influence of natural factors in the region.
■ Given that the two mines have agreed to cooperate, please provide details on the data collected by Ekati during ground-based caribou behaviour surveys (since 2010 when coordination between the mines began). ■ If Ekati has sufficient data near-mine, please analyze a DDMI-Ekati combined dataset to test how caribou behaviour changes as a function of distance from the Mine. ■ Given the insufficient Diavik data near-Mine, would DDMI consider collecting data outside of autumn and using GPS collar information to collect data opportunistically? ■ There was some discussion in the past about the Cumulative Impacts Monitoring Program (CIMP) leading a behaviour monitoring task group, but given the lack of information on the status of this group, we recommend DDMI continue with its own monitoring, coordination with Ekati, and data analysis until such a working group is established and operational.	Please provide details on the methods and data collected by Diavik and Ekati both close to and far from the mines, including sample sizes, group sizes and group composition. Please explain how Diavik determines how much data are needed to do an analysis, and provide a power analysis to support the target sample size. As well please explain why there is such a large range in the number of observations per year and provide details on how Diavik decides when to collect behavioural data at distances greater than five km from the mine. Diavik should analyze caribou behavioural data from Diavik and Ekati Mines from 2012 to 2016. This type of analysis is important for guiding caribou management and mitigation actions at the Diavik mine. Diavik should consider use of non-parametric analytical techniques. Diavik should include a discussion of limitations that might result from pooling data across years.	The methods used for caribou behaviour monitoring by Diavik are reported in the WMP annually including results. Ekati mine does the same. The most recent analyses of these data were reported in 2011 (Golder 2011b). The summary on numbers of caribou in behaviour observations noted by EMAB suggests EMAB is unfamiliar with caribou behaviour monitoring methods after 16 years of reviewing reports. The sampling unit of this monitoring program is a caribou group (i.e., the number of groups reflects the sample size) and not the number of individual caribou. Since 2010, Ekati has observed 7 groups of caribou and collected group behaviour data. In combination with the number of observations by DDMI, there remains insufficient data to complete analyses similar to that in previous comprehensive analysis reports. DDMI will continue to collect caribou behaviour monitoring data when caribou are present in the study area during post-calving to autumn periods because this is when cows with calves are most sensitive to effects of disturbance. Annual variation in observations is an index of caribou abundance in the RSA. There have been too few observations of caribou behaviour to generate confident conclusions from results. Analytical methods used are appropriate for these data and consistent with the scientific literature (e.g., Duquette and Klein 1987). DDMI has already responded to questions about pooling data across years (Golder 2011c). DDMI will consider including a power analysis to determine required sample sizes in the next WMP report.
Given that analyses of change in behaviour with distance are still planned for the future, we re-state, for the record, that analyses of data should address the following: Justify any pooling of data across years, or use year as a variable in the analysis, and identify what, if any, assumptions were made. Reconcile behavioural observations with the occurrence of caribou: does behaviour change with distance as occurrence does, i.e., is behaviour “normalized” past the zone of influence of 14 km? Why is there the same effect before Diavik was built (given that the years 1998/99 show the same ZOI “effect” as the years after the Mine was built)? How can the information gained from the various caribou analyses be used to adjust or develop mitigation measures if there is a larger than predicted effect of the Mine on caribou?		DDMI has responded to these comments previously (Golder 2016).

MSES Comment	EMAB Recommendation	Diavik Response
The data presented in Table 2.1-2 of the WCAR does not seem to match the data discussed in the 2016 WMR (e.g., 2016 southern migration: 1 west, 1 east (WCAR, Table 2.1-2); 9 west, 1 east (WMR, Section 3.4.2)). Please explain why the data are different and how this influences the results presented. The last three years of collar data (as per the WMRs) indicate a departure from predictions for the southern migration. While it appears that over the majority of sampled years that the southern migration prediction is supported, how many consecutive years without support for the prediction are necessary to trigger adaptive management?	Diavik should re-do its analysis of the southern migration of caribou using collar information up to the end of November, to take into account changes in migration timing. Diavik should discuss why some caribou are not following the predicted southern migration, including a large majority in the last 6 years; EMAB's review indicates that since 2011, 48 collared caribou went west during the southern migration while two went east. Diavik should also discuss potential response actions to the departure from the prediction regarding the southern migration of caribou and changes to the timing of migration.	For the purpose of consistency with previous deflection analyses, the southern migration was defined from 1 July to 31 October annually (WCAR Section 2.1.5; WMP Section 3.4.1). For the purpose of the movement maps provided in the WMP, the results included data from 1 July to 30 November. Additional time has been included for mapping purposes since 2014 because most collared caribou remain north of the Lac de Gras region until late-October to November during the decline phase of this herd. Had the collar data through 30 November been included in the WCAR, the EER predictions would have still been supported. The results of the deflection analysis show that east-west movements of caribou vary through time but conform to the predictions of the EER; there is no need for adaptive management because there is no permanent fragmentation effect of the Bathurst caribou herd (i.e., caribou have moved as predicted in subsequent years and the population remains connected). This conclusion is also supported by the results of Virgl et al. (2017), which indicate seasonal range fidelity is high from year to year based on Bathurst collar data. DDMI will consider completing the suggested deflection analysis in the next WMP report.
Monitoring data has demonstrated that for the past 3 years at least, the prediction for the southern migration was not accurate. Therefore, one might conclude that the mitigation measures in place to manage impacts on caribou migration are not as effective as anticipated. An adaptive management process would identify and implement new mitigation measures to manage project impacts. As such, we request that DDMI discuss their adaptive management process and their response action in light of this unanticipated, potential effect of the Project.		Please refer to the results reported for 2014, 2015 and 2016 WMP's, which indicate that most collared caribou moved east of Lac de Gras from 1 July to 30 November. This supports the EER prediction. Note migration maps do not show all collar-paths because of the large seasonal range scale. When the migration period is restricted to 31 October, most collared caribou during recent years have not encountered the Lac de Gras region due to post-calving and autumn range contraction and delayed movement to below the treeline by the Bathurst caribou herd, which is a natural phenomenon during a decline phase (Virgl et al. 2017).
We reiterate our previous recommendations that, given the increase in grizzly bear incidental observations near the Mine over time, DDMI should increase vigilance and future years of data collection should be used to evaluate whether the current deterrent system is effective at reducing grizzly bear presence near the Mine. DDMI should discuss their adaptive management process and their response action in the case that the current deterrent system is found to be ineffective.	Diavik should include a discussion of the possibility that grizzly bears may be becoming habituated and their presence on site may be on the rise.	DDMI has responded to this previously (Golder 2016).
Decisions regarding program frequency were anticipated to be determined collaboratively during wildlife monitoring workshops hosted by ENR in 2016; however, decisions are now expected upon completion of the 2014 data summary analysis report from ENR. ENR should indicate when they expect to complete the 2014 wolverine hair snagging data analysis. If more data collection and analysis is not anticipated for 2017, DDMI should describe alternative plans for evaluating wolverine abundance in the study area.	Diavik should describe alternative plans for evaluating wolverine abundance in the study area as per their WMP objective if they are not anticipating the analysis of the wolverine hair-snagging program to be complete in 2017.	DDMI is not aware when ENR will complete analyses of wolverine hair snagging data. DDMI monitors relative presence and distribution of wolverine using the snow track monitoring program. The 2014 WMP report demonstrated that annual measures of presence from the snow track program correspond with measures of abundance from the hair snagging program. This indicates that results of the snow track program can be used as an index of broad changes in wolverine abundance.
There may be opportunities for more systematic site surveys/checks for wolverines and waste management to mitigate instances of wolverines in waste bins. For instance, could waste collection bin checks be included in already scheduled waste inspections at the Waste Transfer Area (WTA) and Landfill?		Thank you for the recommendation. DDMI currently includes waste bin checks (although not reported) as part of waste bin inspections of the WTA and landfill.
Given that there have only been five wolverine mortalities reported since 2000, there appears to be support for the prediction that mining related mortalities are not expected to alter wolverine population parameters in the Lac de Gras area. However, it is not clear precisely how this prediction is being tested as there has been little information provided on wolverine population parameters over time in the WMRs. We recommend DDMI elaborate on how they are testing this particular prediction given the absence of data on population size.		Mortality is a population parameter and direct mine-related mortalities are annually reported. As noted by MSES, there is monitoring evidence to support that the mine-related mortality rate has been low. Results of wolverine snow track monitoring through 2016 suggest that wolverine presence (an index of abundance) in the study area may be increasing. This also supports the prediction of the EER.

MSES Comment	EMAB Recommendation	Diavik Response
While the overall effect of waste management appears to be positive (fox numbers at the WTA are lower than previous years), the new A21 Area appears to be attracting higher numbers of wolverine and fox. Furthermore, there seems to be an increasing trend in the number of grizzly bear observations and wolverine probability of occurrence over time. We commend DDMI for its efforts which probably led to the low attraction effect on wildlife in the past and concur with their commitment to carry out employee education programs related to waste handling to decrease misdirected waste. DDMI should explore the reasons for the higher levels of misdirected food waste in the A21 Area as this may be contributing to wildlife (particularly wolverine) presence and possible habituation near the Mine site.	Diavik should explore the reasons for higher levels of misdirected food waste in the A21 Area as this may be contributing to wildlife (particularly wolverine) presence and possible habituation near the Mine site.	DDMI reviews the results of monitoring as part of the adaptive management process. DDMI remains committed to carrying out employee education programs related to waste handling.
	Diavik should explain how it will include Beverly/Ahiak caribou in its caribou monitoring program.	Mitigation used at the Diavik mine is designed to protect barren-ground caribou. The WMP is designed to monitor barren-ground caribou and is not herd-specific. Observations of caribou believed to be from the Beverly/Ahiak herd were reported in the 2016 WMP.
	Diavik should discuss adaptive management actions regarding changes to caribou migration patterns as this indicates a potential mine-related effect.	DDMI has responded to this previously (Golder 2016).
	Dustfall could be falling out onto vegetation that caribou eat. Diavik should analyze how much caribou forage area has been lost due to dustfall.	This was not included in the 15 recommendations provided by EMAB on 23 August 2016. DDMI will consider addressing this request in the next WMP report.

Table 2: Comments by the Department of Environment and Natural Resources on the 2017 Wildlife Comprehensive Analysis Report

ENR Comment	DDMI Response
To paraphrase key points in the technical review, IER suggested that the caribou density analysis was inappropriate for drawing conclusions on the ZOI for several reasons including that: A) It did not account for the influence of habitat or population change on caribou density survey segments. B) It used density as a response variable in the absence of including other variables that could affect density in the model. C) The authors were seeking a response in density at the discrete distance of 14 km when ZOI has been generally considered to be a gradient of change in caribou selection. D) The authors used simple linear regression which can test for linear relationships but is not appropriate for detecting thresholds. E) The authors misinterpreted several aspects of the Boulanger et al. 2012 analysis.	A and B) The approach used was to answer a simple question proposed by the Environmental Monitoring Advisory Board (EMAB) about caribou abundance at 14 km. C and D) The approach used was appropriate for providing an answer to the question posed by EMAB. The zone of influence (ZOI) threshold represents the maximum spatial extent of an indirect effect by the mines and should be comparable at distances closer to the mines. The comparison completed in Golder (2017) considers the maximum expected difference. E) We agree that some aspects of Boulanger et al. (2012) were misinterpreted based on new information provided by Boulanger et al. (2017).
ENR agrees with Integrated Ecological Research's conclusion that the approach was unlikely to detect a ZOI and is not a robust test of whether there is a ZOI around the mines or what the size and magnitude of that ZOI might be. ENR will not be making any substantive changes to its use of the concept of ZOI in environmental assessment or range planning on the basis of this analysis.	The analysis completed was not designed to detect a ZOI threshold but to describe abundance at the ZOI threshold estimated by Boulanger et al. (2012). The analysis was appropriate to answer the question proposed by EMAB.
Until substantive, peer reviewed analyses can provide more appropriate estimates of ZOI or insights into the variable nature of ZOI around the mine(s), ENR will continue to work with the Boulanger et al. (2012) estimate in reference to measured indirect impacts of the mines on caribou in environmental assessment and range planning.	No response is required.
DDMI continue to have its consultants participate in the ZOI Technical Task Group (ZOI TTG).	DDMI does not have representation on the ZOI Technical Task Group (ZOI TTG) and will consider doing so in the future.
The ZOI TTG discuss and include a section on analytical approaches to ZOI estimation for inclusion in the draft guidance document for monitoring the ZOI, the finalization of which will be discussed in an upcoming ZOI TTG meeting 13 October 2017.	No response is required.
ENR recommends that DDMI/its consultants re-do analysis of the aerial survey data to include habitat variables and other factors that can influence density (population status, etc.) and use of an analytical technique that can accommodate non-linear relationships in accordance with outcomes of ZOI TTG discussions.	DDMI agrees that it is important to consider habitat variables and other factors (e.g., population size) that can influence density. A new analysis that considers habitat and population size, among other factors, is underway and will be reported when complete. Of minor technical note is that the approach proposed by the ZOI TTG guidelines is a two-part linear model, which is different than a non-linear model.
ENR also recommends that, given that DDMI has clearly compiled activity level data for inclusion in the comprehensive report, that DDMI consider ways to include activity levels at Diavik mine (including both FTE's and waste rock production) into future ZOI analyses.	DDMI has included its full-time-equivalents (FTE) values as indices of mine activity as part of wildlife analyses since 2010 (Golder 2011b, 2014, 2017).

Table 3: Comments by the Boulanger et al. (2017) on the 2017 Wildlife Comprehensive Analysis Report

Boulanger et al. (2017) Comment	DDMI Response
1. The analysis does not account for the influence of habitat or change in population size on density of aerial survey segments and therefore cannot estimate a zone of influence. The density of caribou in any aerial survey segment cell will depend on habitat suitability within any segment. These associations were modelled as part of previous ZOI analyses including those conducted by Golder (Johnson et al. 2005, Golder 2008, Boulanger et al. 2012, Boulanger 2015). In addition, during the time that surveys occurred (1996 to 2012) the Bathurst caribou herd, as indexed by estimates of breeding females, declined from 151,393 to 15,935 caribou (Boulanger et al. 2016) which affected the relative number of segments with caribou present as well as the density of caribou in segments. The issue here is that the Golder analysis does not consider any habitat or population trend factors (beyond removing water habitat from cell areas) and only includes distance from mine as a predictor variable in the simple linear regression model. In other words, the Golder model assumes that distance from mine site is the only factor influencing caribou density in aerial survey segments. By not accounting for any of the habitat and demographic factors influencing density, the analysis lacks any resolution to detect or estimate a ZOI around the mine areas.	The approach was used was to answer a simple question proposed by EMAB about caribou abundance at the 14 km ZOI occurrence threshold estimated by Boulanger et al. (2012). The approach used was appropriate for providing an answer to the question posed by EMAB.
2. The prediction of higher densities of caribou at 14 km as a test of zone of influence is problematic. One of the original rationale for this analysis was a study of boreal caribou that predicted higher densities of caribou at ZOI boundaries (Fortin et al. 2013). We dispute whether this analysis provides a true test of the extent of ZOI as estimated by Boulanger et al. (2012). First, as mentioned previously, the Golder (2017) analysis lacks a base model to describe variation in density based on habitat, which is an integral part of the Fortin et al. (2013) analysis. Second, the ZOI relationship as estimated by Boulanger et al. (2012) describes a gradient of habitat selection as opposed to a discrete boundary or edge (such as clear cuts in the Fortin et al. 2013 analysis). Given this, it is unlikely that an abrupt change in density at the 14 km boundary would occur or would be detectable.	Golder (2017) does not cite Fortin et al. (2013). The approach used was to answer a simple question proposed by EMAB about caribou abundance at the 14 km ZOI occurrence threshold estimated by Boulanger et al. (2012). The approach used was appropriate to provide an answer to this question. A key assumption of the occurrence approach is that occurrence reflects habitat selection and that detected effects are ecologically meaningful to barren-ground caribou. If a change in occurrence (or habitat selection) between its minima (next to mine) and maxima (threshold distance) are likely not detectable on the ecological scale (e.g., abundance) then it would imply that there is no ecological effect. The results of Golder (2017) indicate that the difference in caribou density next to mines (i.e., the minima) and the ZOI threshold of 14 km (i.e., the maxima) is approximately 0.5 caribou per km^2.
3. Density as opposed to presence/not detected as the response (y-axis) variable is problematic in that more factors than just habitat selection (or the effect of the mines) will affect density. Caribou are gregarious and caribou in a given group are not likely independent of each other as discussed in Boulanger et al. (2012). In other words, a larger group size might not really reflect higher habitat quality or greater selection for a given habitat patch/aerial survey segment. For example, caribou aggregate into large groups to escape insect harassment, which is one method in which herd size is estimated (Rivest et al. 1998). In this case, the density of caribou does not depend at all on habitat or distance to mine and in this context using density as the response variable is potentially misleading and adds additional variance to the analysis. If density is to be used, then the statistical model should contain terms to describe factors that cause variation in density. Failure to do this blurs the relationship between density and distance from mine therefore reducing the ability to detect a change in density (as a function of distance from mine).	The variables of caribou occurrence (present/not present) and density are related. For example, the same number of survey segments where density equals zero will also indicate not present. The ability of caribou to be observed during an aerial survey will be a function of their abundance within the visible area (among factors such as topography, animal movement/or not, light conditions). Adjacent transect segment values for either presence or absence will be related to the density of caribou. Hence the same factors that influence caribou density will also influence presence and absence. Caribou have been observed aggregating in large density to escape insect harassment (Rivest et al. 1998; Burch 2012). We expect where these large aggregations occur is at least partly a function of habitat that maximizes relief from swarming insects. Large aggregations appear to be restricted temporally from late June to mid-July during mosquito emergence (Burch 2012). The extent of aerial surveys completed by the Ekati and Diavik mines during post-calving ranges from July to November, so only part of the data would possibly reflect this source of variation, which would also influence the presence-absence coding of aerial survey results. The relative influence of large aggregations can be evaluated by stratifying survey results by month to see if there is a declining density trend within years. A new analysis that considers habitat and population size, among other factors, is underway and will be reported when complete.
4. The simple linear regression model used in the Golder analysis is not estimating or testing a threshold at 14 km or any other interval. The previously mentioned concerns make it highly unlikely that the Golder analysis can discern or detect a change in density. However, beyond these issues, the linear regression model assumes that density changes linearly with distance from mine across the entire range of distances from mine; therefore, it cannot detect a threshold. Previous analyses have used non-linear regression models (Golder 2008), segmented regression models (Boulanger et al. 2012) or generalized additive models (Fortin et al. 2013) that estimate a threshold rather than assuming a linear increase.	Please see previous response about the analysis objective.
5. Using mean yearly densities of caribou in segments further reduces the ability of the analysis to detect changes in density. Unlike previous ZOI analyses, the Golder analysis uses mean density over an entire year for each segment as the response (y-axis) variable. This reduces sample size and masks likely seasonal variation in the use of habitat around the mine area.	The Golder (2017) report statement that “annual mean density for each segment was used to describe the distribution of caribou densities across space and time, and compared to the density predicted at 14 km” is incorrect. Golder (2017) did not use year estimates but the full range of data at the segment-level in the caribou density analysis. Figure 2.1-1 shows the sample size of 142,418 considered in the analysis, which for obvious reasons, cannot reflect the annual scale.

Boulanger et al. (2017) Comment	DDMI Response
6. The Golder report misinterprets various aspects of the ZOI analysis of Boulanger et al. (2012). The assertion that Boulanger et al. (2012) "defines presence as caribou detected at least once during any of the repeated surveys in a given year" (Golder 2017a:11) is incorrect. Boulanger et al. (2012) used detection/not detected in individual segments in each survey conducted as the sample unit, as opposed to pooling data for a year. No pooling of data across years occurs in the Boulanger et al. (2012) analysis.	We agree that Golder (2017) misinterpreted some aspects of the Boulanger et al. (2012) analytical approach. However, our misinterpretation was based on that Boulanger et al. (2012) did not report the sample size used in their analysis or provide the degrees freedom of their "mine phase" or "pooled" models (see Boulanger et al. (2012); Table 2), which would have provided insights into how the data were structured for their analyses. As well, the assumption of detection probability was qualitatively assessed even though a Mackenzie et al. (2006) occupancy parameterization could have been used with repeated measures of survey segments to estimate detection probability for empirical evaluation. Table 2 in Boulanger et al. (2012) refers to a "pooled" model in comparison to results for different periods of years (a mine phase model), which would suggest that the "pooled" model did pool data across years (i.e., no temporal effect assumed).
7. The assertion that the probability of detecting caribou in segments depends on the relative number of segments at different distances from mine is incorrect. The probability of detection of caribou in any segment has no relationship with the number of segments at different distances from mine as suggested by Golder (2017:11). The transect segment (which is nested within the transect) is the sample unit for the analysis and therefore the ZOI regression model considers the distribution of segments as a function of distance from mine and accounts for the fact that there will be lower sample sizes of segments at closer distances from the mine. The distribution of segments will influence the power to detect a ZOI but it will not influence or bias the ZOI analysis/estimate.	The approach to evaluating a change in caribou distribution with proximity to development relies on a measure of distance to sampling units of aerial survey segments. The number of segments representing different distances is known to increase with distance from the mines for the post-2006 aerial survey designs. Golder demonstrated this in a presentation at the 2013 Wildlife Monitoring Workshop hosted by ENR. The number of times a distance is sampled is representative of survey effort at a given distance and Golder (2011) has shown in Diavik's wolverine snow track data that probability of occurrence significantly increases with greater survey effort. Other studies on caribou have recognized this problem and accounted for it (e.g., Weir et al. 2007). The same principle applies to aerial survey effort for caribou in the Diavik-Ekati study area. While the relative difference in survey effort across sampled distances is constant, the absolute difference in survey effort across sampled distances increases each time the aerial survey is repeated. Thus, the amount of time spent surveying for caribou at further distances will be exacerbated when the aerial survey is repeated numerous times. To account for varying survey effort would require an index of survey effort to be explicitly modeled as was done in Golder (2011) and as suggested in the reviewers' comment #1 to Diavik to account for natural factors on caribou density. We recommend further clarification or illustration be provided in the ZOI TTG guidance document on how nesting segments within survey transects accounts for unbalanced sample sizes across the distribution of distances measured at the segment level. If there is lower power to detect a threshold at close distances to the mines, then it can influence where a ZOI threshold is estimated.

CLOSURE

We trust that the above proposed responses meet your needs. If you have any questions, please contact Dan directly at 867-445-9112.

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REFERENCES

Bergerud AT, Luttich SN, Camps L. 2008. The Return of Caribou to Ungava. McGill-Queen's University Press, Montreal, QC, Canada.

Boulanger J, Poole KG, Gunn A. 2017. Review of Zone of Influence Analysis in "Analysis of Environmental Effects from the Diavik Diamond Mine on Wildlife in the Lac de Gras Region". Prepared by Integrated Ecological Research, Nelson, BC, Canada.

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

Burch ES. 2012. Caribou Herds of Northwest Alaska, 1850-2000. Krupnik I., Dau J, eds. University of Chicago Press, IL, USA. 216 pp.

Cohen J. 1988. Statistical Power Analysis for the Behavioral Sciences. 2nd ed. Lawrence Erlbaum Associates, Hillsdale, NJ. 567 pp.

Duquette LS, Klein DR. 1987. Activity Budgets and Group Size of Caribou During Spring Migration. Canadian Journal of Zoology 65:164-168.

Fortin D, Buono P-L, Fortin A, Courbin N, Gingras CT, Moorcroft PR, Courtois R, Dussault C. 2013. Movement Responses of Caribou to Human-Induced Habitat Edges Lead to Their Aggregation near Anthropogenic Features. The American Naturalist 181:827-836.

Golder 2011a. Appendix II: Risk Assessment of Caribou Exposure to Metals from Dust Deposition to Lichen. Submitted to Diavik Diamond Mines Inc, NT, Canada.

Golder 2011b. Analysis of Environmental Effects from the Diavik Diamond Mine on Wildlife in the Lac de Gras Region. Submitted to Diavik Diamond Mines Inc, NT, Canada.

Golder 2011c. Responses to MSES Comments on Vegetation and Wildlife Comprehensive Analysis. Prepared for Diavik Diamond Mines (2012) Inc. by Golder Associates, Ltd., Yellowknife, NT, Canada.

Golder. 2016. Responses to EMAB's 2015 WMP Report Comments. Prepared for Diavik Diamond Mines (2012) Inc. by Golder Associates, Ltd., Yellowknife, NT, Canada.

Golder. 2017a. Analysis of Environmental Effects from the Diavik Diamond Mine on Wildlife in the Lac de Gras Region. Submitted to Diavik Diamond Mines Inc, NT, Canada.

Golder. 2017b. 2016 Comprehensive Vegetation and Lichen Monitoring Program. Submitted to Diavik Diamond Mines (2012) Inc. Yellowknife, NT, Canada.

Handley, J. 2010. Diamond Mine Wildlife Monitoring Workshop Report. Yellowknife, NT.

Johnson CJ, Boyce MS, Case RL, Cluff HD, Gau RJ, Gunn A, Mulders R. 2005. Cumulative Effects of Human Developments on Arctic Wildlife. Wildlife Monographs 160: 1-36.

MacKenzie DI, Nichols JD, Royle A, Pollock KH, Bailey L, Hines JE. 2006. Occupancy Estimation and Modelling: Inferring Patterns and Dynamics of Species. Academic Press, MA, USA. 344 pp.

Rivest LP, Couturier S, Crepeau H. 1998. Statistical Methods for Estimating Caribou Abundance Using Postcalving Aggregations Detected by Radio Telemetry. Biometrics 54:865-876.

Virgl JA, Rettie, WJ, Coulton DW. 2017. Spatial and Temporal Changes in Seasonal Range Attributes in a Declining Barren-ground Caribou Herd. Rangifer 137:31-46.

Weir JN, Mahoney SP, McLaren B, Ferguson SH. 2007. Effects of Mine Development on Woodland Caribou *Rangifer tarandus* Distribution. Wildlife Biology 13:6f6-74.