

Environmental Monitoring Advisory Board

Minutes – September 11-12, 2018

EMAB Boardroom, Yellowknife, NT

Present:

Napoleon Mackenzie, *Chair*
Charlie Catholique, *Director*
Julian Kanigan, *Director*
Gord Macdonald, *Director* (Day 1)
Jack Kaniak, *Director*
Sean Richardson, *Director*
Adrian D'hont, *Alternate*
Sean Sinclair, *Alternate*

Yellowknives Dene First Nation
Lutsel K'e Dene First Nation
Government of the Northwest Territories
Diavik Diamond Mines
Kitikmeot Inuit Association
Tlicho Government
North Slave Metis Alliance
Diavik Diamond Mines

Absent:

Staff:

John McCullum, *Executive Director*
(minutes)
Allison Rodvang, *Environmental Specialist*
(minutes)

Environmental Monitoring Advisory Board
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Guests:

Celestino Oh, Crowe MacKay LLP (Day 1)
Tara Bailey, Arcadis (by phone, Day 1)
Carol Adly, ERM (by phone, Day 1)
Andres Soux, ERM (by phone, Day 1)
Rainie Sharp (by phone, Day 2)
Megan Cooley (by phone, Day 2)

<p>1. Call to Order Chair opened meeting at 1:15 pm.</p>
<p>2. Approval of Agenda ED requested to add an item on Instrumentation of the WRSA to the agenda after the Air Quality discussion. Motion: <i>To approve the September 11-12 agenda, as amended</i> Moved: Charlie Catholique Seconded: Jack Kaniak Motion carried.</p>
<p>3. Conflict of Interest No conflicts were declared.</p>
<p>4. Minutes of Previous Meetings</p>

Request to elaborate on a line about approving the audited financial statement after the end of that meeting.

Motion: *To approve the Minutes of August 14-15, 2018*

Moved: Julian Kanigan

Seconded: Jack Kaniak

Motion carried.

Action Item Review

ED went through completed action items. Discussion:

- Next stakeholder advisory group meeting on ENR legislation is October/November
- Send letter requesting GNWT comment on closure stuff related to wildlife and air quality to LeeAnn and Loretta
- Katherine Harris with INAC might have more information on how well Giant Mine TSP monitors work.

5. Financial Report – to Sep 2018

ED presented Variance Report up to September 2018. Discussion:

- Still waiting for invoices from North-South Consultants and on the Water Licence Amendment Application, as well as more on Air Quality monitoring.
- Already overspent on Water Licence amendment application. Will need to adjust budget once we figure out what the new schedule is.
- Send oral translations of Annual Report summary to Board Members to distribute in communities. Will need direction from Board to do again for the next report. Maybe we don't need to allocate additional funds, could just code it differently.

ED presented updated policy for EMAB to provide computers and reimburse internet costs for Board members. No further concerns were identified.

Motion: *To approve policy on Board Member access to computer technology*

Moved: Charlie Catholique

Seconded: Adrian D'hont

Motion carried.

Break 2:15 pm – 2:30 pm

6. Draft Two-Year Budget

Board went over the draft budget at the August meeting. Gord was not present then, so ED asked Gord to give his perspective on the Draft Budget.

Discussion:

- Gord - Didn't put a lot of review into how funds are allocated, as long as EMAB stays within the CPI variation, Diavik is not concerned about how the funds are distributed.
- ED made small changes to account for oral translations of annual report.

- Narrative document accompanied the budget. TK Panel section notes that EMAB is still working out process.
- Put a nominal amount under Water Licence amendment as we are unsure of this process and what it will look like after Diavik submits other documents.

Motion: *To approve and submit the draft 2019-2021 budget to Diavik*

Moved: Charlie Catholique

Seconded: Napoleon Mackenzie

Motion carried.

Action Item: Send budget proposal to Diavik for their approval.

6a. WRSA Instrumentation Discussion (added item)

ED provided update to Board. Diavik submitted a location for instrumentation for Area 2. Randy is not available but suggested the same comments apply to the proposal for the second instrumentation location. EMAB will prepare comments and send them out to Board after item is posted by WLWB.

Discussion:

Q: Has Randy seen responses from first round of comments? A: He has not seen them.

Noted that the soil is disturbed when the samples were taken, so can't put the instruments right there. Noted that gravimetric measure of soil moisture needs to be adjusted to give volumetric. Most samples are in the required range.

Diavik expects to submit a location for Area 3 around September 24; target to install by mid-October. Hoping to get four locations done this year.

Q: Diameter of till? A: Consistency of soil. Small fractions with some boulders.

Comment: Two reasons to get installed early; (1) monitoring to confirm results; (2) Need to cover area with Type 1 rock after instruments are in place and can't put granite on until locations are approved.

Action Item: Prepare draft comments on Instrumentation Location 2 based on Randy's comments on Location 1 and send to Board for approval.

9. Five-Year Action Planning (moved from Sep 12)

Possible locations:

- Wekweètì Culture Camp – check with Adeline Judas in Wekweètì
- B Dene camp – check with Bobby Drygeese
- Lutsel K'e Culture Camp – check with Lauren King

Try to get more input from Aboriginal Parties on EMAB direction.

Target for December 4 & 5 meeting.

Discussion about getting feedback from Parties to help in developing EMAB's five-year plan. This will require one-on-one meetings between Chair, ED and each of the community representatives.

KIA- Director for Lands, Geoff Clark, teleconference; possible Paul Emingak, ED
Tlichio –Violet Camsell-Blondin, TG Lands, Regulatory, teleconference
NSMA – Nicole Goodman, touch base with Arnold
LKDFN – Chief, Lands and Wildlife, ED to contact Lauren
YKDFN – Johanne Black, William Lines

Noted YKDFN is very engaged on closure, so try to talk to Chief.

Action Item: Seek input from Parties for Action Plan

Target Action Planning meeting for Dec 4-5 Board meeting: Wekweètì, B Dene or Lutsel K'e

7. 2017 Air Quality Report Review

Andres Soux and Carol Adly from ERM and Tara Bailey with Arcadis joined the meeting by phone.

Sean Sinclair presented Diavik's 2017 EAQMP Report and proposed changes to the plan.

- Wind varies a lot, slight prevailing SE
- One TSP exceedance; likely forest fire smoke
- Added two dust monitoring stations on SW of East Island, related to A21
- Noted that concentration of parameters varies depending on depth of snow

Discussion:

Differences between snow and dust would likely be due to different methods

Q: How far down does Diavik take the snow cores? A: Right to ground or ice surface

Q: What information is the model based on? A: Air quality model was updated in 2012 which showed regional predicted TSP concentrations. Showed where TSP was expected to be at highest levels.

Station locations were based on this information and accessibility to power.

Q: Does it make sense to move A154 TSP monitor to the A21 pit? A: Air quality model has two scenarios - one open pit and underground and the other underground - still valuable to have it at A154 because still gets TSP from the underground.

Q: Will the largest contributor of TSP be from A21? A: Underground and A21 will both be very relevant sources. In terms of regional perspective, don't anticipate a huge difference. There are two new dustfall gauges around A21.

Comment: Modeling scenarios didn't include A21.

Comment: Dust control sites are based off historical work done in area. Don't know if they still represent this. Data shows that dust falls out within 1km. Consistent with Ekati

Q: Long term trends in dustfall or TSP? A: Overall seeing a decrease. Construction at beginning and two open pits generated more. Confounded by data completeness issues.

Comment: Dustfall and TSP could be affecting caribou ZOI in terms of different tastes and smells in the environment.

Q: Does GNWT have Air Quality regulations in place? A: No.

Q: What is the 60ug guideline based on? Q: not sure at the moment, protective of environment and human health.

Comment: Would be helpful if presentation included data from previous years to give context.

Proposed Changes to EAQMP

Discontinue TSP monitoring. Rest is largely the same.

Diavik will respond to EMAB letter regarding TSP monitoring soon.

Q: TSP is not a good measure for human health impact? A: PM2.5 is more hazardous for people and can go into lungs. Just looking at TSP data won't say if it is hazardous to people.

Comment: Workers are exposed to a lot of dust.

Q: what is the effect of PM 2.5 on wildlife

A: standards based on human health; don't know effect on wildlife.

Diavik noted it is concerned about the effects of dust on workers. They have done some testing in cabs of haul trucks and underground drivers. Some workers will likely have to wear respirators.

Tara Bailey presented Arcadis' review of the 2017 EAQMP Report:

- QA/QC issues are evident with both monitors, difficult to see if preventative maintenance procedures are being adhered to
- Locations of monitoring stations – lack of information between model and what is monitored, can't correlate how effective program is
- Lack of detailed analysis – TSP spike attributed to forest fire smoke is much higher at one station than the other – need more information, data are difficult to validate if Diavik doesn't provide enough information
- Dustfall monitoring – not following internationally established protocols which collect samples on a monthly basis. Can't evaluate effectiveness of dust suppression techniques
- Some hits at the airstrip. Dust suppression used but still indicates that dust suppression should be looked at in this area.
- NPRI and GHG reporting – not a lot of assessment could be done. Based on reviewing data from other sites it seems reasonable.
- A21 – need a more detailed modeling to include the predicted impacts of A21

Discussion:

Q: What kind of preventative maintenance could Diavik be doing to make TSP monitoring more effective? A: Arcadis agreed with ERM recommendations regarding calibration schedules etc., however unknown if these schedules are being maintained. There is not enough information to audit this. Calibration could be done on site by staff as well as cleaning and routine maintenance. Regular checks on units (temperature, pressure, flow)

Q: Experience with use of monitors in arctic environments? A: Tara hasn't specifically dealt with monitors in this environment. Other consultants at Arcadis do though, and she can ask for their expertise.

Comment: Would be useful to know if anything could be done differently to increase success rates.

Comment: Unless you have someone on it every day, it is difficult to do. It is a very challenging environment and experienced staff are required.

Q: Do you see any difference between seasons with how monitors are operating? A: Cold will slowly break down instruments; problems can show up later because of previous exposure to cold.

Q: mitigative things in dustfall? A: link when you see high values, link temporal discussion, natural wind direction or activities. Monthly sampling allows more visual for seeing trends, need attempt to evaluate why Diavik sees higher data, more detail, not even able to link to what model predicted

Q: Premature to discontinue TSP monitoring? A: Won't know what A21 impacts are, by not evaluating it at all, we are just getting snapshots of what's happening, prudent to have more discussion before eliminating. It's not clear that the TSP monitoring couldn't be more effective. Similarly, quarterly collection of dust samples doesn't provide much information.

Q: More practical level of things Diavik could be doing? A: Take back to Arcadis tech people on what options would be satisfactory. Might need cost proposal.

Comment: between amount of downtime for equipment and questionable data due to calibration issues it seems like Diavik doesn't have enough reliable data to justify discontinuing TSP monitoring. There are also questions about the original modelling process, and the model states it does not include development of A21 pit. There is no TSP data from when an open pit is operating. It seems like Diavik is saying it is too hard to do good TSP monitoring, and too expensive. Ekati has had a successful program for many years, so no reason Diavik can't. What about purchasing backup instruments to be ready if one of the monitors stops working?

Comment: Diavik has over 1000 days of valid data and there does not appear to be any specific bias. Diavik has had very few exceedances – low ambient concentrations of TSP. Are they giving up too easily? It can be done but what is return on time and money?

Ekati has some challenges; the programs aren't comparable.

Backup instruments would be very costly - \$35K. This is an expensive program in terms of costs and man-hours.

Q: how will the environment benefit from TSP monitoring

Comment: Diavik still monitors dust on the ground, snow and water.

Comment: Could be a more collaborative effort on what else could be done, wildlife folks see value in TSP monitoring. It is heavy-handed to discontinue TSP monitoring – these data help verify EA predictions.

Tara noted there are many unknowns: is the model accurate, are the locations adequate. How problematic is the data due to calibration and QA/QC issues.

Diavik noted there has been a lot of activity on the site since the mine went underground: re-mining rock from WRSA, crushing rock for construction and underground, depositing waste rock, re-sloping WRSA.

Concern noted that Diavik wants to discontinue the program based on faulty equipment and a faulty program.

Comment: Beneficial to have a program that includes impacts from A21 at least for a portion of its operating life. Dust is an issue for communities; we need to get this right. Representing communities EMAB will be in touch with Tara about how program could be carried out in a more cost-effective way. It would be good to have a meeting on how to move forward.

Action Items: Tara to check with Arcadis staff regarding experience with TSP monitors in the northern environment and options to improve program

Arcadis to finalize review of 2017 EAQMP review based on discussion and forward to EMAB. Staff to summarize and send to Board for approval and conveyance to Diavik/GNWT.

Julian to talk to GWNT Wildlife staff.

Adjourned at 5:30 pm

**Wednesday, September 12, 2018 – Yellowknife
Meeting Reconvened at 9:05 am**

8. 2017 AEMP Review

Rainie Sharp and Megan Cooley joined the meeting via teleconference.

Sean Sinclair presented Diavik's 2017 AEMP Report. He noted it was conducted under AEMP Design 4.1.

Dust: lower than previous three years. Highest near runway.

Water quality: below EQC for all parameters. 19 SOI's, 16 Action Level 1's; 9 Action Level 2's.

Discussion:

Q: Did Diavik determine how much phosphorus in the lake from dust was becoming bioavailable for organisms as follow-up from 2016 Dust Addendum? A: Background dust levels are already high. Dust addendum reported 0.63 tonnes/yr of aerial dust deposition from Diavik, 0.42 tonnes/yr from effluent, while the overall natural loadings to Lac de Gras was 72 percent of the total. Not seeing any additional P contribution from dust; no spatial plume of phosphorus so likely it is immediately consumed. No signs of additional nutrient enrichment near A21, so doesn't appear to be a phosphorus effect from dust.

Ref. to Dust Addendum Appendix B to Appendix 13 – anthropogenic dust phosphorus contribution is about 1 tonne/year; effluent contributes about 0.4 tonnes of phosphorus.

Eutrophication: seeing nutrient enrichment effects; total phosphorus (TP) increased during the open water season. Both TP and TN were within licence limits. TP is higher in winter under ice due to less consumption. Chlorophyll *a* concentration and phytoplankton above normal range in NF and MF. Zooplankton above normal in NF. Areas of Lac de Gras above normal range:

TP – 1.1%

TN – 41.9%

Chlorophyll *a* – 26.2%

Phytoplankton – 19.4%

Zooplankton - <1%

Q: How are areas in the lake comparing to what is modeled in the EA? A: TP increase above 4.5 ug/l was predicted to extend to less than 20 percent of LDG. In 2017 the area of the lake affected was 1.1 percent.

Plankton: indication of nutrient enrichment; no indication of toxicological effect

Phytoplankton are classified to species, some to genus. (ref to Design Plan 4.1 p. 57).

A21 Fish-out: 309 fish captured; 148 released to LdG. Many died. Less than 3 kg were fit for human consumption. All fish were measured for length, weight, basic stats.

Generally 4-6 community members involved at any given time.

Contact person for fish out is Angie McLellan, DFO.

Q: How did the A21 fish out compare with other pits? A: much less fish in A21, other pits were shallower and better fish habitat. More sediment added to water column over longer period of time in A21 before fish out was conducted.

Some zooplankton above normal range but no action levels or evidence of toxicological effect

Q: Does phosphorus fluctuate a lot year to year? A: Variable since 2011, highest was 2008 in 19.6 percent of the lake. Try to limit phosphorus in the lake through water treatment processes. Not surprising that it fluctuates so much because there are so many factors affecting it.

Q: Are there streams entering LDG that would have fish? A: Fish swim back and forth between LDG and LDS via the Narrows. Spring thaw reports to LDG.

Q: Time for total lake turnover? A: 12 years.

Q: Did Diavik get results that it was expecting from the fish habitat programs? A: West Island stream worked better likely due to the more natural habitat enhancement features used compared to what was used at M Lakes.

Q: Any logistical problems for collecting data in 2017? A: 2017 was fine. Diavik started using a Hewes Craft boat, working through lab challenges of low detection limits.

Q: In-situ pH measurements were sometimes below benchmarks. How does pH fit into response framework? No action level for pH in the Response Plan, and no normal range provided for pH comparison to pre-project. Curious as to the rationale for this. A: Only use lab-based pH in analysis. Diavik will get back to EMAB on this question from NS.

Q: NS noticed levels of certain metals in the effluent plume are disconnected from levels in mixing zone; what is the reason for this? Ex. Uranium lowest from June to October in mixing zone but opposite in plume, pg 42 of report. A: possibly due to sediment disturbance. Diavik will take this away and respond later.

Q: a possible toxicological effect was identified for zooplankton in previous years, but not 2017. Why? A: don't recall an effect on zooplankton in previous years. Check and follow-up.

Megan presented the NSC review. Clear, well-written report. Four points to highlight (not major)

- Dissolved oxygen – comparison to benchmark should use the early life stage benchmark of 9.5 mg/l instead of current
- Phytoplankton QA/QC – should include biomass results
- Nutrients/Chlorophyll a – add a statement that the maximum extent measured is limited in years when FF is not sampled
- Diavik uses winter concentration of Total Nitrogen (TN); extent appears higher in summer, so should use measurement from then

Q: confirm that LdG is P-limited

A: general indication that this is the case

Next steps

NSC would like a response on the pH question with respect to action levels before finalizing. Will provide a final report within a week contingent on how soon Diavik responds to questions.

RS – on pH – action levels are for toxicological impairment from SOI's.

Action Items: follow up phosphorus contribution/effect from dust

Diavik to provide answers to outstanding questions on 2017 AEMP:

pH and action levels

disconnect between effluent and mixing zone results

possible toxicological effect identified in previous years; was this zooplankton, fish or something else.

North-South to finalize review of 2017 AEMP review based on discussion and information from Diavik, and forward to EMAB. Staff to summarize and send to Board for approval and conveyance to Diavik.

EAQMP Discussion Con't

Board decided to wait for Diavik to submit their proposed changes to the EAQMP and use that as a starting point to initiate discussion with interested parties regarding next steps.

Action Item: initiate discussion/meeting on EAQMP after receiving Diavik's proposed changes to the EAQMP.

8. Board Member Round Table and Community Concerns

Jack Kaniak – Kitikmeot Inuit Association

- KIA having meeting in Kugluktuk this week, wanted to give presentation but couldn't as EMAB meeting was this week

Adrian D'hont – North Slave Metis Alliance

- Arnold will bring up concerns if he has them

Charlie Catholique – Lutsel K'e Dene First Nation

- Will report information from meeting to Lands and Wildlife. Make sure to send minutes.

Napoleon Mackenzie – Yellowknives Dene First Nation

- Community meeting in Dettah next week
- Moved sacred tree to Weledeh

Sean Richardson – Tlicho Government

- Added Regulations departments to Tlicho Government. Originally Culture and Lands Protection. Protection includes wildlife and mapping, Regulations includes mining and remediation.
- Alternate for Michael will be replaced with Violet Camsell-Blondin (new head of Regulations)

9. Next Meeting

Jack made a motion to adjourn the meeting and the Chair closed the meeting with a prayer.

Next meeting is set for Dec 4-5, 2018.