Meeting Notes

Dominion Diamond Ekati Corporation
Air Quality Workshop
Yellowknife, NT
July 20, 2015 9:00am to 4:00pm –Katimavik B Room, Explorer Hotel

Participants
In Attendance: Claudine Lee (DDEC), Laura Malone (DDEC), Marc Wen (ERM), Tonia Robb (ERM), Eric Denholm (EDenholm Consulting), Chris Madland (Golder), Kevin O'Reilly (IEMA), Melissa Pink (Lands), Matt Seaboyer (ENR), Sjoerd Van der Weilen (Tilcho First Nation), Bradley Summerfield (EC), Shin Shiga (NSMA), Peter Unger (LKDFN), Ruari Carthew (MVEIRB), Emery Paquin (IEMA) Nick Ballantyne (DDEC), Alex Power (YKDFN), Kate Mansfield (MVEIRB)

By Phone: Jaida Ohokannoak (IEMA), Steve Strawson (Golder)

Opening and Welcoming (Facilitator)
The Air Quality Management Plan workshop began at 9:30 am; the Facilitator, Margaret Kralt with Dillon Consulting (Dillon), opened the meeting by introducing herself and inviting participants to introduce themselves and state the organization they represented.

Claudine Lee of Dominion Diamond Ekati Corporation (DDEC) provided an overview of the purpose of the workshop, stating that several different discussions regarding air quality and emissions management and monitoring will take place today. The first part of the day will focus on current mine operations and the review of the three (3) year report for the Ekati Air Quality Monitoring Program, followed by a discussion on the management plan for the Lynx site, and then ending with a review of the conceptual management plan for the Jay project. Air Quality and emissions management currently does not fit within a specific regulatory component, as a result DDEC has developed a comprehensive monitoring and reporting program.

Ekati Diamond Mine Air Quality Monitoring Program – Presentation Overview

Claudine Lee of DDEC gave a presentation highlighting the components of the Air Quality Monitoring Program (AQMP), the methodology for monitoring air quality and emissions, and key results. In April, 2015 DDEC issued a three (3) year report to affected parties and requested feedback; DDEC will provide responses to the comments received. This workshop is intended to gather suggestions, clarify any questions and come up with a clear plan for monitoring air quality and emissions.

Ekati AQMP Overview from 1998-Current (ongoing)
The purpose of the program is to monitor ambient air quality and to assess the effectiveness of air quality management plans in maintaining air quality throughout the life of the Ekati Mine's mining operations. It is ongoing and always being evaluated and updated, changed and reviewed. The three (3) year report is a summarization of the information collected, comparing each year's results to the historical data of the of the air quality. Key points milestones in the project include:

- 1998 – air quality monitoring program was initiated, the 1995 Environmental Impact Statement was used to set monitoring program; results are compared to the baseline data and surveys.
- 2006-no high volume air quality collected as it was undergoing a review and a redesign of the program. Dust fall monitoring was initiated in July in 2006

- 2008 - Review of monitoring-key changes, SO_2, oxides of nitrogen, TSP and fine particulate matter PM 2.5 added where building locations are.
- 2014 - updated high volume air particles; previous to this operating solely on the Partisol, all of the HVAS units were decommissioned in 2013.

2012-2014 Results

The results were compared to historical and the 2006 CALPUFF data. Air dispersion model result trends compared well with what is observed from the field data (i.e. snow core chemistry, HVAS, lichen and dust fall). Map, included as slide 8 of the presentation shows the locations of the continual air monitoring stations (red dots), the HVAS stations (green dots) and the dust fall monitoring locations (blue dots). The components of the monitoring include:

- Meteorological monitoring of Air emissions and GHG (plus incinerator)
    - Three data sources, airport weather, meteorological, polar lake meteorological-only installed during open water season, they are reported in the annual aquatic effects water collection monitoring program
    - Snow core samples are collected late in the winter provide SWE.
- Air emissions and GHG calculations:
    - Reporting under the National Pollutant Release Inventory
    - DDEC uses an Energy and Green House Gas (GHG) Management steering committee which is responsible for approving and overseeing energy and GHG reduction projects and tracking performance (Greenhouse Gas Emissions Reporting Program).
    - Fuel consumption levels in 2012 to 2014 were similar to those reported between 2006 and 2008, primarily due to an increase in motive diesel use as compared to the 2009-2011 reporting period as a result of material movement near Misery Pit and various construction activities.
    - A total of 200 kilo tonnes of CO_2e emissions were calculated to be released in 2014. The average annual GHG emissions from 2012 to 2014 were 190 kilo tonnes of CO_2e. This is 20% more than that estimated during the 2009 to 2011 AQMP (158 kilo tonnes of CO_2e), due to the increase in fuel usage.
    - In 2012, GHG emissions from the Ekati mine made up 12% of the total GHG emissions from the Northwest Territories, and 0.025% of the total national GHG emissions
    - DDEC continues to implement various programs looking at minimizing and optimizing the amount of fuel we use. No idled campaign was launched when we took over Ekati.
    - NO_2 has had an overall reduction in production.
    - TSP-Running HVAS in the winter was requested, there has been difficulty in obtaining the information. Officially moved to Partisol sampler in 2012/2013.
    - Erroneous samples (numbers not in brackets) were not included in the table. Partisols-the GNWT guideline was adopted from the Canada wide standards. The invalid samples were a result of Partisol equipment issues. The Partisol stations recorded instances of exceedences-corresponded to the instance of smoke.
    - All other times DDEC were well below the number for exceedences
    - The monthly maximum values for NO2, NO and NOx-2012-2014-all values were below the GNWT standards
    - SO_2 concentrations were well below the 24 hour standard for the GNWT
    - PM 2.5-The instances of exceedences occurred during days where there was smoke from wild fires with in the area

- Now that we aren't personally weighing out the filter paper, we are getting more results that are more accurate.

Kevin O'Reilly: On the GHG emissions, there is mention of a dashboard, is that not publicly available? DDEC has monthly newsletters could this be included? Could it be available more than just once every three years?
Claudine Lee: Good point, the DDEC environment group will talk to the communities group and see how this could be incorporated.

Kevin O'Reilly: Is there some kind of efficiency unit for reporting the greenhouse gases? This would provide a way for suggestions on how to improve efficiency for equipment use and the level of fuel efficiency.
Matt Seaboyer: It is possible to include vehicle information into the inventories include trucks and various amount of fuel that they use, then assess efficiencies and change and improvement overtime.

Kevin O'Reilly: Slide 15-why is there such a big difference for the maximum TSP in a 24 hour from 2012, 2013 and 2014?
Claudine Lee: 2014 could be because of the smoke created by the forest fires.
Kevin O'Reilly: Is smoke that big of a deal when dealing with TSP?
Claudine Lee: Yes
Kevin O'Reilly: Why did the other monitoring stations not register higher TSP during the peak forest fire times? If the smoke has that much effect, why wouldn't it be uniform from all monitors?
Claudine Lee: The smoke is not dispersed evenly between all of the monitors.

Matt Seaboyer: It is strange that there is such a difference between Grizzly and Cell B for their TSP readings. It would be interesting to see why there is such a difference?
Claudine Lee: Grizzly also showed a response to the forest fires in 2014 with increased TSP.

Dust Fall Monitoring and Dust Suppression at Ekati

- In 2012, three additional dust fall stations were temporarily set up downwind of the Fox Pit waste rock area at 100 m, 300 m and 1,000 m away from the pit. These stations were used from July to September of 2012 to measure dust fall levels downwind of the waste rock piles. They were not in use in 2013 or 2014.
- In August 2014, three additional permanent dust fall stations were set up downwind of the Misery Haul Road, about a kilometer closer to the main camp compared to the original Misery Haul Road stations. These new stations were better aligned with the predominant summer winds coming from the east-northeast compared to the original Misery Haul Road stations.
- We have our various locations and the samples that we collected and are analyzed
- As you can see in the 2012-2013 and 2014 that you can see the dust fall at Fox falls quickly and the stations are measured from the pit
- Misery-The same behaviour as in the results as Fox. 2014 is generally higher in then previous years but the dust fall at Fox decreases. These trends reflect the amount of vehicle traffic present on each road.
- Dust fall concentrations at 5 stations showed that the average dust falls are higher in 2013 and 2014 then in 2012
- Acid Deposition: See the established critical loads in the various jurisdictions throughout Canada. This was calculated from the loads in different project areas and converted.

- In the areas where we can't use DL10, there is road watering, depending on the temperature and conditions will depend on the amount we water. Speed limits help manage dust in more high traffic areas. EK-35 is used on the Ekati mine airstrip as it is approved by Boeing for use with aircrafts
- We have looked into different products as an alternative to dust suppressants. Reason we used EnviroKleen is it was previously proved by the inspector to be used underground. We wanted to move forward with this so this is a 1km pilot project on misery haul road-we purchased a new applicator and worked with the manufacturer to train our people to use equipment and how to apply it. DL-10 is an asphalt based product- we are still looking at other options. EnviroKleen is a synthetic project with a binding agent associated with it. Began it in June, this is much cleaner and the application went well and we are monitoring it. We have put more dust fall monitors in this area to see the difference between the areas with DL-10 versus the area with EnviroKleen, we also set up some remote cameras to monitor whether there is large plumes of dust when vehicles drive on it. We are looking into other products but if we didn't use EnviroKleen wouldn't have been able to get started this year as approval takes long.

Kevin O'Reilly: Slide 23 - why are the red dotted lines not the same on all the graphs? Why is the scale different for 2012?
Claudine Lee: You see a change because in 2012 Misery Pit had just opened and therefore there the amount of hauling and truck traffic is less, therefore the results are lower. In 2013-14 operations began and the hauling started. In 2014 it was hard to put dust suppressants down; there must be appropriate conditions for application of the DL10. It is likely that the DL10 went down after monitoring had started. When DL10 cannot be used, must rely on road water; however there are limitations on this as it requires regulatory approval.

Emery Paquin: I accept the fact there are some challenges, especially in the measuring of the data. The Misery haul of 2013, the highest values shown here are for the months in July and August. If there are regulatory progress delays then why are the highest measurements for July and August for 2013? I am having difficulties on the data. I need an explanation for the details of the graph.
Claudine Lee: The 2013 levels could be directly related to the traffic loads.
Emery Paquin: This just emphasizing the importance of scheduling, I am wondering if there is some discussion with ENR regulatory personnel. Why does the first application for dust suppressant have to wait until the Inspector is on site? Can this be changed?
Claudine Lee: There is a letter that says the inspector has to be on site and if required to witness the application of DL-10 on the Misery Haul Road, however this has not delayed the application. If DDEC is using road water as dust suppression, we must first sample, wait for the results and compare to them to water licence and then request authorization from the Inspector. DDEC does its best not to allow this to delay application. Delays are usually associated with the weather and the environmental conditions.
Matt Seaboyer: One of the main issues is the temperature. The temperatures are often too low in the spring for application. Has DDEC done any research into looking for another product that can be used at lower temperatures?
Claudine Lee: Yes, will explain shortly.

Jaida Ohokannoak: Slide 24-there are a number of exceedances on the LLCF, has DDEC considered adding a product to it to harden the kimberlite?
Marc Wen: Elevated levels at the LLCF may be temporary effects of reclamation work done at the Cell B site, but this is to allows seeding to occur. There is a crust and it is being broken up for the seeding and this is created some dust fall.

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Claudine Lee: Part of the Cell B pilot study is part of a long term study looking at what can work to stabilize the water and damage from wind erosion. The focus is on the long term reclamation.
Kevin O'Reilly: Applying sealant would throw off pilot re-vegetation and reclamation program?
Claudine Lee: Yes.

Brad Summerfield: Just curious about the exceedances in September. Could temperature or regulatory delays be an issue?
Claudine Lee: Those two sites are closest to the roads so it might be registering more at this location. If it has been a dry year the road watering does not last as long. The larger trucks also break the DL10 sealant, which creates more dust. It could also be a combination of any of those things.

Emery Paquin: Slide 8-There are several sites along the Haul road where the dust fall monitoring has been set up, I don't see any similar dust fall collection system around the LLCF. Is there a reason for that? Or any research on how quickly the dust from the LLCF falls out?
Marc Wen-The LLCF is active and wet Cell B has some dry areas, but it is different than the haul roads. There is less effort put to dust monitoring at the LLCF because activities are different.
Emery Paquin: I agree with you on some degree, over the next couple of years the Kimberlite will be placed into pits, so I would anticipate a further drying out of the system, it might work well if there are dust fall monitoring stations in more areas other than just close to the haul roads.
Marc Wen: DDEC would have to consider access, but yes certainly something can be considered. However, reclamation of the LLCF will also be proceeding during Jay Project operations when FPK is placed into the Panda/Koala pits.
Claudine Lee: DDEC can look into that.

Emery Paquin: Slide 24 - in 2014 there was some substantial dust generated by the LLCF themselves, although it is only a year it seems the data is showing that it is increasing
Marc Wen: There was lot of activity on the road and this could have been the cause for the increase in dust particles.
Emery Paquin: IEMA's visit to site – noted dust at the LLCF, it would be reasonable to consider dust monitoring stations at the site.

Kevin O'Reilly : Slide 8 - the pilot area for Cell B? How big is it? It is maybe 10-15%-is it even that much?
Claudine Lee: Is it approximately 4 Hectares and the dust monitoring station is right in line with the area they were doing the work for re-seeding (this includes tilling and turning the soil).
Kevin O'Reilly: It would be interesting to know what amount of Cell B has activity and how much. There is still a significant part of the LLCF that is going to remain uncovered. Has DDEC ever used soil sampling in any of your research? Given the size of the area where the revitalization work is happening, having a series of stations that can measure distance and the effects of our efforts in the monitoring area would be beneficial.

Matt Seaboyer –Slide 25 - has DDEC ever looked into studies on how accurate the dust fall monitors are in measuring the accuracy of acid deposition?
Marc Wen: To the best of knowledge, there are no studies.

Kevin O'Reilly-During the IEMA site visit, there was a significant visible difference in the levels of dust in areas where EnviroKleen was used. Seems that EnviroKleen was working and good effort and look forward to the dust fall results.

Matt Seaboyer- Using EnviroKleen was a great step and a great study. The dust fall monitors are those similar distances as your other road transects?
Claudine Lee: Yes it is the same so data can be compared to other sets on Misery Haul road. The report will come out in the fall; DDEC is excited to see results. It would be easier if ENR provided a list of possible products as opposed to DDEC trying to get approval for a product.

Jaida Ohokannoak: Is there a special report produced for dust suppression?
Claudine Lee: There is a section in three year report, and a letter to the Regulatory Inspector after the 2012 Misery Haul Road application. A separate report will not be issued.

Snow chemistry monitoring

- Snow samples were collected between March 25 and April 12, 2014, following the Ekati mine Snow Core Sampling procedure document (see Appendix 10). The procedure used at the Ekati mine is the same that is used by EC, Canadian Air and Precipitation Monitoring Network (CAPMoN) stations and the US EPA.
- We followed the snow core sampling procedure which is included in the three year report. We checked in with a few people, it is the same monitoring technique that environment Canada uses. We are confident that this is an effect sampling technique.
- The sampling locations represent a variety of terrain types and distances from mine operations. Sloping sites were selected so that adequate snow accumulation was present, with the slope facing toward the mine site to avoid sheltering from the monitored source. At each site, three separate snow samples were collected using a Mt. Rose sampler (Plate 2.6-1) from the upper, middle and lower slope positions. Snow depth and core mass were measured for each sample to allow calculation of the SWE.
- Snow and lichen are paired up for sampling.
- Spatial trends for TSS the amounts decreases as you get further away from the mine activity. Winter loading and a number of metals are elevated in the area directly surrounding the mine footprint with concentrations decreasing as you move away from mine.

Emery Paquin: Have you determined the source of the Aluminum in the snow chemistry, specifically in the sampling locations?
Marc Wen: There hasn't been extensive work to date on what this is from – could be anything from emissions. There is nothing written on aluminum.
Emery Paquin: Given the results that are shown on the slide, is there a plan to do this?
Marc Wen: There are no plans; aluminum was shown for illustration purposes, to show the demographic of disposition. It is likely that the higher levels of aluminum are connected to other geographical features.
Emery Paquin: Yes I accept the fact aluminum was shown here, the snow is analyzed for a suite of metals, given what is higher levels surrounding LLCF, are there any plans to look at this data in more depth to find the potential source?
Marc Wen: This would have to be considered in more detail.
Chris Madland: I suspect it has a lot to do with the host rock.
Emery Paquin: Source could be the host rock, but we are talking about the snow chemistry so we are talking about the surrogate for dust fall, I would think that the major source of contaminants in the snow would be emissions for the mine site or the dust that is generated. Are you suggesting the source could be other than those?
Chris Madland: Not specifically no.

Emery Paquin: I would encourage DDEC to consider doing some work around this area. This information just builds a case for the LLCF to be looked at.
Marc Wen: The main message is that the dust fall drops off very quickly and in this chart it shows that it is all very contained close to the site. The concentrations are low-what would be useful would be peppering the area with one or two transects-to me this doesn't speak to the LLCF, I think things are quite well contained.
Matt Seaboyer: I am wondering what the flight path is for the planes coming in. Maybe the emissions from the plane are depositing?
Claudine Lee: The airplanes run northeast southwest orientation

Alex Power: The data from this in the dust fall, at daily accretion rates is there any time course data What are levels today? How have they changed over time?
Marc Wen: There is snowfall, rainfall and runoff, some will be lost in the soil, some would be saturated in heavier materials. Not sure the accumulation is great. There is a bit of a buffer around roads-different in ten years then the first year. A component of this is lichen sampling which we will look at next.

Lichen tissue monitoring

- This program is completed in the same year as the snow core sampling
- Results; the most enhancements occur within 10-30 km-highest concentrations close to the road and operations.

Marc Wen: (question about vegetation) this is related to dust fall beyond 30m, there do not appear to be effects to the lichen vegetation. As we can see for lichen it is a much better program, it is telling us that less and less is depositing every year, this is a program we are looking to curtail. It is a reasonable program. The main take away it correlates reasonably well.

Rauri Carthew: Slide 38 (4th bullet) Does the report provide more details on where elements are shown in relation to distance from the mine? At which point you actually reach those levels?
Marc Wen: The report will show those details, we can get back to you on that. There is a general comment and then there will be specifics.

Matt Seaboyer: You co-located a PM2.5 Partisol with the BAM continuous PM2.5 monitor at the CAM building. I do not see the results from that co-location in the report.
Claudine Lee: If that information is not included in the report (it was on the recommendation) it will be put in there.

Kate Mansfield: Lichen program is not yielding new information, but given the fact that there could be more deposition with new operations, is there any thought to how this could be linked this affects other things like caribou?
Marc Wen: The initial intent was not to connect it to things like caribou; it was intended to connect integrated time sensitivity. Have not tried to connect this to things like caribou. Mine has been operating for a while and there is data that could be correlated. If the program is of real interest to people, or could be incorporated into other purposes of monitoring, then it is something that could be repeated and there is data that can be looked at to compare. We have learned about as much as we can from it, but if there is something different or the information was used in a different way, we may consider modifying the lichen program.

Alex Power: Run off, soluble metals don't seem to be picked up by the lichen. What do we know about the history of these ions? Have you looked at the fish or the lake? It's going somewhere.
Marc Wen: Yes, we have had the same question – what is happening with the dust? Have done some research – looked at the disposition rates and applied them to lakes and watersheds (focused on the AEMP Lakes). The research shows it's not a meaningful number. If there are localized effects, it is probably from activity.

Kevin O'Reilly: Comments from ENR and a letter from the IEMA on June 1st raised the issue of correlation between lichen and snow sampling – is this the same distance as the previous study? Are there comments can be offered at this time?
Marc Wen: 300 m is the maximum distance. If showing up every 3 years to monitor lichen, there is a constraint for finding lichen. The further away you go the more it becomes irrelevant. DDEC could do a summer sampling and then a winter at the co-located sites for snow. But at a distance beyond that, it does not seem to have any relevance.

Matt Seaboyer: Previous air quality reports indicated the 2008 lichen samples were within 100m of the 2005 lichen samples. However, the most recent samples are 300m away from the previous sampling locations. So are you trying to go to the same location, by are having difficulty locating lichen to sample, so you need to go farther distances away?
Marc Wen: Lichen are slow growing – even if you are going to the same spot, there is an element of finding the lichen as a result it cannot be done year after year, it could be done within a 10 to 15 years cycle

Matt Seaboyer: It appears the QAQC monitoring procedures have gotten better. Remote data viewing capabilities that are now available for the CAM site is a useful tool for quick data checks. Suggestion - have a bit more formalized process for collecting data and assessing to reduce time down because of equipment.
Claudine Lee: DDEC physically checks the equipment every 6 days, checking the monitoring stations. Downloading data is consistent – when there was visible smoke, downloads happened more often. At the site every week – if there is something going on, the stations are checked again. This is a formalized work instruction and schedule. This corresponds to when parts have to be installed on the equipment.

Air Quality and Emission Monitoring and Mitigation Plan-Claudine Lee

Claudine Lee of DDEC gave an overview presentation on the AQEMMP-Air Quality and Emissions Monitoring and Management Plan (the name has officially been changed). This is being updated for the Lynx project, a very small project close to Misery, but is applicable for the whole site. There will be no changes to the meteorological monitoring, the air emissions and GHG calculations, Partisols air monitoring. Snow and lichen sampling will continue. There will be new installation of dust fall sampling; DDEC is looking at installing another set of dust falls monitoring stations. Stations will be located near the haul road, both the upgraded winter road access as well as located close to the 1 km new Lynx haul road.

- Updates to Ekati Air Quality Monitoring Program for Lynx
- Locations for Air Quality Monitoring at Lynx

Matt Seaboyer: I am assuming that is where the prevalent down winds are happening?
Claudine Lee: Yes, as well as dispersion modelling.
Emery Paquin: This location is intended to capture both the road and the dust that can be made from blasting?

Claudine Lee: Yes, that is correct.

Emery Paquin: Is this a transect?
Claudine Lee: Yes

Kate Mansfield: Could you just clarify the next submission of the AQEMMP, will it be just for Lynx? Will there be an annual report and not every three years? If Jay comes will it include the same components?
Claudine Lee: The submission will only be Lynx, not Jay. Jay still has a while to come-there will still be lots of opportunities to add, change, modify it in the future.
Claudine Lee: Jay is in the future when Jay comes on board at the end of the discussion I will talk about how it will be involved in the reporting.
Kate Mansfield: Slide 4 – bullet 2 will the response framework for aquatics include air triggers?
Claudine Lee: For now the response framework for the aquatic will not be included in that. A similar style of triggers will be incorporated into the next version that includes Lynx.

Matt Seaboyer : Has there been any inclusion on monitoring NO_2 and PM 2.5 monitoring around Lynx?
Claudine Lee: No it has not been included because of its proximity to the Misery Pit.
Matt Seaboyer: I would recommend sampling locations for these parameters. I would recommend two locations
Chris Madland: I think that is not entirely unreasonable, it is not an adaptive management if you have to wait 60 days and then it is a long time to implement mitigation measures.
Matt Seaboyer: I could recommend a continuous monitoring station; it is useful looking up those monthly trends and if you check it monthly I think there still would be value in the information.
Chris Madland: I think you have to monitor how quick you can respond to these results.

Kevin O'Reilly: Just trying to understand what parameters or variables are for the Lynx site? Is it safe to assume units of TSP?
Claudine Lee: That is coming in the next few slides
Kevin O'Reilly: Timing – the response framework DDEC is already doing Lynx now; it would probably good to have those triggers identified before too much work happens there.
Claudine Lee: That is why DDEC is having this discussion now. Winter season has a lot of work scheduled, towards the end we can talk about timing more. It will likely be towards the end of august or September for a version for circulation.

Conceptual locations for Jay Construction and Operations Air Quality Monitoring

- June 1 DDEC submitted a conceptual Jay project monitoring plan
- My expectation of the additional station will be continuous to give us the appropriate results. Locations for all the areas will be ground truthed
- The locations need to be verified on the ground yet, the other location just west of the pit.
- Why did we propose something on the east? We were siting stations on predominant wind direction. The higher concentrations and deposition rates are more significant in non-dominant wind directions. Because of this we have actually considered the west side. The third location for Lynx is the transect which would include, dustfall and snow collection.

Jaida Ohokannoak: What about putting a monitoring station sites east across from Lac du Sauvage, particularly during the construction phase?
Chris Madland: It is not like there are no stations on the east side but your consideration is noted.

Rauri Carthew: Out of the three sites mentioned, will DDEC be choosing one?
Chris Madland: DDEC is planning on choosing 2 out of the 3, one will be continual.

Kevin O'Rielly: When we saw the mapping the first presentation (slide 29). I know the IEMA and SENES worked together to come up with this sort of alignment for snow and lichen sampling locations. With Jay being in the centre of a bigger part of your operations are going to switch down to the Lac du Suavage site? If there are no monitoring stations on the east side, I think you will see a gap for snow and lichen sampling. With the shifting of the mine operations to that area at least one monitoring location should be added to the east side.
Chris Madland: I think that is reasonable

Matt Seaboyer: DDEC is going to have one continuous site and just TSP will be continuous?
Chris Madland: Yes, PM 2.5 could be an alternative.
Matt Seaboyer: Well I am not saying to swap out but to add in the testing of parameters PM2.5 and NO_2. I would strongly recommend having at least one continuous monitoring station for these parameters
Claudine Lee: Just a reminder that this discussion is focusing on Jay and when Jay comes on board the other two mines will be officially shut down.
Chris Madland: That is a good point and we will take that into consideration. It is important to do monitoring that will give you results. We recognise that there will be more activity during construction phase. To increase monitoring during that stage is something to consider. However it is also important to remember the single most effective monitoring source is people on the ground. This is one of the few air parameters that is visible. Responding with watering is a pretty effective way to diminish dust. We want to create monitoring locations as pretty stable and not move around so have something that we are able to compare the results to.

Matt Seaboyer: You mentioned that an important component is people on the ground; do the haul truck drivers call in? Who is making those calls?
Claudine Lee: Drivers inform us when they see anything; this is related to safety than anything else. There isn't something formal in place; it is all around safety of the site and safety for the drivers.

Kevin O'Reilly: I think I can appreciate some of the difficulties of trying to do construction phase monitoring. By the time you get any feedback it is going to be difficult to adjust activities. If it is just a passive system there really will not be much feedback.

Emery Paquin: You say that during construction you want to focus on a passive monitoring rather than active. It doesn't make sense, at one point you are saying you want active monitoring for construction, but now you are saying you saying passive monitoring is your preferred approach. This is a bit of a contradiction.
Chris Madland: Point taken, however there are practicalities that have to be considered.

Rauri Carthew: I am looking at the map are you proposing are you keeping the monitoring that exist and setting up new sites by Jay?
Chris Madland: Yes, as mentioned earlier this is conceptual and similar but exclusive to the Jay project.

Matt Seaboyer: What is the best avenue for what we are proposing here? Comments I provided to you, when should we discuss my comments. The new levels that we are proposing. (table provided by ENR for everyone to look at – proposed three levels with associated triggers for air monitoring).

Kevin O'Reilly: Is this something that GNWT has prepared?
Matt Seaboyer: Yes

Rauri Carthew: How much time is expected to pass if a Level 1, 2 or 3, has occurred before a response happens?
Chris Madland: It really is a season to season, get results and implement next season,

Kevin O'Reilly: I would recommend, now that you have access to the data, looking at it on an hourly basis, if there are any exceedances there could be ways to determine cause looking at the cause and finding ways to mitigate. Prepare a small amount of protocol that has people looking at the data and implementing this.

Peter Unger: In the DAR technical sessions stated that exceeding the ambient air quality standards would not be a significant affect; do you have an estimate on how often it would end up in level 3?
Chris Madland: We expect them to be similar to what we have now.
Peter Unger: Why is it defined as not significant if there are exceedances?

Marc Wen: I think the modelling is different from the monitoring. It is important to compare modelling with monitoring - in this case modelling are higher than monitoring.
Peter Unger: In the DAR modeling it is not expected to have exceedances but the DAR goes into detail on the significant effects and states that they are not an issue. Why?
Claudine Lee: We are looking more towards the comments to the triggers themselves. The conversation around significance is maybe more in tune with the Environmental Assessment Process.

Kevin O'Reilly: I am trying to understand how these action levels will work. I think it is a good idea-how would it work in practice? What things are there air quality things apply to? TSP? SO_2? NO_2?
Chris Madland: Particulate and NO2, it is reasonable to eliminate SO_2 due to the low sulphur level diesel.
Matt Seaboyer: I agree that it is just background levels for SO_2, it is now a waste of time and finances, get rid of it and focus more on the other parameters, they are more important.
Kevin O'Reilly: Is there daily, monthly annual concentrations being recorded for all three?
Chris Madland: Over a 24 hour period the standard of the NWT 28 micrograms/m^3 . Federal standard has a 28 micrograms/m^3. Compliance is determined based on the 98 percentile of the value over three years.
Kevin O'Reilly: Could we have the three parameters and all the standards listed in the document. What are the appropriate parameters? What are the blasting residues in terms of dust? Are these things going to capture these effects?
Chris Madland: Yes, more so the NO2 but blasting is a small component-in the grand scheme of things.
Kevin O'Reilly: Will any of these (TSP/PM 2.5/NO2) capture blasting?
Chris Madland: It will capture some of it, there will be some NO_2 associated with blasting. Be mindful that the averaging periods we are talking about are 1 hour.
Kevin O'Reilly: How do you design your action levels? It is a big deal to exceed on a one hour or a 24 hour. With these different periods of time you are averaging over. How will these action levels be designed to incorporate these different recording periods?
Chris Madland: Maybe on a weekly basis we can go and change the filter on the Partisols, you can look at the results and notice if there is an increase within a 24 hour period. It is something to consider and will look into it.

Matt Seaboyer: Proposed changes - So we will have changed if the concentrations are above a certain percentage or within a certain percentage. Action needs to only be taken if you are above a certain number. The actual concentration levels reflect the CCME guidelines.

Kevin O'Reilly: I am trying to understand how the notion of lead time feeds into these action levels. Why wait until you exceed at 80% before anything happens, or by the time 80% is exceeded it has gone even higher. How is this going to work in practice? I am thinking of it in comparison with the water quality monitoring program. How do you deal with trends over time and lead time?
Claudine Lee: This will be included in annual reports and three year reports. If you were seeing a trend of concern before you were reaching these triggers. That is a change to the reporting itself.
Kevin O'Reilly: Maybe in terms of lead time and trends and so on, it might be more appropriate to think of at least in terms of the annual standards. This is when the annual standards maybe the action levels for those might have a lower percentage (example 50%), if things are starting to trend might trigger a response before it gets up to 80%.
Matt Seaboyer: That is one of the reasons-as you can see in action level two-you are seeing we have changed it to 50%.
Chris Madland: Responding to 10-20% you are going to cut it off at the knees before it gets too high.

Kate Mansfield: Have the GNWT proposed triggers been submitting to the review board registry?
Matt Seaboyer: No not yet, we just submitted it today to review and discuss, once agreed it will be submitted to the review board registry.

Mark Wen: Just regarding response frameworks, what this ends up being is a set of logic rules; when operationalize you realize that it will not capture certain things. Chris made the comment that it is a living document and it is the concept we need to remember. It will adapt as it is put into operational methods.
Chris Madland: This has been hashed out a lot and continues to be worked on.

Kevin O'Reilly: May need to develop a different set of suites of action and responses for 24 hours vs. annual actions.
Chris Madland: Thanks, we will look at that. The NWT standards are the primary influencer of how the thresholds are set-we want to assess how things change in time or space. Annual data report is a substantial change, makes sense in terms of being able to do adaptive management, the three year summary to tie everything up.

Kate Mansfield: There are four comparisons to be made-will the four components be in the annual report and overviewed in the three year report?
Chris Madland: I don't think anything is ruled out or ruled in. It would make sense to have three comparisons, the DAR predictions, the AQEMMP thresholds and the NWT air quality standards in an annual report. The assessment of spatial and temporal trends would likely be included in the three year report.

Matt Seaboyer: In addition to the fuel use reporting, including an equipment inventory would be valuable information. That way you keep a running tally of what is at site as well as informing the tier levels of the vehicles.
Chris Madland: I don't really see the purpose of this or that it is appropriate
Matt Seaboyer: Having that running inventory is critical, if you did see these levels rising then you could purchase new equipment.
Claudine Lee: That sounds like part of an action plan.

Chris Madland: Agreed, yes obviously you want to create value in doing that.
Matt Seaboyer: I think this is leading into having the high efficiency equipment and acknowledge the changes in your equipment to improve the quality on site.

Rauri Carthew: Annual data report, does DDEC anticipate going into further discussions on the valued environmental components on, for example, human health or caribou?
Chris Madland: I think it would be an important decision to make at the time given the information available

Matt Seaboyer: Great to see some protocol on QA/QC of vehicle and equipment etc. Also, happy about you committing to the annual report.

Engagement Schedule for AQEMMP
Kate Mansfield: Does DDEC have any plans for review of the program between the commencement of operations and the commencement of closure?
Claudine Lee: Between operations and closure would be the annual review and three year review.
Kate Mansfield: Is that a commitment? We would like to ensure that there is a mechanism in place to have community involvement in activities on the AQEMMP?
Claudine Lee: Any change that DDEC would want to do to the management plan would be circulated for comments. It depends on the reports that are produced from the annual and three year plan.

Kevin O'Reilly: We recognize that you are acting in a bit of a legislative gap, you have offered a process to report and try and update the plan and engage folks for both Lynx and Jay. Are you thinking that you will have a part of the report that you will use that mechanism for connecting all the projects in the annual report?
Claudine Lee: The annual report for the water licence is really a summary report. The comparisons and the data will be in the three year report. Again DDEC has not decided on that, but that is how I see it.

Kevin O'Reilly: What will this report look like? Will it be pages and pages of data? Or is it more of a report to highlight the three areas? Trying to figure out what it will look like.
Marc Wen: The AEMP evolved over a decade, so the bulk of the report relies heavily on science in the absence of a formal plan. With a really good response framework, annually you have the key parts of your data set in the annual report and then every three years will be a more in detail report. Putting a plan in place and an annual report would not be data driven. There is some things you want to explain but you want it keep it simple, look at, and understand it, not to make it too complex.
Claudine Lee: I agree, I see it the same way.

Matt Seaboyer: I would see there are some graphs or trends showing over the past three years, some tables with data, not too complex.

Alex Power: None of your graphs have errors, I would like to see some with errors on it.
Marc Wen: I acknowledge that and we should do that.

Emery Paquin: I would like to commend DDEC on hosting this workshop; this workshop went a long ways in clarifying a lot of the outstanding issues.

Meeting Notes

Workshop Review and Wrap-up

- After the discussion concluded Margaret Kralt (Dillon) provided a high level overview of the information covered.
- Claudine Lee: going forward, we will be setting up a tight timeline.
- The workshop ended at 3:25pm