

Red Dog Mine Risk Assessment Meeting with members of Maniilaq Association/National Park Service/Northwest Arctic Borough April 22, 2005 (1:10 p.m. to about 3:30 p.m.)

Questions and comments raised by attending members of Maniilaq Association/National Park Service/Northwest Arctic Borough on April 22, 2005 held at the Maniilaq Association building in Kotzebue regarding a slide presentation on the findings of the risk assessment of the fugitive dust issue from the port to the mine by Scott Shock.

Teck Cominco representative by teleconference: Jim Kulas

Exponent presenter: Scott Shock

DEC attendees: Rich Sundet and Lindsay Smith

Attendees:

Chris Young of National Park Service (NPS)

Grace Kirk, Helen Bolen, Paulette Schuerch, Cyrus Harris, and Enoch Shiedt of Maniilaq Association (Maniilaq)

Walter Porter of Northwest Arctic Borough

James Mason of the Arctic Sounder (the Kotzebue newspaper)

Kulas gave a brief overview of the risk assessment process and then Shock gave a slide presentation of the findings at 1:35 p.m.

Comment – Schurerch - How far are the boundaries of the purple area in the slide of the ambient air boundary?

Response – Shock - The ambient air boundary begins 300 feet on each side of the Delong Mountain Transportation System (DMTS) road. That is not shown on the figure. The purple area on the figure is just a general schematic illustration of the areas we studied.

Comment – Bolen - What is the prevailing wind in the area?

Response – Shock - The winds are seasonal. Deposition from the fugitive dust is generally higher on the north/west side of the road due to the prevailing wind direction.

Comment - Bolen - Did you differentiate the comments on the diets between the residents from Kivalina and Noatak because their diets are different?

Response – Shock - Yes we did. We took comments from the separate villages as one of the first steps in the risk assessment process. We also looked at the individual diet in the risk assessment. We used a Fish & Game database that had data from the two separate villages. We combined the database information for Kivalina and Noatak and used that to evaluate three types of people; children, adults, and adults workers. The assessment results only vary a little if each village is looked at separately, and would not change the conclusions. We will add a section to the risk assessment document or the formal response to comments to address the differences in diets.

Comment – Schuerch - How many individuals were looked at in each village?

Response – Shock - A risk assessment works by looking at overall risks to exposed populations rather than individuals. In this case, the exposed populations we evaluated were children, adults, and adult workers.

Comment – Schuerch - Did you look at persons with asthma?

Response - The risk assessment does not evaluate individuals. We use information on what people eat, what types of food they eat, and their intake. We also look at the toxicity of the metals then assess what potential effects may occur on an example person (child, adult, or adult worker). [**Additional Note:** Risk assessment is designed to be protective of sensitive individuals (either those more sensitive, or those more exposed). To be protective, risk assessment tries to overestimate exposure and toxicity, to result in an overestimation of risk.]

Comment – Schuerch - When you drive along the DTMS road, is there still a large flock of ptarmigan located there?

Response – Kulas - Yes there is still a flock. We harvested some of those along the haul road for the study. [**Additional Note:** we had trouble finding ptarmigan for the study, possibly because of the hard winter].

Response – Shock - We collected ptarmigan along the road and from a background sample location to the south.

Comment – Shiedt - What about the voles along the road – did you evaluate those?

Response – Shock - Yes we sampled them then used that information to model the effects to larger animals that would eat them. [**Additional Note:** We also sampled plants that the voles would eat, so that we could model the voles' exposure and assess the risk to them.]

Comment – Shiedt - What standards did you use to ensure that the children are safe?

Response - Shock - We looked at how much and what types of food are used, and we already know the toxicity of the metals. For lead, we used that information in an EPA child lead model. As with adults, we assumed that children eat a 100-percent subsistence foods diet.

Comment – Schuerch - What about pregnant women, did you evaluate them?

Response – Shock - Yes we used a model that evaluated that scenario as well.

Comment – Kirk - What about the workers, did you evaluate them?

Response - Teck Cominco has their own blood testing program and they compare those findings to regulatory levels. [**Additional Note:** Federal law requires Teck Cominco monitor the lead exposure of the employees, this is done with a blood lead testing program. The Mine Safety Health Administration sets allowable blood lead levels, the Teck Cominco program is more stringent and has lower allowable levels].

Comment – Shiedt - Are there any studies outside of the ambient air boundary perimeter along the corridor between the port and mine?

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Response – Shock - Yes. A large part of the risk assessment was outside of that boundary to see what contaminant concentrations are there and what effects are to the plants and animals there.

Comment – Kirk - What about berries outside of the ambient air boundary?

Response – Shock - (Shock showed the attendees the area on the map that was sampled then noted that Exponent only used the data close to the port and road in the assessment because it was the most conservative). Berries declined in metal concentrations a bit in 2004 from the 2001 study.

Comment – Bolen - Would you use this berry information as a base for future studies?

Response – Shock - Yes and we would use this in a monitoring plan.

Comment – Schuerch - Is there any tilaaqiuq (the plant used to make Eskimo tea).

Response – Shiedt - It is all over in that area.

Response – Kulas - Samples representative of the subsistence foods were studied. So future studies would only target those representatives.

Response – Shock - Exponent worked with DEC during the risk assessment work plan development to select target species that would be representative of the various food groups.

***Comment** – Shiedt - I would like to see another berry study.

Response – Shock - There will likely be some ongoing monitoring at some frequency that would probably include some subsistence foods such as berries.

Comment – Harris - What about the truck spills, were they part of the risk assessment?

Response – Shock - Teck Cominco had a program that systematically evaluated those spills and did additional cleanup where necessary. We did look at patterns of deposition, but the individual spills did not affect the overall pattern.

Comment – Shiedt - Regarding reclamation, what about the waste rock stockpiles?

Response – Kulas - Hazel and Enoch are working with us on the reclamation plan.

Response – Shock - It is an active part of the mine and is not part of the scope of the risk assessment.

Comment – Kirk - Are you working with the people from the State that did the blood testing?

Response – Shock - No. We did discuss the blood testing program with them and have seen the findings. We reviewed the results in the risk assessment, but we did not rely on that information in the risk assessment.

Comment – Schuerch - What about other sources of lead like lead paint?

Response – Shock - This can be an issue, but this is a separate issue from the risk assessment.

Response – Kirk - I recall some testing and they found that some locals (e.g., residents from Kivalina and Noatak) had high lead levels. I think that this type of exposure would be beneficial to evaluate.

Response – Shock - Yes there are different potential exposures like from paint or making lead sinkers, but they are not something we would look at in the risk assessment.

Response - DEC - (After the meeting, to address this question and others like it raised at the meeting, DEC believed that further clarification is warranted on the scope and objectives of a risk assessment performed by DEC Contaminated Sites compared with a Public Health Assessment such as might be performed by Department of Health and Social Services. DEC has authority to regulate environmental media such as air, soil and water and make sure that any contaminants in these media are not reaching people in an amount that would likely pose a risk to human health DEC supervises and monitors risk assessments in order to manage contamination at a particular site and holds parties that are associated with the site responsible for its management or clean up. As such it cannot take into account sources of contamination not associated with a particular site, such as use of lead paint in homes. The Department of Public Health can perform Public Health Assessments and take into account health outcome data, such as blood lead levels. They can include past as well as current information, and integrate other health related considerations, such as the benefit of eating subsistence foods, or other potentially harmful exposure to the same contaminants.

Comment – Schuerch - Who helped collect the information for the risk assessment?

Response – Shock - For caribou, members of the subsistence committee and/or village members in 1996 and 2002 assisted in collecting the caribou. Four were harvested by the mine and six by road down toward the port, and those animals had been over-wintering along the DMTS road. Most of the samples (e.g., soil, sediment, water), however, were collected by Exponent.

Response – Kulas - The berry work in 2001 was performed by DEC and they and some local village residents such as Colleen Swan collected the berries. Also, berry samples have been collected again in 2004 with participation by Jerry Norton and Joe Swan from Kivalina.

Comment – Harris - Did you evaluate ocean currents between different years?

Response – Shock - In the port area, this is a highly dynamic area. We looked at the currents which are seasonal as well. Therefore, between the high impact of currents and the increased effort that has been performed to reduce sources of fugitive dust, the metal concentrations have been decreasing in the sediment. [**Additional Note:** There are ocean current surveys which have been conducted by the government that we looked at.]

Comment – Harris - (this comment was missed)

Response – Shock - We evaluated a long list of contaminants and used a screening process to identify which contaminants to further sample and evaluate in the risk assessment.

Comment – Schuerch - What is your barge schedule?

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Response – Kulas - We average about 26 ships a year. About 4-10 barge loads are needed to fill up a ship. We start the shipping season around July 4-7 and finish in October. One year we went into November.

Comment – Schuerch - Have you done any statistical evaluation on the wind conditions?

Response – Kulas - We have meteorological stations at the port and mine, and continuously log this information. [**Additional Note:** The meteorological information, including wind directions, has been considered throughout the sampling and risk assessment programs.]

***Comment** – Harris - Have you sampled any area above the ocean waterline in the active area? You should test that area because when the bottom sediments are turned up, that is where they will wash up on shore and there may be an exposure avenue to residents traveling back and forth along the beach.

Response – Kulas - The Subsistence Committee brought this up before, but they found that there are rocks and little sediment/fines, and high energy from the ocean waves. Therefore, they concluded that it was not worthwhile to pursue any further. [**Additional**

Comment – Concentrate dust is extremely fine particles that would not be deposited in a rocky high energy area]

Comment – Schuerch - So on a scale of 1 to 10, what is the risk from the sediment?

Response – Shock - (Shock explained the metal concentration levels found in the sediment which all are currently very low and below ecological benchmarks). Lead levels are for the most part are now only 10-12 parts per million above reference concentrations, but are still considered low in concentration.

Response – Kulas - The levels seen now were not seen during the early portions of the mine operation and when the metal concentrations were seen accumulating. But because of the modifications done to reduce the source emissions of the dust, the metal concentrations have decreased, and dispersion has assisted in this decrease in concentrations.

Comment – Shiedt - Couldn't the lead float further out than where you sampled?

Response - Kulas - Yes lead as in the form of our product can float. However, the metal levels in the sediments have decreased because of source reduction and dispersion from the ocean currents and waves. Regardless of what got into the ocean, the metal levels had never been exceptionally high. However, we did get fined by EPA for these releases, which were captured on a videotape several years ago. [**Additional Note:** Sediment metals concentrations decrease rapidly with distance from the shiploader, and are mostly approaching background concentrations toward the edges of our sampling grid.]

***Comment** – Shiedt - How long does it take for the metal concentrate/dust to settle in the ocean?

Response – Kulas - I don't know how long it will take for the particles to sink. However, the metal crystals will eventually sink because they are more dense than water.

Comment – Schuerch - How long is the projected mine life from now?

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Response – Kulas - We have about 26-27 years of life remaining in the mine, but this projection solely depends upon the metal prices. For example, if the price goes up then some of the area that we think is infeasible to mine at this time would now be considered feasible.

Comment – Schuerch - Did you evaluate the lagoon that is right by Kivalina?

Response – Shock - No we did not because it was too far away. We sampled the two lagoons by the port because of the metals and they represented the worst case. However, we did not find any effects for those two lagoons.

Response – Shiedt - There are no fish in those two lagoons by the port because they freeze solid. I remember that was part of the reason for selecting that location to build the port.

Comment – Shiedt - Did you sample in each freshwater creek?

Response – Shock - We sampled three creeks that cross the road, at different distances from the port and mine to get results that would be representative of creeks along the road.

Comment – Kirk - What time of year did you sample?

Response - We did most of our field studies in June, July, and August. For specific types of samples, we focused on when the organism targeted for the study, such as invertebrates, were present.

Comment – Harris - Did you perform sediment sampling in the freshwater creeks?

Response – Shock - Yes we did and this was mostly done in 2003.

Comment – Kirk - Did you look at the migration patterns of the caribou and could any metal change in the land result in a change to the caribou migration pattern?

Response – Shock - We did not look at change in the habits of any organism.

Comment – Kirk - Would you use such studies in your risk evaluation?

Response – Shock - We probably would use this information if it was available. Indirectly we did obtain some information. We did study lichens and found that there are little or no lichens immediately along the edge of the road; therefore, the caribou could not be eating lichens right along the roadway.

Comment – Harris - What is the composition of the dust?

Response – Kulas - Teck Cominco ships five times more zinc than lead so there is a concentration in the soils or in the tundra that is proportional to this ratio.

Comment – Shiedt - What are the metal concentration in the road?

Response – Shock - The concentrations in the road drop off significantly as you move away from the port and mine. We have concentrations listed in the risk assessment document and in earlier documents. For example, lead was found in the 100s of parts per million (ppm) but when you go 100 yards from the road the lead levels decrease to the 10s of ppm.

Comment – Schuerch - What about studies further away?

Response – Shock - We had a transect sampling scheme, with the transects oriented perpendicular to the road, and had several stations per transect with increasing distance. We put the transects on the north side of the road, because concentrations on the north side of the DMTS road have been found to be higher than those levels found on the south side of the road because that is where more deposition has occurred with the prevailing wind patterns.

Response – Kulas - There are other contaminants of concern and we sampled a wide area for a variety of metals.

Response - Shock - [**Additional Note:** Moss studies by NPS and Exponent give us the broadest picture of the patterns of deposition. Moss samples were taken many miles in all directions from the road, port, and mine facilities.]

Comment – Schuerch - What about the geotextile that is under the DMTS road?

Response - Kulas – There is a lot of bedding material under the surface of the road and the geotextile there has a 100 year life. The geotextile and bedding material were placed there to minimize the thawing of the underlying permafrost.

Comment – Schuerch - So there is no effect of eating caribou to humans? What was Noatak and Kivalina responses to this question?

Response – Shock – [**Additional Note:** The caribou and all of the rest of the subsistence food diet were found to be safe.] I believe that there was some general reluctance by both groups to accept that the risk assessment found that there was no such risk. For example, at Kivalina or at our meeting with the Subsistence Committee, someone noted that they observed caribou near the road were getting less fat along their backs. However, at that meeting, Roland Booth noted that perhaps the animals in the area of the road were more stressed because of hunting from both directions (Kivalina and Noatak) by hunters on snow machines.

Comment – Shiedt - Other studies showed similar findings that there is no risk to human health from eating caribou. These were compared with studies of caribou sampled in Nome and Canada near the Alaska border. This was true except for one caribou that was harvested at Red Dog Mine, but that caribou was a sick animal.

Comment – Kirk - So what is the long-term projection of what will occur at the mine to address the contamination?

Response – Shock - There will be some level of long-term monitoring and I will be discussing development of a risk management plan later in the presentation.

Comment – Harris - Has there been any study on the thickness of egg shells of birds in relation to the mine?

Response – Shiedt - There was a study earlier and that was regarding whether there was a relation to DDT.

Response – Shock - DDT and other organic pesticides are not a problem from Red Dog Mine.

Comment – Kirk - Did you study ducks and geese?

Response – Scott - We studied Brant and will show a slide in the presentation of other birds evaluated during the risk assessment.

Comment - What about breathing the dust is there a risk?

Response – Shock - What happens is that you breathe in the dust, then it is brought up in mucus and gets swallowed. We did include that exposure pathway in our assessment, which overall found that risks were not a concern. [**Additional Note:** To control risks in the workplace environment, Teck Cominco has a monitoring program and requires respirators for those exposed to certain work environments where there is a lot of dust.]

Comment – Shiedt - Does the haul truck washing occur in the winter?

Response – Kulas - In the winter, we cannot use truck washing, so instead we focus on keeping the trucks clean and we have successfully done that at the port by basically sucking up the dust in a system that we installed there. We have installed a system at the mine similar to that which we have at the port and are evaluating that system. However, we probably need to do more at the mine.

Comment – Bolen - What has DEC determined in their review of the draft risk assessment document – is the environment and people safe?

Response - Sundet - Explained that DEC is currently evaluating the draft risk assessment as well as the public. Therefore, DEC cannot say at this time where they agree or disagree with the report's findings. Sundet also noted that he had been in contact with the National Park Service and the Trustees for Alaska and that they indicated that those groups would be contracting the report out for review.

Comment – Schuerch - Can you provide this slide presentation to us because the risk assessment report is too large?

Response – Kulas - We were also asked in Noatak for a similar layman document to summarize the risk assessment report. Teck Cominco is contemplating whether to generate such a document but at this time we are reluctant to release the slide presentation because there is so much supporting information that we are providing to you verbally at this time, without which the slides simply could be misrepresented.

Comment – Porter - What about other mines that have similar contaminants? How do they address these problems that Red Dog Mine has?

Response – Kulas - There are some limitations because there are inherent dust problems with any active mine. However, we are constantly evaluating how to reduce the amount of dust. For example, we are evaluating whether to blast only on a non-windy day, use more water trucks to water the road in the summer, reviewing the crushing operation, and looking how to address the tailings and waste rock piles. We are not in violation of our air permit, but we still have caused a release of metals by fugitive dust. Some problems that we particularly have is because we have such a high grade ore. Other mines are able to use water to reduce the amount of dust but we have to limit water use because of freezing weather.

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Comment – Schuerch - What about other mines in the polar region?

Response – Kulas - You are probably referring to the Polaris Mine. They had the same problem as we do at Red Dog Mine with low temperatures and humidity. Also, standards have changed so in some ways we are playing catch-up. [**Additional Note:** Red Dog was constructed in the 1980's and followed the knowledge and standards that existed at that time. Regulations and requirements have become more stringent. Red Dog has addressed that through modifications and continuous improvements to the operation].

Comment – Shiedt - What about blasting, can the dust go towards Kelly?

Response – Kulas - The snow is a good indicator of the way the dust is settling. Mostly, the dust is settling to the north of the road. We ran a dust monitor in Noatak and levels were hundreds of times below the national standard for lead in a residential setting.

Comment – Schuerch - Please elaborate on the proposed port expansion?

Response – Kulas - The risk assessment has no relationship to the port expansion study. An environmental impact study (EIS) will be done for the port expansion study. It is expected that the U.S. Army Corps of Engineers will include information from the entire fugitive dust issue, including the risk assessment report, in the EIS because it has an impact to the environment.

Comment - What about other impacts such as asbestos from truck brake linings?

Response – Shock - The trucks' use their gears to assist slowing down so less wear is placed on the brakes. [**Additional Note:** Research has shown that most of the chrysotile asbestos in brakes is transformed by heat into non-asbestos compounds during the braking process.] It is expected that asbestos release and exposure to asbestos would be insignificant.

The risk assessment meeting ended at about 3:30 p.m.