Comments on the Human Health-risk Sections of the Draft DeLong Mountain Transport System (DMTS) Fugitive Dust Risk Assessment Work Plan, Red Dog Mine, Alaska (Exponent, Feb. 2004)					
Comment #	Page	Section	Technical /Policy	Priority	Comment
HH-1		General Comment	General	High	Several changes to the screening method have been recommended. Since it is not known exactly what impact this will have on the Risk Assessment, the CSMs were not reviewed in detail. Any necessary changes that result from screening changes should be made to the CSMs.
HH-2	2-1 to 2-3	2.1.2	Technical	Moderate	Section 2.2 clarifies some of the DEC's earlier questions regarding past spills. However, Section 2.2 infers that Teck Cominco has reviewed the DEC spill report (from spills records since 1995) and Table 2-2 lists only those spills which occurred on the DMTS. DEC suggests that Section 2.2 be further clarified that the spills identified in the DEC spill report (thus Table 2-2) occurred within the DMTS and the port area that is subject to this risk assessment, i.e., not the mine area. Section 2.1.2 refers the reader to Appendix A regarding sampling in the Tank 2 spill area. Review of Appendix A refers the reader to Table A-1 to determine what compounds were sampled; however, there is no referral to the actual laboratory sample data. Please address this issue and appropriately reference Figure A-5 and Table D-1. During discussions with Exponent on February 24, 2004, Exponent indicated that the area where the spills occurred in the port area is now covered by asphalt. DEC suggests that you may wish to incorporate these activities into Section 2.1.2 and resultant impact to exposure to any remaining contamination. See Comment #12 also below.

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HH-3	2-6	2.2.4	Policy	Low	Trustees for Alaska have previously made the comment that paving the road will not reduce fugitive dust originating from the beds of trucks.
HH-4	2-8	2.3.2	Policy	moderate	Please give explanation why future residential development of land is not expected. Land ownership is an important factor in determining future land use as are existence of zoning restrictions. What is in place to prevent residential development in the future?
HH-5	2-9	2.3.1.3	Technical	Low	Given that a portion of the site is north of 68º and the site seems to be underlain with continuous permafrost it is acceptable to treat the entire area as an artic zone site and not evaluate groundwater.
HH-6	2-11	2.3.3	Technical /policy	High	Exposure to metals in dust can occur through the ingestion and inhalation exposure routes. As mentioned in the work plan, ingestion of soil accounts for ingesting dust through hand-to-mouth activities as well as inhaling particles that are subsequently swallowed. Quantitative assessment of this pathway should be based on particle size. Based on the *Draft Fugitive Dust Background Document* (2002), 80% of the zinc concentrate is smaller than 23 microns and 80% of the lead concentrate is smaller than 20 microns. This pathway has been identified as a community concern (see Fugitive Dust Risk Assessment Work Plan comment #19.) Please clarify what portion of the ore can be reasonably be expected to be smaller than 1 micron. As methyl mercury is volatile, the inhalation pathway should be evaluated if this compound is present at the site. Please clarify which form of mercury is present.

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HH-7	2-13	2.3.3.1	Technical	Low	In the discussion regarding DEC's cleanup levels (top of page) please note the two exceptions for which DEC does have inhalation clean up levels, lead and mercury.
HH-8	2-14	2.3.3.1	Technical	Low	Please assure that dermal exposure is discussed in the uncertainty analysis of the Risk Assessment. Methyl mercury can easily be absorbed through the skin and dermal exposure should be evaluated if this compound is present at the site. Please provide information on the species of mercury present at the site to determine if dermal exposure to mercury should be investigated.
HH-9	2-15	2.3.3.3	Technical	Moderate	The method for developing SQS does not guarantee that they are protective of human consumption of fish.
HH-10	3-1	3.1	Policy/ Technical	Moderate	Of the initial list of compound used for COPC screening, bismuth, calcium, chloride, gallium, germanium, gold, silicon, sulfate, and sulfur are initially screened out because of reasons listed in Section 3.1. The reasons listed are that the compounds are not listed in DEC's tables, there are no relevant human health or ecological toxicity criteria, and data has not been collected for most of these constituents. Screening out compounds for these reasons are not appropriate based on the DEC RAPM and EPA's *Risk Assessment Guidelines for Superfund (RAGS), Part A*. The DEC RAPM indicates that compounds without risk-based benchmarks are retained for a more detailed evaluation in the remainder of the risk assessment process. These compounds should be evaluated qualitatively (briefly address toxic potential), and discussed in the uncertainty section. In 2003 comments on the work plan, information was requested regarding the pH levels in environmental media in order to evaluate whether sulfur might be present as sulfide.

					Please see comment in eco portion (Comment Eco-2)
HH-11	3-1	3.1	Technical /policy	Moderate	Please expand on petroleum contamination and/or spills in regards to the paved area. The Tank #2 spill is the largest petroleum spill listed in Table 2-2. The residual range organics (RRO) concentrations in this area are above the Arctic Zone cleanup levels listed in Table B2. Diesel range organics (DRO) are above one-tenth the Arctic Zone cleanup levels. According to the DEC RAPM Section 4.2.3 these compounds should be retained as COPCs. Additional information on previous controls (i.e. paving) that reduces exposure to these compounds is needed to evaluate if RRO and DRO should be retained as COPCs. (see also Comment #2)
HH-12	3-2	3.2.2	Technical	Low	It would be helpful for the reviewer if a more detailed rationale of why particular studies listed in Table 3-2 were not included as part of the risk assessment. It would be appropriate to include this discussion in the risk assessment. The data usability criteria in Section 3.2.2 appear appropriate. A table of what data would be used in the risk assessment as well as how that data will be incorporated would be helpful for the reader.
HH-13	3-3	3.2.2	Technical	Moderate	Data Quality Review – Please explain why data sets were not validated and if unvalidated data in the data set was used for screening
HH-14	3-4 to 3-7	3.2.3 to 3.2.7	Technical	Moderate	Based on the information provided in Appendix A regarding reference sample locations and the reference sample concentrations listed in Appendix C, the reference locations appear to be chosen appropriately
HH-15	3-5	3.2.4.2	Editorial	Low	It seems the second paragraph in this section should have a separate heading as it is about Site Stream Surface Water

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HH-16	3-8	3.2.8	Technical	High	Background or reference concentrations were not determined in the manner recommended by the ADEC (2003) *Determining Background Concentrations in Soil.* The results of the statistical comparisons between site and reference area data sets are not presented. The reader cannot review the results of the ANOVA and Wilcoxon tests. There is no presentation of cases when the parametric and nonparametric did not agree, and therefore, the reader does not know how the more "reliable" method was selected. It is requested that given the low number of samples for some tests and the high degree of variability that you select 0.1 as the p value to determine significant difference. It should be noted at this point that future comments about dividing the site into operable units might render this method of determining background impracticable. Another method may have to be selected. In addition, some chemicals were eliminated as COPCs if there were no screening criteria available for the specific media, even if the compound was retained as a COPC in another media. For instance, lead was eliminated as a COPC in surface and lagoon water (Table 3-16 and 3-17) because no screening criteria were available for that media. According to DEC's RAPM, if no criteria are available the compound should be retained as a COPC for more detailed evaluation. In the example with lead, lead is assumed to be a site contaminant and therefore should be retained as a COPC. Chemicals that were infrequently detected above the screening level or had no screening criteria should be retained as COPCs. Qualitative assessment of the compounds and discussion in the uncertainty section may be appropriate.

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HH-17	3-8 and 4-2	3.2.8 and 4.2.1	Technical	High	Combining sample data for the road and port to calculate both site concentrations for comparison to reference levels and the exposure point concentrations (EPC) can have the effect of "smoothing" the site data. The highest contaminant levels are found at the port site. Concentrations along the road are considerably lower than concentration at the port site (area highlighted in inset of maps) as depicted in Figures 3-6 through 3-11. The site average (or 95 UCL) will be biased low by combining both the road and port data when exposure is assessed at the port. For human health, it is more appropriate to divide the site into operable units, as recommended by DEC on June 9, 2003, or calculate EPCs based on exposure areas. Addressing the site in this way may also assist with any risk management decisions that may be warranted following assessment. Exposure of one receptor to multiple exposure areas will need to be considered if this method is used.
HH-18	3-8 and 4-2	3.2.8 and 4.2.1	Technical	High	Three potential operable units include the port facility as the area west of the NANA land and NANA easement border (see Figure 1-5), the DMTS near mine area as the area east of the state land and NANA land boundary to the solid waste permit boundary, and the DMTS road as the area in-between. These three areas have distinct exposure and contaminant distributions.
HH-19	3-12	3.3.1.3 (see also section 3.3.2.3, 3.3.3.3)	Technical /policy	High	Eliminating compounds that were infrequently detected and that were infrequently in excess of screening levels are not appropriate screening methodologies for compounds that are associated with site activities (i.e. in the ore or part of the ore processing).

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HH-20	3-16	3.3.3.2	Technical	Moderate	Screening values used for lagoon water, marine surface water and marine sediment may not be appropriate. The plan uses Washington state sediment screening values instead of NOAAs, as well as WA water screening values, and some EPA AWQC values. Please explain why Alaska water quality values were not used. Screening values for fish consumption are unlikely to represent subsistence users in Northwest Alaska.
HH-21	4-1	4.2	Policy	Low	The RAPM requires that the work plan include toxicity criteria. These were requested in the comments on the work plan provided in June 2003.
HH-22	4-2	4.2.1	Editorial	Low	The student's t-statistic UCL equation is incorrectly written. The standard deviation should not be within the parentheses with the t-value
HH-23	4-2 to 4-3	4.2.1	Technical /policy	High	Although this section generally describes how exposure point concentrations will be calculated (the 95%UCL of the mean for most CoPCs, the arithmetic mean for lead), it does not provide any specific information about the site data that will be used in the calculations. Presumably, the exposure point concentrations for each exposure medium will be calculated from the concentrations measured in the medium. As mentioned above, use of one combined data set could substantially underestimate potential exposures of individuals whose activities routinely occurred in more highly contaminated areas near the mine site or the port area. (See Comment #19.)
HH-24	4-3	4.2.2	Technical	Moderate	It is not clear how contamination levels will be determined in subsistence foods, please explain.
HH-25	4-4 to 4-5	4.2.2.1	Technical	Low	The proposed alternative lead absorption values are acceptable as a basis for comparison to default. However please include a short discussion of the uncertainty associated with the use of the referenced lead bioavailability study to estimate absorption values.
HH-26	4-6	4.2.2.2	Editorial	Low	Second paragraph, last sentence. The phrase "95 percent UCL of the maximum detected concentration" should be just "the maximum detected concentration".

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HH-27	4-6	4.2.2.2	Technical	High	Under the intake equation, incorrect input values are listed for AT for children. It should be 6 years (2190 days) For the subsistence scenario, an IR of 100 mg/day for adult (the residential value) would be more appropriate.
HH-28	4-10	4.2.3.1	Technical	High	It is not completely clear how the FI factor is going to be used for the worker scenario and what the different values in the equation represent. However 50mg/day is the ADEC default value for worker ingestion intended to suit the typical working day. Multiplying this rate by 2/3 is inappropriate, unless the work week at Red Dog is unusually different from the standard, as it already takes into account that an individual spends only a fraction of their time at work. The soil ingestion that occurs during subsistence activity is in addition to the 50 mg/day.
HH-29	4-11	4.2.3.1	Technical /editorial	Moderate	Please clarify equation at the top of the page. It appears that the diet portion of the formula does not include a food consumption rate. IR_s is denoted as the food consumption rate, but is used as the soil consumption rate.
HH-30	4-17	4.3.2	Technical	Moderate	It appears the first full paragraph on this page is written to clarify that some toxic effects from cadmium seem to be correlated with specific routes of exposure. However, this paragraph could be misinterpreted as a marginalization of community concern about cadmium exposure from fugitive dust. Since no biomarkers of exposure are being used in this risk assessment, other sources of cadmium exposure are not relevant. Please summarize the main point of this paragraph and eliminate all unnecessary text regarding cigarette smoke.

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HH-31		Tables 3-5 to 3-13	Technical	High	Statistical methods used to compare site concentrations and reference concentrations are of concern, especially when there is a small sample size or high variability. In some of cases the site concentration is determined to be less than or equal to the reference concentration even though there is a high maximum and mean site concentration in comparison to reference. In some cases lead, cadmium, and zinc have been attributed to background because of this in sediment and surface water samples. For instance, the maximum and mean site concentration for lead in pond sediment is 1,810 mg/kg and 484 mg/kg, respectively. The reference maximum and mean concentrations are 20.3 mg/kg and 11.6 mg/kg. Because of the high variability and/or small sample size lead is considered to be attributable to background.
HH-32		Tables 3-16 to 3-18	Technical/ policy	Medium	Please indicate why EPA's AWQC have been used as screening criteria rather than Alaska's water quality criteria (18 AAC 70). In many instances Alaska's water quality criteria are equal to EPA's AWQC. When comparing EPA's AWQC and Alaska's water quality criteria it does not appear that using Alaska's criteria would affect which compounds were retained as COPCs, but this should be reviewed. Please note the consumption of fish near this site exceeds the consumption level used by EPA to calculate the AWQC levels.
HH-33		Table 3-16	Technical	Medium	It does not appear that the screening toxicity values were adjusted to a HQ=0.1 as indicated in the footnote. The values in the Tables 3-17 and 3-18 have been adjusted but not in Table 3-16. Antimony would screen in as a COPC if the adjusted screening level were used.