Health Canada Santé Canada

Safe Environments Directorate
Healthy Environments and Consumer Safety Branch
269 Laurier Ave. W., 4th floor, A/L 4904A
Ottawa, ON K1A 0K9

January 27, 2014

Sent by e-mail to: Info@nirb.ca

Subject: Health Canada's review of the additional information provided regarding the *2011-2012 Annual Monitoring Report for the Meadowbank Gold Project, 2012* (NIRB File No. 03MN107)

Dear Nunavut Impact Review Board,

Health Canada (HC) submits this letter in response to the NIRB's November 27, 2013 letter requesting input on additional information in the report, "Appendix I2: Human Health Preliminary Quantitative Risk Assessment (PQRA) of Consumption of Country Foods", (Appendix I2 was provided with the 2011-2012 Annual Monitoring Report), with respect to the monitoring program as outlined in Condition 67 of the Board's recommendations. The NIRB had previously requested HC's review of the PQRA on December 7, 2012, to which HC had responded on February 4, 2013. The Appendices to the PQRA were not made available to HC until January 28, 2013, therefore they were not reviewed prior to HC's response.

HC reiterates that it has not reviewed the report, "Appendix I1: Wildlife Screening Level Risk Assessment" (WSLRA), as HC does not possess the relevant expertise in the areas of modeling emissions and deposition, environmental transport, fate and/or contaminant uptake by plants or wildlife (country foods). Another department may have the expertise necessary to review the WSLRA.

HC has reviewed the Appendices to the PQRA report, as well as the additional information provided by Agnico Eagle Mines Ltd (AEM) on April 10, 2013, and provides the following comments for the NIRB's consideration.

General

HC reviewed the worked calculation examples provided by AEM and has not identified any concerns.

Methodology and TRVs to assess risk

Tin (Sn)

The toxicological reference value (TRV) chosen by AEM for inorganic tin is more conservative than the value supported by HC. HC agrees with the proponent's two assertions that it is unlikely tributyl tin would be naturally present in the environment and that it is unlikely to represent a concern in the context of the mine. HC has no further questions with respect to the levels of tin modeled in country foods.

Arsenic (As)

The levels of exposure to total arsenic from country foods assessed were negligible in comparison to the levels of total dietary exposure presented in the Canadian Total Diet Study (2007). Therefore, HC has no further questions with respect to levels of arsenic in the country foods assessed in the PQRA.

Cadmium (Cd)

HC agrees with AEM's discussion on the potential health risks posed by cadmium. HC has no further question with respect to the levels of cadmium in the country foods assessed in the PQRA.

As previously mentioned in HC's letter to the NIRB dated February 4, 2013, HC reiterates that the Territorial Governments may want to re-examine existing guidance for the consumption of caribou organs (liver and kidney).

Lead (Pb)

The predicted values for the levels of lead in country foods for both the onsite and external reference site are within an order of magnitude of each other, according to the data provided in the PQRA. HC compared several estimates of total dietary exposure to Pb with the predicted daily exposure estimates to Pb by moderate and high consumers of caribou kidney and liver; and Canada goose muscle, provided in the PQRA (refer to attached Appendix 1). In the case of caribou liver, moderate consumption of this country food, from the project site or external reference site, is predicted to exceed the 90th percentile total dietary exposure estimates in both toddlers and in teens/adults (for the general Canadian population); and, this moderate consumption is also predicted to exceed the mean total dietary exposure to Pb by First Nations populations living on reserve, as found in the 2008/2009 report of the First Nation Food, Nutrition & Environment Study (Chan et al, 2011).

Health Canada recommends that dietary exposure to lead should be As Low as Reasonably Achievable (ALARA principle)[1]. If the predicted Pb residue levels and the estimates of exposure to Pb in the country foods included in the assessment are accurate, some concerns about the consumption of country foods obtained from the project site (and the external reference site) exist. HC notes the uncertainty in some of the lead concentrations in country foods that were used in the exposure model (AEM asserted that the level of Pb in the onsite sedge sample was likely mis-reported as it is much higher than other samples) and the uncertainty associated with the use of conservative, predictive models employed to estimate Pb levels in the country foods assessed. Given these uncertainties, HC suggests sampling caribou kidney, caribou liver and Canada goose muscle at both onsite and external reference locations in order to establish the current Pb levels in these country foods. This would also serve as a benchmark for future assessments of lead in country foods from this site. If the background levels of lead in these country foods are determined to be high in the region, then it may be appropriate to consider risk management options.

<u>Other – Migration of Fish Offsite</u>

HC considers AEM's response to the question regarding migration of fish offsite to be sufficient. HC has no further questions on the topic of including a monitoring program for levels of mercury in fish from the site.

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[1] Health Canada. 2011. Food Directorate Updated Approach for Managing Dietary Exposure to Lead. http://www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/lead_strat_plomb_strat-eng.php

Should you have any questions regarding HC's response, please contact Kelly Senkiw, Environmental Assessment Coordinator, at 613-941-7997 or via email, kelly.senkiw@hc-sc.gc.ca.

Sincerely,

Nicole Coté
Manager, Environmental Assessment Division
Health Canada, National Capital Region
Tel.: 613-952-8267
Fax: 613-946-9673
Email: Nicole.cote@hc-sc.gc.ca

cc: Kelly Senkiw, Environmental Assessment Coordinator, Health Canada
Gregory Kaminski, Senior Environmental Health Assessment Specialist, Health Canada

References

Chan, L, Receveur, O, Sharp, D, Schwartz, H, Ing, I and Tikhonov, C. (2011). First Nation Food, Nutrition & Environment Study (FNFNES): Results from British Columbia (2008/2009). Prince George, BC: University of Northern British Columbia, [accessed: January 9, 2014]: http://www.fnfnes.ca/docs/BC%20Reports/FNFNES_Report_BC_FINAL_PRINT_v2.pdf.

Health Canada. Canadian Total Diet Study. 2007. (and various years). www.hc-sc.gc.ca/fn-an/surveill/total-diet/index-eng.php

Encl.

Appendix 1. Predicted exposure to lead from caribou kidney, caribou liver or Canada goose muscle compared to total dietary exposure to lead.

Appendix 1: Predicted exposure to lead from caribou kidney, caribou liver or Canada goose muscle compared to total dietary exposure to lead. Only those values exceeding one of the total dietary intake assessments are presented. All values are in units of (ug/kg bw/d).

Country Food and Human Consumer	Predicted lead exposure – moderate consumption*	Predicted lead exposure – high consumption*	Internal Health Canada probabilistic lead exposure Assessment – median +	Internal Health Canada probabilistic lead exposure Assessment – 90th percentile+	Final Human Health State of the Science Report on Lead**	FNFNES***
Caribou kidney onsite/ toddler	-	0.192	0.195	0.363	0.1	0.23
Caribou kidney external reference/ toddler	-	0.103				
Caribou kidney onsite/ adult	-	0.108	0.069	0.148		
Caribou kidney external reference/ adult	-	-				
Caribou liver onsite/ toddler	0.685	1.443	0.195	0.363		
Caribou liver external reference/ toddler	0.368	0.775				
Caribou liver onsite/ adult	0.365	0.814	0.069	0.148		
Caribou liver external reference/ adult	0.196	0.437				
Canada goose muscle onsite/ toddler	-	0.256	0.195	0.363		
Canada goose muscle external reference/ toddler	-	-				
Canada goose muscle onsite/ adult	-	0.139	0.069	0.148		
Canada goose muscle external reference/ adult	-	-				

* Appendix C of AEM's PQRA on the Meadowbank Mining project; **Toddler = 1-4 years**

+ values are for all foods. Based on lead occurrence data from the 2000-2002 Total Diet Study(TDS) combined with consumption data from the Canadian Community Health Survey (CCHS) cycle 2.2, 2004.
Toddler = 6 months-4 years, adult =12+

TDS: www.hc-sc.gc.ca/fn-an/surveill/total-diet/index-eng.php
CCHS: Statistics Canada 2004. Canadian Community Health Survey – Cycle 2.2 Nutrition. Detailed information for 2004 at: http://www.statcan.gc.ca/cgibin/imdb/p2SV.pl?Function=getSurvey&SDDS=5049&lang=en&db=imdb&adm=8&dis=2
CCHS general information: http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/index-eng.php

** Health Canada. (2012). Final Human Health State of the Science Report on Lead: http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/dhhssrl-rpecscepsh/index-eng.php#a7 [accessed January 9, 2014].
Value represents the median dietary lead exposure for the Canadian population.

*** Chan, L, Receveur, O, Sharp, D, Schwartz, H, Ing, I and Tikhonov, C. (2011). First Nation Food, Nutrition & Environment Study (FNFNES): Results from British Columbia (2008/2009). Prince George, BC: University of Northern British Columbia, [accessed January 9, 2014]: http://www.fnfnes.ca/docs/BC%20Reports/FNFNES_Report_BC_FINAL_PRINT_v2.pdf.
Value represents average daily intake of lead from food and tap water for BC First Nations people living on reserve.