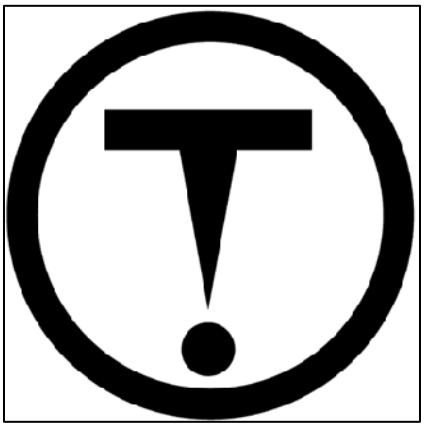
Date: December 13, 2013

To: British Columbia Mine Sites

Re: Hazard Alert — Lead Exposure
Concerns regarding lead exposure on mine sites

Recently, we have found an increase in the number of mine site employees who have incurred adverse health effects due to lead exposure. A concerning trend of potentially inappropriate controls against lead hazards have been identified at a number of sites across the province. Lead is a toxin that cannot be adequately removed from the human body, having the ability to accumulate over repeated exposures, presenting a serious risk for workers who regularly work with and around lead and lead containing materials. The purpose of this hazard alert is to inform on the sources of lead on a mine site, the health concerns, potential control options, and further resources that are available to advise on preventing worker exposure to lead.

Hazard Alert
Lead Exposure



Lead exposure at mines is a concern if ore is lead containing (such as galena) and when lead is added during extraction or in another mining process. Lead is often used in fire assay, a laboratory method to extract gold. Lead exposure on mine sites can also occur from concentrate dust, welding or grinding lead coated materials, battery disposal, and demolition activities. The Occupational Safety and Health Administration lists lead as a leading cause of workplace illness. Inorganic lead compounds are listed as IARC group 2A carcinogens.

Exposure Pathways

Lead can be inhaled or ingested; absorption through the skin is uncommon (with the exception of organic lead compounds which can be more readily absorbed through the skin). Lead particles deposited in the upper respiratory tract are cleared by mucociliary movements into the gastrointestinal tract. Ingestion can also occur due to poor hygiene practices (workers not washing hands before eating, drinking, or smoking). Smaller particles that reach the lower respiratory tract can be completely absorbed. Once lead enters the body it gets into the bloodstream, circulates throughout the body and can become stored in bones, the liver, kidneys, pancreas and lungs. In adults, approximately 94% of the total amount of lead that enters the body is stored in bones. Lead can also be found in the blood stream. The elimination half-life for lead in the blood stream is approximately 30 days, while the elimination half-life for lead in bones is approximately 27 years. With such a long biological half-life, the total body burden increases with time.

Health Concerns

Lead toxicity can adversely affect numerous body systems and cause significant neurologic morbidity, including but not limited to encephalopathy (for which symptoms may range from confusion/disorientation, to seizures, or coma and death). Initial symptoms of lead poisoning are non-specific. Undue fatigue and some abdominal pain (e.g. due to constipation or sometimes diarrhoea) are common first symptoms. Other initial symptoms can include lassitude and/or generalized aches and pains in the muscle and joints.

Exposure Controls

All potential sources of lead exposure shall be controlled to minimize worker's exposures to lead. If there is lead on your mine site you must ensure that appropriate control measures are in place. This includes adequate ventilation such as local exhaust ventilation and/or fume-hoods. These types of equipment should be properly designed to draw exhaust away from the worker and regularly monitored to ensure that there is appropriate air flow at all times while lead exposure is a concern. Lead and lead work areas should be contained and safe work procedures developed to ensure that the potential for worker exposure is kept as low as possible. Safe work procedures should include stipulations for the use, storage and disposal of appropriate clothing and personal protective equipment. Work clothing used in lead work areas should not be used in other work areas and should not be brought home by workers. The employer shall determine an effective method to have lead contaminated work clothes cleaned. Workers must be informed of the hazards related to lead and thoroughly trained on the safe work procedures.

A dry must be made available to lead exposed workers such that they can effectively clean themselves and keep street and work clothes separate from each other. Drys should have a "dirty side" where lead contaminated work clothing is kept and no street clothes should be stored and a "clean side" where street clothes are kept and no dirty work clothes kept. The dirty and clean sides should be separated by showers such that workers can leave their dirty work clothes on the dirty side, cleanse themselves and put on their street clothing. Personal hygiene should be emphasized and workers should also be instructed not to eat, drink or smoke until they have effectively cleansed their face and hands.

Air monitoring can be done to help determine lead exposure however work of short duration may not allow for enough airborne material to be collected for laboratory analysis. Wipe sampling of surfaces can be done to give an indication of lead contamination.

Medical Surveillance

Elevated lead levels that could lead to long term health problems may initially occur in the absence of noticeable symptoms. A medical surveillance program is required in accordance with section 2.12 of the HSR Code. Lead exposed workers shall be advised of the nature of the health risks and that a medical surveillance program is available. Participation in the program shall be voluntarily and free for employees. A person participating in the medical surveillance program may attend the doctor of his/her choice to undergo any examinations and tests required by Code section 2.12.1(2). A blood sample is often taken to determine the blood lead level. Note, blood lead levels are not synonymous with lead poisoning (e.g. see above about elimination half-lives) and a physician should be consulted to interpret the results of a blood test.

Further Information

For more information on lead, how you can be exposed, its health effects and how you can prevent exposures you can refer to a number of other sources some of which are listed below. If you have further questions about how to comply with the HSR Code requirements regarding lead please contact the Occupational Health Group of the Ministry of Energy and Mines and Responsible for Core Review.

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Additional resources

1. http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/lead-plomb-eng.php
2. http://www.hc-sc.gc.ca/ewh-semt/contaminants/lead-plomb/index-eng.php
3. http://www.hse.gov.uk/lead/
4. http://humanservices.alberta.ca/documents/WHS-PUB_ch061.pdf
5. http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/lead.pdf
6. http://www.ccohs.ca/oshanswers/chemicals/chem_profiles/lead/
7. http://www.lrws.gov.sk.ca/occupational-lead-exposure-information-physicians
8. http://www.wcb.yk.ca/Media/documents/lead.pdf
9. http://www.worksafebc.com/publications/health_and_safety/by_topic/assets/pdf/LeadContainingPaintCoatings.pdf