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Voluntary Agreement for Mercury Reduction Efforts
Northshore Mining Company

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Approved

Introduction

Northshore Mining Company has an active mercury reduction program that began under its previous ownership, Cyprus Northshore Mining, and that has improved since then. Northshore Mining supports the goals of the Minnesota Mercury Reduction Initiative and hereby submits its voluntary mercury reduction agreement, which is a formalization of completed work as well as works in progress.

Elements of Northshore Mining's Voluntary Reduction Agreement

Research

Northshore funded an extensive mercury mass balance study which analyzed all raw materials, plant water flows, plant water discharges, coal ash and stack discharges for trace levels of mercury. As a result of this mass balance, it was determined that the maximum potential mercury emissions to the air due to production of taconite pellets and power generation (combined) is 9.5 lbs/year, or 10.6 lbs/year at maximum production under a proposed Direct Reduced Iron project. Further information about specific releases and collection efficiencies is available in the full report. Most of the potential mercury emissions from this plant are contained in the Milepost 7 Tailings Basin. Water discharges from the basin have mercury levels lower than those of the receiving stream, and information to date indicates that the mercury levels are below the stringent levels required under the Great Lakes Initiative.

Community Education and Outreach

Northshore is working with Lake County to publicize current collection programs available as well as to make them more effective. At present this approach involves two strategies: increasing publicity regarding devices and products which might contain mercury and their proper handling as wastes; and making it easy for local citizens to dispose of those materials correctly. An estimated 400 fluorescent lamps are collected for recycling every year in Silver Bay and the surrounding communities. Although there is no information available concerning the exact number of bulbs which fail every year, the number seems low and a casual inspection of unauthorized dumping areas shows that at least some bulbs are not being recycled. Northshore proposes to accept, for free, fluorescent lamps from citizens and send them out for recycling. In order to help local businesses, Northshore proposes to assist their recycling efforts by providing a collection and storage area for waste lamps. Each business will pay the cost of recycling but not of storage or shipping.

Northshore also proposes to work with Lake County in a publicity campaign to promote awareness of mercury around the home and in appliances which might be scrapped. The publicity campaign and collection efforts will target not only mercury-containing devices such as thermometers and tilt switches, but also chemicals such as old medicines and fungicides. If assistance is needed farther north, the efforts can be extended into Cook County.

Accounting for the actual reduction in mercury releases to the environment for the above two steps will be difficult because there is no real information on current releases due to improper disposal. However, records will be kept of the materials collected and shipped for recycling, and the approximate amount of mercury collected as a result. It should be noted that community collection and education efforts are expected to evolve and improve with time and experience, but may be dropped if they prove ineffective.

Process Changes

Northshore Mining changed its laboratory method of assaying ore and pellets for iron in 1994 from a method which used mercuric oxide and which generated 15 – 20 pounds of mercury compound wastes per year, to one which does not use mercury. This has eliminated the cycling of 15 – 20 pounds of mercury compounds per year through the warehouse and laboratory, and eliminated a possible contamination source.

Instrumentation Changes

Since 1990 Northshore has collected and shipped out for recycling over 900 pounds of elemental mercury used to run instruments such as manometers. Some of that mercury was in use in instruments which have been replaced. Some of that mercury was stocked to replace mercury lost to spillage or equipment breakage. By removing 900 pounds of mercury from service and committing to using alternate instrumentation wherever possible, Northshore has eliminated the possibility of releasing that mercury to the environment.

Northshore personnel are now alert to the possibility of mercury devices in active equipment, and Northshore has a policy of removing mercury switches, relays and other closed devices and sending them for recycling as the equipment can be replaced. Roughly 5 pounds of such devices are removed from service and recycled every year. Assuming that one-half the mass of the devices is due to mercury, that translates to 2.5 pounds mercury removed safely from the plant every year. The practice of searching for mercury devices in equipment before scrapping it began in 1992. Consequently a small but unquantifiable amount of mercury was released to the environment before then. An example of such savings and releases comes from the belt scales of Northshore's Concentrator. The Concentrator has 22 sections, of which roughly half are active. In February 2000 an Instrument Shop technician realized that the old conveyor belt scales, which are no longer used, contained mercury switches. The technician collected 81 mercury switches from the belt scales still on the property. Each switch ampoule weighs 11.6 grams. Although it contains glass, wiring and a plug, a significant amount of mass of the assembly is the mercury contained within. A conservative assumption would be that half the mass of the ampoule is due to mercury. Therefore, the collection project removed at least 470 grams (1 pound) of mercury and prevented its release to the atmosphere. Unfortunately, half the scales had been shipped out for scrap in the early 1990's, before plant personnel had begun collecting mercury switches. Roughly a pound of elemental mercury must have been released to the air when those scales were scrapped.

Northshore Mining began collecting fluorescent lamps in 1992 for recycling; prior to that time lamps were routinely thrown in the trash as they were throughout the state. Based on records of lamp shipments to recycling facilities, an estimated 0.3 lbs/year of mercury was released to the environment each year prior to the beginning of recycling efforts. That amount of mercury is now prevented each year from being released to the environment, due to recycling efforts.

Relamping and Energy Savings

Northshore Mining is currently replacing 230 mercury vapor lamps at its mine in Babbitt with high-pressure sodium lamps and the appropriate fixtures. Depending on wattage, the lamps contain $\frac{1}{7}$ to $\frac{1}{4}$ the amount of mercury of the mercury vapor lamps they are replacing, and represent 28.7 grams (0.06 pounds) less mercury cycling through the plant. In addition, they are more efficient. Minnesota Power, which provides power to the Babbitt operations, estimates energy savings from this relamping operation of 907,000 kWh/year, with a mercury reduction due to power generation of 0.05 lb/year.

Accounting Methods

The mercury collection methods that are viable for Northshore Mining will not lend themselves easily to the percentage reduction method of accounting desired for the statewide mercury emissions inventory, because in most cases the previous emissions will be impossible to estimate accurately. However, Northshore Mining is a small mercury source, with emissions well under the 50 lbs/year limit established for the first round of voluntary reduction agreements to be solicited. It would take Northshore over 90 years of running at maximum production to emit the amount of mercury from its stacks that it has already removed from circulation and eventual release at the plant. Northshore has also already contributed significantly to the body of knowledge regarding mercury release and fate from its facility. Northshore agrees to report, on an annual basis, the amount of mercury collected and recycled in the form of lamps and devices collected both at the plant and from the surrounding communities.

Sincerely,

Robert C. Berglund
General Manager