

Discussion Paper on Pollutant Release Reporting Requirements As It Relates to Mining Facilities

The purpose of this paper is to provide background information on the current reporting requirements, as it relates to mining facilities, in Canada, the United States and Australia. This document is prepared to help initiate discussions surrounding mining activities that are currently exempted under the National Pollutant Release Inventory (NPRI), and activities that may warrant further considerations and possible inclusion under the NPRI reporting.

1. Mining Activities in Canada:

1.1 *NPRI*

The National Pollutant Release Inventory (NPRI) is a legislated, nation-wide, publicly-accessible inventory of pollutants released to the environment and transferred for disposal. It provides Canadians with access to information about pollutants that are released and transferred by facilities located in their communities. The NPRI also encourages industry to take voluntary measures to reduce releases, and allows for the tracking of progress. In addition, it supports a number of regulatory initiatives across Canada, and assists governments and other stakeholders in identifying priorities for action. Since its inception in 1992, the role of NPRI has expanded to include the collection of information on NPRI substances being recycled and pollution prevention activities.

The NPRI program is delivered by Environment Canada (EC) under the authority of the *Canadian Environmental Protection Act* (CEPA). The renewed CEPA, 1999 (CEPA 1999) came into force in April 2000, and, as a consequence, was the authority for the 2001 NPRI reporting year and beyond. Pursuant to subsection 46(1) of the CEPA 1999, the owners or operators of facilities that manufacture, process or otherwise use one or more of the NPRI-listed substances (under prescribed conditions) are required to submit an annual report to EC on the releases and transfers of those substances that are published in Canada Gazette, Part I. For 2002 reporting year, there were 273 substances listed in the NPRI, 61 of which had been declared toxic under the Act.

Currently, mining industries report to the NPRI under the Canadian SIC code 06. Sub-codes exist for the gold, copper and zinc, nickel-copper, silver-lead-zinc, molybdenum, uranium, iron ore, asbestos, potash, salt, and bituminous coal sectors.

In 2001 70 facilities reported to the NPRI under SIC 06. However, with a few exceptions, the largest pollutant releases of significance reported were releases to surface water, and in a few cases, air, of ammonia and nitrates. These are most likely residues of explosives used in the mining process. In some cases releases of metals and hydrogen cyanide to water are reported. Releases of hydrogen cyanide to air are reported in a few cases as well. Some refining operations report as mines, and report large releases of metals to the air.

Exemption:

With regard to mining facilities, the Guide for Reporting to the National Pollutant Release Inventory 2001 provide provisions to exempt mining facilities from reporting releases and transfers of substances to the NPRI. Specifically, a facility is exempt from reporting a substance to the NPRI if the only source or use of that NPRI substance was related to mining, but not those facilities that further process or otherwise use mined materials.

In summary, the exemption for mining is for activities related to the actual removal of ore, rock or overburden, up to and including primary crushing. However, releases and transfers of NPRI substances used in the further processing of rock ore, such as milling, concentrating, smelting and refining are reportable. NPRI also states that listed substances in tailings are not reportable unless they leave the tailings impoundment or other forms of on-site containment. The exemption from NPRI reporting does not apply to releases to air of Criteria Air Contaminants (CACs) resulting from the combustion of fuel in stationary combustion equipment.

Threshold Exemption:

In previous years, a facility was exempt from reporting to the NPRI if its employees worked less than 20 000 hours during the reporting year (equivalent to 10 full-time employees). Environment Canada has removed the 20 000-hour employee threshold for specific facilities such as certain types of incineration and for wood preservation Schedule 2, Part 5, of the 2000 Canada Gazette Notice . This change was necessary to capture facilities associated activities that are required to report to the NPRI since they did not meet the 20 000-hour employee threshold.

Starting in the 2000 reporting year, the reporting threshold for mercury (and its compounds) was reduced from 10 tonnes to 5 kg and the 1% concentration threshold was removed .

Seventeen polycyclic aromatic hydrocarbons (PAHs) were added to the NPRI for 2000 at an alternate threshold Schedule. The alternate threshold for the newly added PAHs is based on quantities released or transferred from incidental manufacture rather than quantities manufactured, processed or otherwise used (50 kg), except in the case of wood preservation using creosote.

For 2000, Environment Canada added dioxins, furans and HCB to the NPRI, at non-quantitative, activity-based thresholds. Dioxins and furans are reported together, and include the 17 most toxic dioxin and furan congeners. Hexachlorobenzene (HCB) shares the same reporting requirements as dioxins and furans, but must be reported individually.

1.1.1 Other reporting instruments that capture releases and transfers from mining activities

The *Metal Mining Effluent Regulations* (MMER) were registered on June 6, 2002 under subsections 34(2), 36(5) and 38(9) of the *Fisheries Act*. The MMER apply to all Canadian metal mines (except placer mines) with an effluent flow rate in excess of 50 cubic meters per day that were in commercial operation, under development or reopened after the day the Regulations were registered. The MMER require metal mines to report on the presence of a number of substances in mine effluent. These

reporting requirements apply to arsenic, copper, cyanide, lead, nickel, zinc, total suspended solids and radium 226, as well as pH and acute lethality. Comprehensive reporting is also required to address the environmental effects monitoring provisions of the regulations.

It is important to note that the MMER require reports of releases of only a limited number of NPRI substances to water. Environment Canada will continue to produce annual reports summarizing the performance of Canadian metal mines with respect to compliance with the regulated deleterious substances. In addition, Environment Canada is developing a web-based electronic reporting system that should facilitate compliance reporting and timely access to data by the general public.

1.1.2 Releases and transfers not captured under the current NPRI reporting requirements

Because of the exemption on extraction phase mining, the types of pollutant releases and transfers currently not captured by the NPRI may include the following:

1.1.2.1 Releases:

Air emissions

PM₁₀, TSP and Metals

Wind-borne dust, products of combustion from mine transportation, power generation and blasting activities, associated with extraction phase, may contribute to significant air emissions of PM₁₀, TSP and metals. In particular, fugitive dust may contribute to emissions of fine particulate matter (PM₁₀).

Primary crushing activities may also contribute to wind-borne dust (particulate matter, metals) and emissions of Criteria Air Contaminants (CACs). Also, there may be some potential air emissions associated with mine tailings, waste rock and ore storage piles.

VOCs

Potential sources of VOC emissions may include: vehicle exhausts, workshops, cleaning and site maintenance activities.

Water releases

Releases of NPRI substances may include the following sources:

- NPRI substances (e.g., metals) in runoff from disposed overburden, waste rock and ore storage piles.
- NPRI substances in waste rock used to construct dykes and roads on mine sites.
- NPRI substances in mine-waters (may contain traces of explosives, drilling fluids, lubricants, metals, other chemicals used in mine).
- NPRI substances in cooling waters for extraction equipment (may contain lubricants).
- NPRI substances in waste water (metals, process chemicals) from crushing and grinding operations.

- Water releases in runoff from exposed areas and administrative/workshop areas.

It should, however, be noted that certain facilities may employ wastewater treatment facility at their mine site. As a consequence, releases of NPRI substances may be significant.

Land disposal/transfers

Transfers/land disposal of substances in tailings (metals and process chemicals).

Transfers

- Transfers or disposal of air pollution/dust control system wastes from primary crushing operations (metals and any process chemicals used).
- Transfers or disposal of water pollution control system wastes from extraction and crushing operations.
- NPRI substances in wastes transfers/disposal from extraction associated operations and equipment and administrative/laboratory/workshop areas.

1.2 Ontario

The Airborne Contaminant Discharge Monitoring and Reporting Regulation (O. Reg 127/01) came into force in May 2001. Facilities in Ontario that meet the reporting requirements, for air releases, will be required to report emissions of any of 358 contaminants, from a wide range of industrial sectors, including metal, non-metal and coal mining facilities. The Regulation (O. Reg 127/01) require reporting of air emissions from all types of mining activities, including releases from tailing areas and road dust. Air emissions reporting is required annually (calendar year) and for the smog season (May 1 to September 30). Airborne contaminants with MOE release based thresholds have been established for a number of contaminants, including particulate matter (coarse and fine fraction). As well, sector specific reporting requirements have also been established under the Ontario regulation (O. Reg 127/01).

The Ontario Ministry of the Environment (MOE) and EC are currently developing a one window approach to reporting. A three year pilot study project, to work towards further integration of the MOE and EC's emissions program, reporting and substance list, have already been initiated.

2. Mining activities in other jurisdictions

2.1 *United States*

In the United States, the Toxics Release Inventory (TRI) is a publicly available Environmental Protection Agency (EPA) database that contains information on toxic chemical releases and other waste management activities reported annually by a certain covered industry groups as well as federal facilities. The TRI was established under the *Emergency Preparedness and Community Right to Know Act (EPCRA)* of 1986 and expanded by the *Pollution Prevention Act* of 1990.

The TRI program has expanded significantly since its inception in 1987. Initially, the mining sector was not included in the original form of the United States Environmental Protection Agency's (USEPA) TRI because the database was primarily focussed on manufacturing sectors. However, on May 1, 1997, the USEPA promulgated a final rule (62 FR 23834) in which several new industrial sectors were added. Metal and coal mining facilities are among the affected sectors under this rule, and were subject to reporting requirements under the TRI program.

2.1.1 Metal mining

Facilities with Standard Industrial Classification (SIC) codes, as presented in the following table, are covered by the EPCRA section 313 reporting requirements. In particular, the metal mining facilities, under the SIC major group 10, that are subject to TRI reporting include the following:

SIC Code	Mining Type
1021	Copper Ores
1031	Lead and Zinc Ores
1041	Gold Ores
1044	Silver Ores
1061	Ferroalloy Ores, Except Vanadium
1099	Miscellaneous Metal Ores, Not Elsewhere Classified: Aluminum, Antimony, Bastnasite, Bauxite, Beryllium, Cerium, Cinnabar, Ilmenite, Iridium, Mercury, Microlite, Monazite, Osmium, Palladium, Platinum, Rare-Earths, Rhodium, Ruthenium, Rutile, Thorium, Tin, Titanium and Zirconium ore mining.

Exemptions:

Three types of metal mines are excluded from the EPCRA section 313 reporting requirements. These include: iron ore (SIC code 1011); uranium-radium-vanadium ores (SIC Code 1094); and metal mining services (1081). It should be noted that the work of metal mining services firms contracted by a mine are considered as employee, for the purposes of determining employee and activity thresholds for the mine, and include releases and transfers of TRI substances associated with the activities of the contracted firm.

Threshold Exemptions

The contents of overburden and waste rock are not considered for the purposes of reporting threshold calculations. However, if the threshold is otherwise exceeded by the facility then releases or transfers of TRI substances in waste rock must be reported regardless of concentration. Similarly chemicals used for remediation purposes are not considered for facility reporting threshold calculation purposes, but must be reported if the reporting thresholds are otherwise exceeded by the facility. Releases and transfers of substances contained in overburden are not required to be reported, although releases of chemicals used to remove overburden (e.g. explosives) are required to be reported.

2.1.2 Coal mining

Exemptions:

Coal extraction activities are provided with an exemption from reporting under TRI. This includes all activities prior to beneficiation. This exemption, however, does not include crushing, screening, reclamation, and chemicals used to maintain transport equipment. The rationale for this exemption provided by USEPA is that coal mining does not typically involve the presence or use of TRI substances. Coal pile run-off and accidental releases from coal extraction activities are reportable.

2.1.3 Summary of Mining sector releases and transfer under the TRI

The addition of the coal and particularly metal mining sector had a major impact on pollutant releases and transfers reported under the TRI. In the 2000 reporting year, the metal mining sector accounted for 47.3% of total releases of TRI substances reported by industry. Coal mining accounted for 0.2% of total releases. All of the ten leading sources of total pollutant releases in the United States reporting in 2000 were metal mines.

The overwhelming bulk of the releases reported from the metal mining industry are on-site land releases (3.315 billion pounds of releases of a total of 3.358 billion pounds of total on and off-site releases), specifically to surface impoundments and other land disposal. The bulk of the reported substances are metals. This reporting pattern reflects the disposal of waste rock and tailings containing reportable metals. It should also be noted that on April 10, 2003, the US supreme court ruled that waste rock cannot be considered "toxic" for the purposes of the TRI. This ruling may significantly impact TRI reporting.

3. Australia

Australia's National Pollutant Inventory (NPI) is a database designed to provide the community, industry and government with information on the types and amounts of certain substances emitted to the air, water and land. The NPI was established in February 1998, with the first reporting year being 1998-99. Like the TRI, reporting requirements are established on a sectoral basis. A "handbook", Emission Estimation Technique Manual (EET) published by Environment Australia, is required for each sector to which reporting applies. With respect to mining, handbooks have been published for Coal and Metal Mining (March 1999) and Mineral Sands Mining (April 2001).

The NPI reporting list for the first three reporting years (1998/1999, 1999/2000 and 2000/2001) were initially required to report their emissions to air, water and land of 36 substances, however, the NPI reporting list was expanded to 90 substances in the 2001/02 reporting year.

Reporting Thresholds:

The reporting thresholds for each of the substances on the NPI reporting list is subject to at least one threshold. If a facility is triggered by a threshold for a substance on the reporting list, the facility would be required to report emissions of that substance from that particular facility. There are five categories of thresholds. Typically if a facility uses

10 tonnes or more of a NPI substance per year, then the facility would be subject to reporting of emissions of that substance. In some cases reporting is also triggered by the amounts of energy used by a facility. Transfers of substances to on or off-site landfills and tailings sites or off-site to sewers or for treatment, destruction, or recycling are not required to be reported under the NPI.

3.1 Coal and Metal Mining

The mining activities covered by the EET manual, under the NPI, cover both surface and underground coal and metal mining, including extraction phase activities. Mining facilities are encouraged to develop a process flow diagram to identify the main activities or processes generate, or could generate, NPI listed substances, and the wastes and emissions resulting from the operation of each activity or process. The Transfers of substances off-site for treatment or disposal are not required to be reported under the NPI.

Exemption:

Discharges to sewers or tailings dams, deposits of substances to landfills and the removal of substances from a facility for destruction, treatment, recycling reprocessing, recovery or purification are considered transfers and therefore exempt from being reported under NPI.

Land discharges

Transfers of NPI substances in waste rock or to tailings dams, spoil dumps, and surface impoundments of liquids and slurries are not reportable. However, releases NPI substances from these areas, including leaks, seepages and spills are reportable.

3.1.1 Mineral sands

This sector includes mining of titanium-bearing minerals such as rutile, leucoxene, ilmenite, xenotime and monazite, and the industrial minerals zircon, kyanite and garnet. Key elements of the reporting guidance provided to this sector by Environment Australia include the following:

Air Emissions

- Mining, stockpiling, transportation and handling of ore and waste materials are seen as the major sources of air releases from the sector. Dust generation and emissions from fuel combustion (vehicles and stationary engines) are the key pollutants to be considered.
- The key sources of dust to be considered for reporting purposes include drilling, blasting, wheeled vehicle movement, grading, scrapers, dozers, or and waste handling (trucks, loaders and excavators), and wind erosion of disturbed areas (stockpiles, pits, TSFs, product and waste/byproduct stockpiles).
- PM10 and NPI substances in TSP (dust) are reportable if the substances' reporting thresholds are exceeded.

Water Discharges

- Releases of NPI substances contained in surface run-off and erosion from processing and mining areas are reportable.
- All constituent NPI substances released in process discharge waters and liquid waste streams, and spills are considered to be emissions and to be reportable except where waters not altered from their natural state (e.g. no additives, run-off from stockpiles etc).

Land Emissions

NPI substances contained in materials moved to surface impoundments of liquids, solids, etc and tailings storage facilities considered transfers and not reportable. However, emissions/releases from these facilities are reportable.

4. Summary and analysis

Releases and transfers of NPRI-listed substances from extractive mining activities are currently exempt from reporting under the NPRI.

The exemption of extractive mining activities from the NPRI represents a potential gap in the NPRI reporting framework. The major pollutant releases and transfers not captured by the NPRI, as a result of the mining exemption, include:

- The release of substances to the air in dust from extraction and crushing operations, exposed areas, overburden, waste rock and tailings storage areas; and
- The release of substances in water discharged from extraction operations (cooling and process waters and mine-waters), and in runoff and AMD from overburden, waste rock, tailings and ore storage areas, and exposed areas.

Ontario's Air Emission Monitoring and Reporting Regulation, which came into force in May 2001, includes requirements for reporting of air emissions from all types of mining, including releases from tailings areas, and road dust.

- The **United States** added the coal and metal mining sectors to the TRI in 1998. Reporting requirements for the metal mining sector includes the land disposal of substances in waste rock and tailings, as well as air or water releases from waste rock and tailings storage/disposal facilities. Reporting requirements for metal mines are, however, not the same as they are for coal mines. For example, in the US TRI, coal mines are not required to report releases from activities prior to beneficiation (with some exceptions). The April 10, 2003, ruling of the US supreme court that waste rock cannot be considered "toxic" may significantly impact TRI reporting for waste rock.
- **Australia** currently includes air and water releases from coal, metal and mineral sands mining, including from waste rock, tailings and ore storage areas in its

National Pollutant Inventory. Substances disposed of to land in tailings, waste rock and overburden are not reported as a result of the non-reporting of transfers of substances in waste under the NPI system. It should be noted that NPI only requires reporting of releases from waste rock and tailings facilities.

Based on the review of the current reporting requirements in Canada, the US and Australia, it is clear that there are significant difference between the approaches adopted by these jurisdictions, and hence the reporting requirements. In particular, the coal mining facilities are not subject to TRI reporting requirement prior to beneficiation. Furthermore, recent court ruling on waste rock, as not being toxic, may significantly alter the reporting requirements for waste rock under the TRI reporting.

The Australian NPI only requires reporting releases from waste rock and tailings facilities. The US TRI requires metal mines to report TRI chemicals in the waste rock and tailings.

5. Mining activities that warrant further consideration and inclusion under the NPRI

The key issues related to the removal the mining exception from the NPRI include the following:

- The scope of sectoral coverage, i.e., should all mining sub-sectors be included, as in Ontario, or should only specific sub-sectors (e.g. metals, coal, diamonds, oil sands) be included.
- Whether or not to include substances in overburden, waste rock and tailings.
- The scope of inclusion of air (e.g., constituents of dust from operations, exposed areas, overburden, waste rock and tailings storage areas, equipment and vehicle emissions) and water discharges (e.g. contaminants in mine-water, cooling and process waters, runoff and AMD from exposed areas and overburden, waste rock, and tailings areas) in reporting of extractive mining operations.
- Addressing the issue of the potential double counting of waste rock/overburden/tailings disposal to land and releases from waste rock/overburden/tailings disposal areas in dust, runoff, AMD, and spills.
- Sector-specific issues related to specialized sub-sectors such as diamonds, oil sands and placer mining in the Yukon.

5.1 Environment Canada's Proposed Approach

As a path forward, EC would like to propose that discussions surrounding mining activities be focused on the actual releases and its significance. Furthermore, It would be worthwhile to assess and examine the current reporting requirements in the US, Australia and the significance of the recent US court ruling on waste rock. EC, therefore, feels that it would be an excellent opportunity, for the stakeholders, to derive and/or extract best from TRI and NPI reporting requirements to develop Canadian position on mining activities that would require reporting under the NPRI.

5.2 Next Step

The multi-stakeholder Mining Sub-group (MSG) will be re-activated to initiate discussions respecting mining activities that warrant further consideration and inclusion under NPRI. EC is proposing that the MSG meet (via conference call) prior to the WG meeting in June so that a meaningful and constructive discussions could be carried out during the face-to-face meeting. Further discussions will then take place among the MSG to formulate Canadian position.