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## **Fact Sheet: Mercury Amalgamation and Gold Recovery**

### **Mercury Emissions and Risks**

Mercury is a naturally occurring metal that has several forms. Metallic mercury is a shiny, silver-white, odorless liquid. Metallic mercury (inorganic mercury and its compounds) enters the air from mining and manufacturing activities and from burning coal and waste. When heated in its elemental form or in amalgams (mixtures with other metals such as gold), mercury releases an unseen vapor. Mercury in any form, liquid or vapor, is extremely toxic to humans, especially children and pregnant women. Mercury vapor can affect many different areas of the brain, the nervous system, and their associated functions.

Mercury used for gold recovery poses three prominent risks. The first risk stems from mercury that is carried into homes and schools, or other occupied areas, on clothes and shoes. These releases pose a special risk because the people in those areas do not know that the mercury is present and cannot take precautions to protect themselves from harm. The second risk is to fish and wildlife due to the uncontrolled release of mercury and its vapor when mercury accumulates in water and other environmental media. The final risk is posed to workers handling mercury or mercury amalgam in uncontrolled settings.

Elemental mercury releases vapors that can result in human exposure during the amalgamation process with gold. Additional mercury vapors are emitted during the gold recovery process. Heating mercury/gold amalgams under uncontrolled conditions results in mercury vapor exposure to either the workers handling it or to the environment and unintended receptors when (1) mercury vapors deposited on clothes create additional exposure to the miner and result in potential exposure to others, such as children at home; or (2) mercury vapor is transported in the air and condenses on the ground or in surface water, where it can be transformed into methylmercury. Methylmercury can build up in the environment and accumulate in certain freshwater fish and marine mammals.

Mercury retorts or similar devices can recover mercury and reduce or eliminate vapor inhalation by miners and others. However, even when these devices are used, there can be significant human exposures and releases to the environment. Extreme caution is needed when using mercury.

This fact sheet focuses on the guidelines regulating mercury emissions and how to handle mercury and mercury amalgams to prevent the uncontrolled release of mercury. The Agency for Toxic Substances and Disease Registry (ATSDR) ToxFAQs website provides information on frequently asked questions about mercury: <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=113&tid=24>.

## Statutes and Rules

Reducing mercury exposure is a priority for the Idaho Department of Environmental Quality (DEQ). Mercury vapor emissions and mercury discharges or releases into the environment during amalgamation or recovery processes may be regulated by DEQ under the following statutes and rules:

- Idaho Environmental Protection and Health Act (Idaho Code 39-102 and 102A)
- Idaho Hazardous Waste Management Act (Idaho Code 39-4408)
- Rules for the Control of Air Pollution in Idaho (IDAPA 58.01.01)
- Idaho Water Quality Standards (IDAPA 58.01.02; see 10.85, 800, and 850)
- Rules and Standards for Hazardous Waste (IDAPA 58.01.05)
- Ground Water Quality Rule (IDAPA 58.01.11.400)

Other state and/or federal rules and regulations may apply. A joint review process may be requested through the Idaho Department of Lands (IDL) to consolidate permitting and regulatory agency interaction for mine operations. The joint review process may be requested for large- or small-scale projects. The joint review process document is available on the IDL website at [http://www.idl.idaho.gov/bureau/Minerals/surface\\_mine/feb1996jrp\\_bkmrk.pdf](http://www.idl.idaho.gov/bureau/Minerals/surface_mine/feb1996jrp_bkmrk.pdf). Contact IDL at (208) 334-0200 or DEQ at (208) 373-0502 for more information.

## Air Emissions

The “Toxic Substances” rule (IDAPA 58.01.01.161) provides that “any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.” Compliance with IDAPA 58.01.01.161 may be demonstrated by complying with “Demonstration of Preconstruction Compliance with Toxic Standards” (IDAPA 58.01.01.210).

“Category I Exemption” (IDAPA 58.01.01.221) requires that any stationary source emitting in excess of 25 pounds of mercury per year must obtain a permit to construct. While fugitive mercury emissions are not counted, mercury emissions from activities associated with gold recovery using heat to separate mercury amalgams would probably not be considered a fugitive emission.

A mercury retort or other apparatus that controls mercury emissions is recommended to contain and control air releases during recovery from mercury amalgams. A DEQ air quality permit may be needed. Contact DEQ’s Air Permit Program at 1-877-5PERMIT.

## Environmental Releases and Spills

The “Water Quality Standards” (IDAPA 58.01.02.10.85) define a release as “any unauthorized spilling, leaking, emitting, discharging, escaping, leaching, or disposing into soil, groundwater, or surface water.”

IDAPA 58.01.02.850 states “in the case of an unauthorized release of hazardous materials to state waters or to land such that there is a likelihood that it will enter state waters, the responsible persons in charge must: (1) Stop Continuing Spills—make every reasonable effort to abate and

stop a continuing spill; (2) Contain Material—make every reasonable effort to contain spilled material in such a manner that it will not reach surface or ground waters of the state; (3) Department Notification Required—immediately notify the Department or designated agent of the spills; (4) Collect, Remove, and Dispose—collect, remove, and dispose of the spilled material in a manner approved by the Department.”

Hazardous waste generators have release reporting requirements, depending on the generator status and quantity of material released. A hazardous waste release to soil or water may also constitute illegal disposal.

Except as allowed under an air permit, releases to the environment, including to the air, public land, private property, surface water, and/or ground water, are a potential violation. Releases may result in costly cleanup. To report a spill or accident involving mercury, contact the Idaho State Communication Center at **(800) 632-8000 or (208) 846-7610**.

The Idaho State Communication Center will activate Idaho's Emergency Response Network, which consists of state and local agencies (including designated DEQ field personnel), and, if necessary, federal agencies. Surface water releases may involve the United States Environmental Protection Agency (EPA).

A mercury release greater than the amount contained in a thermometer must be reported immediately to the Idaho State Communication Center.

## **Waste Generation and Disposal**

Every business in Idaho is required to track the volume of hazardous wastes generated, determine whether or not each type of waste is hazardous, and ensure that all wastes are properly disposed of according to federal, state, and local requirements. The types and number of requirements that must be complied with under the federal Resource Conservation and Recovery Act (RCRA) and the “Idaho Rules and Standards for Hazardous Waste” (IDAPA 58.01.05) are based on the quantity and type of waste generated. While some forms of mining-related wastes are exempt from these requirements, it is up to the generator of such wastes to determine which wastes are and are not exempt.

Depending on the quantity of hazardous waste generated each month, a RCRA generator identification number may be needed, and hazardous waste reporting may be required. Regulated hazardous waste must be disposed of at a permitted hazardous waste facility or a facility that beneficially uses/reuses or legitimately recycles/reclaims the waste. Contact DEQ at (208) 373-0502 for more information.

No trash or other solid waste should be buried, burned, or otherwise disposed of at the site. These disposal methods are regulated by Idaho’s “Solid Waste Management Rules” (IDAPA 58.01.06), “Rules and Standards for Hazardous Waste” (IDAPA 58.01.05), and “Rules for the Control of Air Pollution” (IDAPA 58.01.01).

## Containment, Storage, and Transportation

The “Water Quality Standards” (IDAPA 58.01.02.800) state “hazardous and deleterious materials *must not be stored*, disposed of, or *accumulated* adjacent to or in the immediate vicinity of state waters unless adequate measures and controls are provided to insure that those materials will not enter state waters as a result of high water, precipitation runoff, wind, storage facility failure, accidents in operation, or unauthorized third party activities.”

In addition, hazardous waste generator requirements for storage and transportation may apply depending on the generator status, which is based on the quantity and type of waste generated. Likewise, if hazardous waste is moved off site, a hazardous waste manifest may be necessary, depending on generator status. The Idaho Transportation Department may have specific requirements for packaging, labeling, and transporting hazardous waste.

DEQ encourages the safe collection, transport, and disposal of elemental mercury when used or encountered during suction dredging activities. Refer to the *Best Management Practices for Mercury Collection from Suction Dredging Activities* located at [http://www.deq.idaho.gov/media/638458-mercury\\_BMP\\_dredging\\_fs\\_0411.pdf](http://www.deq.idaho.gov/media/638458-mercury_BMP_dredging_fs_0411.pdf).

DEQ further recommends that elemental mercury is always contained with secondary containment, such as within a second, larger unbreakable container, and these containers are transported securely.

## Mine Plan of Operation and Reclamation Plan

Depending on location and size, a mine plan of operation and/or reclamation plan may be required from IDL, United States Forest Service, or Bureau of Land Management. Check with these agencies to determine if a plan of operation and/or reclamation plan are required.

Even if a plan is not required, DEQ recommends a plan of operation is prepared that describes the following to ensure that environmental regulations are not violated.

- Access and egress
- Fugitive dust best management practices
- Storm water best management practices
- Water quality best management practices
- Spill prevention, containment, and cleanup/disposal
- Water quality and ground water monitoring
- Types of materials processed and disposed
- Ore-processing procedures, including amalgamation and recovery
- Solid waste generation and disposal
- Hazardous waste characterization, generation, and disposal
- Reclamation activities

A plan of operation is a proactive step toward protecting the environment and demonstrates that the mine operator has considered the legal requirements applicable to the facility and its activities.



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