

ENVIRONMENTAL PROTECTION AGENCY  
40 CFR Part 63  
[EPA-HQ-OAR-2010-0239; FRL- ]  
RIN 2060-AP48

**National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category; and Addition to Source Category List for Standards.**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Proposed rule.

**SUMMARY:** EPA is proposing to add the gold mine ore processing and production area source category to the list of source categories subject to regulation under the hazardous air pollutant section of the Clean Air Act (CAA) due to their mercury emissions. EPA is also proposing national mercury emission standards for this category based on the emissions level of the best performing facilities which are well controlled for mercury. EPA is soliciting comments on all aspects of this proposed rule.

**DATES:** Comments must be received on or before [INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER] unless a public hearing is requested by [INSERT DATE 10 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]. If a hearing is requested on this proposed rule, written comments must be received by [INSERT DATE 45 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]. Under the Paperwork Reduction Act, comments on the information collection

provisions must be received by the Office of Management and Budget (OMB) on or before [INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2010-0239, by one of the following methods:

- Follow the on-line instructions for submitting comments at the following web address: [www.regulations.gov](http://www.regulations.gov).
- E-mail: Comments may be sent by electronic mail (e-mail) to a-and-r-Docket@epa.gov, Attention Docket ID No. EPA-HQ-OAR-2010-0239.
- Fax: Fax your comments to: (202) 566-9744, Attention Docket ID No. EPA-HQ-OAR-2010-0239.
- Mail: Send your comments to: Air and Radiation Docket and Information Center, Environmental Protection Agency, Mailcode: 2822T, 1200 Pennsylvania Ave., NW, Washington, DC 20460, Attention: Docket ID No. EPA-HQ-OAR-2010-0239. Please include a total of two copies. In addition, please mail a copy of your comments on the information collection provisions to the Office of Information and Regulatory Affairs, Office of Management and Budget (OMB), Attn: Desk Officer for EPA, 725 17th St., NW, Washington, DC 20503.
- Hand Delivery or Courier: Deliver your comments to EPA Docket Center, Room 3334, 1301 Constitution Ave., NW, Washington, DC 20460. Such deliveries are only accepted

during the Docket Center's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA-HQ-OAR-2010-0239. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at [www.regulations.gov](http://www.regulations.gov), including any personal information provided, unless the comment includes information claimed to be confidential business information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through [www.regulations.gov](http://www.regulations.gov) or e-mail. The [www.regulations.gov](http://www.regulations.gov) website is an "anonymous access" system, which means that EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through [www.regulations.gov](http://www.regulations.gov), your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and will be made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to

consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses.

Docket: All documents in the docket are listed in the [www.regulations.gov](http://www.regulations.gov) index. Although listed in the index, some information is not publicly available (e.g., CBI or other information whose disclosure is restricted by statute). Certain other material, such as copyrighted material, will be publicly available only in hard copy form. Publicly available docket materials are available either electronically in [www.regulations.gov](http://www.regulations.gov) or in hard copy at the EPA Docket Center, Public Reading Room, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air Docket is (202) 566-1742.

**FOR FURTHER INFORMATION CONTACT:** For questions about these proposed standards for gold mine ore processing and production, contact Mr. Chuck French, Sector Policies and Program Division, Office of Air Quality Planning and Standards (D243-02), Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-7912; fax number (919) 541-3207, e-mail address: [french.chuck@epa.gov](mailto:french.chuck@epa.gov).

**SUPPLEMENTARY INFORMATION:**

The information presented in this preamble is organized as follows:

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## I. General Information

### A. Does this action apply to me?

The regulated categories and entities potentially affected by the proposed standards include:

Category	NAICS code <sup>1</sup>	Examples of regulated Entities
Industry:		
Gold Ore Mining	212221	Establishments primarily engaged in developing the mine site, mining, and/or beneficiating (i.e., preparing) ores valued chiefly for their gold content. Establishments primarily engaged in transformation of the gold into bullion or dore bar in combination with mining activities are included in this industry.

<sup>1</sup> North American Industry Classification System.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be affected by this action. To determine whether your facility would be regulated by this action, you should examine the applicability criteria in 40 CFR 63.11640 of subpart EEEEEEE (National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category). If you have any questions regarding the applicability of this

action to a particular entity, consult either the air permit authority for the entity or your EPA Regional representative, as listed in 40 CFR 63.13 of subpart A (General Provisions).

B. What should I consider as I prepare my comments to EPA?

Do not submit CBI to EPA through [www.regulations.gov](http://www.regulations.gov) or e-mail. Send or deliver information identified as CBI only to the following address: Roberto Morales, OAQPS Document Control Officer (C404-02), Office of Air Quality Planning and Standards, Environmental Protection Agency, Research Triangle Park, NC 27711, Attention: Docket ID No. EPA-HQ-OAR-2010-0239. Clearly mark the part or all of the information that you claim to be CBI. For CBI contained in a disk or CD-ROM that you mail to EPA, mark the outside of the disk or CD-ROM as CBI and then identify electronically within the disk or CD-ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

C. Where can I get a copy of this document?

In addition to being available in the docket, an electronic copy of this proposed action will also be available on the Worldwide Web (WWW) through the Technology Transfer Network

(TTN). Following signature, a copy of the proposed action will be posted on the TTN's policy and guidance page for newly proposed or promulgated rules at the following address:

[www.epa.gov/ttn/oarpg/](http://www.epa.gov/ttn/oarpg/). The TTN provides information and technology exchange in various areas of air pollution control.

D. When would a public hearing occur?

If anyone contacts EPA requesting to speak at a public hearing concerning this proposed rule by [INSERT DATE 10 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER], a public hearing will be held on [INSERT DATE 15 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]. If you are interested in attending the public hearing, contact Ms. Pamela Garrett, Metals and Minerals Group (D243-02), Sector Policies and Programs Division, U.S. EPA, Research Triangle Park, NC 27711, telephone (919) 541-7966 email address: garrett.pamela@epa.gov to verify that a hearing will be held. If a public hearing is held, it will be held at EPA's campus located at 109 T.W. Alexander Drive in Research Triangle Park, NC, or an alternate site. If a hearing is requested by [INSERT DATE 10 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER], any persons interested in presenting oral testimony at that hearing should contact Ms. Pamela Garrett at least 2 days in advance of the date of the public hearing.

**II. Addition to Section 112(c)(6) Source Category List**

Section 112(c)(6) of the CAA requires that EPA list

categories and subcategories of sources assuring that sources accounting for not less than 90 percent of the aggregate emissions of each of the seven specified Hazardous Air Pollutants (HAP) are subject to standards under section 112(d)(2) or (d)(4). The seven HAP specified in section 112(c)(6) are as follows: alkylated lead compounds, polycyclic organic matter, hexachlorobenzene, mercury, polychlorinated biphenyls, 2,3,7,9-tetrachlorodibenzofurans, and 2,3,7,8-tetrachlorodibenzo-p-dioxin.

In 1998, EPA published a list of section 112(c)(6) categories (63 FR 17838, April 10, 1998). At that time, there was very little available information on mercury emissions from gold mine ore production and processing. Since the 1998 notice, a substantial amount of data and information have become available on mercury emissions from this source category. For example, in 2000, the first estimates of mercury emissions from this source category were published in the Toxics Release Inventory (TRI), largely because of the lower TRI reporting threshold for mercury that went into effect about that time. Following this, from 2001 to 2005, additional data and information were collected through the Voluntary Mercury Reduction Program (VMRP), which was a collaborative agreement between the State of Nevada Division of Environmental Protection (NDEP), EPA's Region 9 Office, and four gold mining companies.

Then, in 2005-2006 the EPA's Office of Air Quality Planning and Standards (OAQPS) and the NDEP sent questionnaires to a number of companies seeking additional information and data on mercury emissions. Moreover, starting in 2007 the NDEP has been requiring all facilities in Nevada to conduct annual mercury emissions tests. Based on these data collected over the past several years, along with information about the industry processing and production levels and activities in the early 1990s, EPA has estimated that the gold mine ore processing and production emitted about 4.4 tons of mercury during the baseline year (i.e., in 1990). These estimated mercury emissions in the 1990 inventory for gold mine ore processing and production are based on emissions from the following thermal processes at gold mine ore processing and production facilities: roasters, autoclaves, carbon kilns, pregnant storage solution tanks ("preg tanks"), electrowinning, melt furnaces, and retorts. We have updated our 1990 baseline emission inventory for section 112(c)(6) to reflect this contribution of mercury from gold mine ore processing and production and determined that this area source category contributed to the 90 percent of the aggregate emissions of mercury in 1990. Consequently, we are adding the gold mine ore processing and production area source category to the list of source categories under section 112(c)(6) on the basis of mercury emissions.

### III. Background Information

#### A. What is the statutory authority and regulatory approach for the proposed standards?

As mentioned above, CAA section 112(c)(6) requires that EPA set standards under section 112(d)(2) or (d)(4). The mercury standards for the gold mine ore processing and production area source category are being established under CAA section 112(d)(2), which requires MACT level of control. Under CAA section 112(d), the MACT standards for existing sources must be at least as stringent as the average emissions limitation achieved by the best performing 12 percent of existing sources (for which the administrator has emissions information) for source categories and subcategories with 30 or more sources, or the best performing 5 sources for categories and subcategories with fewer than 30 sources (CAA section 112(d)(3)(A) and (B)). This level of minimum stringency is called the MACT floor. For new sources, MACT standards must be at least as stringent as the emission control that is achieved in practice by the best controlled similar source (CAA section 112(d)(3)). EPA also must consider more stringent "beyond-the-floor" control options. When considering beyond-the-floor options, EPA must consider not only the maximum degree of reduction in emissions of HAP, but must take into account costs, energy, and nonair quality health and environmental impacts when doing so.

B. What source category is affected by the proposed NESHAP?

The gold mine ore processing and production area source category consists of facilities engaged in processing gold ore to recover gold using one or more of the following process units: roasters, autoclaves, carbon kilns, melt furnaces, mercury retorts, electrowinning, and/or pregnant solution tanks. There were approximately 21 gold mine ore processing and production facilities operating these processes in the United States (U.S.) in 2008. The majority and the largest of these facilities are located in Nevada. The other facilities currently operating are in Alaska, California, Colorado, Montana, and Washington. In 2007, the U.S. gold mine industry produced about 240 metric tons of gold, and the value of gold mine production was about \$5.1 billion.

C. What are the production operations, mercury emission sources, and available controls?

All gold mine operations in the U.S. begin by mining ores, generally using large earth moving equipment. The ore is then subject to crushing operations. After crushing, some ore may be pre-treated by roasting or autoclaving. Subsequent to these operations the ore undergoes some type of leaching process using a dilute cyanide solution. The cyanide binds with the gold (and various impurities including mercury) to produce a "pregnant" solution. The pregnant solutions are further processed using

various thermal processes (e.g., electrowinning, retorts and furnaces) to recover gold. The gold mine ore processing and production area source category covers the thermal processes that occur after the crushing, including roasting operations (i.e., ore dry grinding, ore preheating, roasting, and quenching), autoclaves, carbon kilns, electrowinning, preg tanks, retorts and furnaces. Further details of the gold production processes are described in section C.2 below.

#### 1. Historical Background on Mercury Emissions

Mercury, which is naturally present in the ores in various concentrations, enters the gold recovery processes with the gold mine ore. Most of this mercury is recovered as a by-product in the form of liquid elemental mercury, or as a mercury precipitate, placed in closed containers, and stored or sold to commercial metal companies. In addition, a notable amount of mercury is currently captured by mercury emission control devices (e.g., in carbon media) and is not recovered for sale. Nevertheless, some portion of the mercury in the ore is liberated to the air during the thermal processes resulting in mercury emissions to the atmosphere. Without emissions controls the potential for mercury emissions from these facilities would be quite high.

In May 2000, EPA published the first estimates of mercury emissions for gold mine ore processing and production facilities

as part of the EPA's TRI for year 1998. Total mercury air emissions reported to the TRI in the 1998-2001 timeframe for this source category were about 14,000 pounds per year. However, EPA estimated (in the 1999 National Emissions Inventory) that total mercury emissions from this category were higher (about 23,000 pounds in 1999), and the mining industry reported emissions to be 21,000 pounds in 2001. Even at that time, some facilities had controls on processes to limit mercury emissions. Early efforts to reduce or limit mercury emissions were due in part to concerns about worker exposure to mercury. For example, for years facilities that were processing ores with higher levels of mercury have been using retorts to condense and capture the mercury in liquid elemental form. Moreover, two of the largest facilities have been using mercury specific emissions controls on their roasters since the mid-1990s. Also, a number of facilities had carbon adsorption beds to control mercury emissions on various thermal process units prior to 2001. We estimate that without these early controls the potential emissions would have been much higher than 23,000 pounds (at least 37,000 pounds).

Since 2001, mercury emissions from gold mine ore processing and production have been further reduced. The reductions achieved since 2001 were obtained through programs implemented by the NDEP, EPA, and industry. The first program for reducing

mercury emissions from these facilities was the Voluntary Mercury Reduction Program (VMRP). The VMRP was a voluntary partnership between the NDEP, EPA Region 9, and four large gold mining companies. The main goal of the VMRP, which was officially adopted in June 2002, was to achieve significant, permanent and rapid reductions in mercury air emissions from precious metal processing operations. The VMRP focused on 5 large facilities in Nevada that accounted for most of the reported emissions in 2001. Some mercury emission reductions were quickly achieved by adding emission controls to some of the thermal units that emit mercury at these facilities.

To achieve further reductions in mercury emissions, the NDEP converted the VMRP into a regulatory program, called the Nevada Mercury Control Program (NMCP). As described on the NDEP website, the NMCP is a State regulatory program that supersedes and replaces the VMRP and requires best available mercury emissions control technology on all thermal units located at all precious metal mines in Nevada. The NMCP was adopted March 8, 2006 and made effective May 4, 2006. The NMCP is a case-by-case permit program in 2 phases. The NMCP also had an early reduction program, which provided incentives for facilities to add controls within the first 2 years of the program (by mid-2008). A few facilities in Nevada took advantage of the early reduction program and added mercury specific controls (sulfur

impregnated carbon filters) in 2007 on various thermal units.

In Phase 1 of the NMCP, which has recently been completed, permits were issued that require comprehensive work practice standards for the proper operation of existing mercury controls and the operations of the thermal units to minimize mercury emissions until specific controls are identified later under Phase 2 of the program. Phase 1 also required annual stack testing, site inspections and emissions reporting to collect data to assist in mercury emissions controls determinations in Phase 2. Emissions data collected in Phase 1 of the NMCP were used in the development of this proposed rule. Phase 2 has begun issuing permits and all permits are scheduled for issuance by the end of calendar year 2010. Implementation of controls will begin shortly after permit issuance. The Phase 2 permit process is a technology review and engineering analysis to determine the best available control technology and mercury emission limits. Controls and mercury emissions limits will be determined on a case-by-case analysis and will be unique to the individual unit (not universal for the unit type). The NMCP is a control-based program that will require thermal units in Nevada to have a best available mercury control technology installed. The NDEP and EPA have coordinated on the review and analyses of data on emissions, controls, and monitoring approaches for mercury emissions from this category, and

collaborated to assure that the State program could co-exist and provide an additional level of control for facilities in Nevada while working in concert with the proposed National standards.

As described further below, several facilities already have effective mercury emissions controls in place on various thermal units. We expect that a number of other facilities will need to add mercury controls to comply with emissions limits set forth in this NESHAP, resulting in further emissions reductions from this category.

## 2. Description of Gold Mine Ore Processing and Production

The gold mine ore processing and production source category consists of the following processes: roasting operations, autoclaves, carbon regeneration kilns, electrowinning cells, pregnant solution tanks, mercury retorts, and melt furnaces. Each facility may not have every one of these processes because there are different production paths that can be taken to recover gold from mine ore. Mercury can be emitted from each of these thermal processes. Some of these processes are already well controlled for mercury emissions; however, there are some process units at several plants that are only partly controlled or uncontrolled for mercury.

The first step in gold mining is extracting the gold-containing ores from surface or undergrounds mines, generally by using large-scale earthmoving equipment. Samples of ore are

examined to determine grade and metallurgical characteristics. Broken rock is marked by type for efficient processing. Based on its metallurgical makeup, the ore is delivered to the proper processing location. Low grade ore is roughly broken into small chunks, and high grade ore is delivered to a grinding mill, where the ore is pulverized to a powder (milled ore).

Depending on its metallurgical and other characteristics, the ore may be pretreated in a roaster or autoclave prior to leaching, or it may be sent directly to a leaching circuit without pretreatment. The two main types of ore are oxide ore and refractory ore. If the process of cyanide leaching can extract most of the gold contained in an ore with no pretreatment, the ore is referred to as oxide ore; otherwise, the ore is described as refractory ore. Oxide ore is sent directly to the leaching circuit where cyanide is used to liberate the gold. However, refractory ores contain organic carbon and/or sulfide mineral grains which inhibit the efficient recovery of gold during cyanide leaching. Roasters and autoclaves are used to oxidize the ore and remove these components. Refractory ore containing carbon and sulfur is roasted to over 1000°F, burning off the sulfide and carbon. The product of this process, which is now basically an oxide ore, is routed to a leaching circuit. Sulfide refractory ore without carbon is oxidized in an autoclave to liberate the gold from

sulfide minerals; then it is sent to a leaching circuit. At all facilities, the ores are eventually sent to some type of cyanide leaching process.

Lower grade oxide ores generally undergo a heap leaching process, whereby the ore is spread over large areas and dilute cyanide solution is slowly dripped through and collected on liners and channels. During the leaching process, cyanide binds with gold and other elements (including mercury) producing a "pregnant" cyanide solution. At most facilities that use this process, the next step involves pumping the pregnant cyanide-gold solution to tanks with activated carbon where the gold is adsorbed (collected) out of solution onto the activated carbon, and the remaining cyanide solution is largely recycled. This carbon adsorption step that follows the cyanide leaching is generally referred to as the "carbon-in-column" process.

Higher grade ores are generally milled. If the ore is a higher grade "oxide ore," it is milled and then generally sent directly to carbon-in-leach processes where activated carbon is added along with the milled ore and cyanide solution in tanks where the cyanide-gold complexes adsorb onto activated carbon. In these units the leaching and carbon adsorption occur together. If the higher grade ore is a refractory ore, it is roasted or autoclaved first, then it is sent to carbon-in-leach processes.

However, a few facilities do not use carbon. Instead, these facilities use a different, zinc precipitate process, which is described later in this preamble.

At all the facilities that use a carbon adsorption process, the gold loaded carbon (which also contains mercury and other constituents) is moved into a vessel where the gold is chemically stripped from the carbon typically by using a concentrated caustic cyanide solution, producing a concentrated cyanide-gold solution. Gold (along with other metals and minerals) is drawn from this concentrated solution electrolytically (in electrowinning cells). The concentrate from the electrowinning cells is usually sent to a filter press to remove excess moisture and then to a retort followed by a melt furnace. However, some facilities do not have retorts. These facilities dry the concentrate and then feed it directly to the melt furnace. Either way, the gold is melted in furnaces into dore (pronounced "doh-rey") bars containing up to 90 percent gold. Dore bars are subsequently sent to an external refinery to be refined to bars of 99.9 percent or more pure gold. The processing steps are discussed in more detail below. For processing steps that emit mercury, the discussion below also describes the points of mercury emissions and available controls for such emissions.

### 3. Pretreatment of Refractory Ore.

As mentioned above, refractory ores have to be pretreated by furnace oxidation (ore roasting) and/or pressure oxidation (autoclaving) before they can be ready for cyanide leaching.

Roasting Operations. The roasting operations that are sources of mercury emissions include ore dry grinding where the ore is ground and dried, preheating prior to roasting, roasting, and quenching. The roaster is by far the process unit with the greatest potential for mercury emissions because of the large quantity of ore processed and the high roasting temperatures, which readily volatilize available mercury from the ore. The mercury concentrations in the roasted ores are high enough that elemental mercury can be recovered from the roaster exhaust gas by condensation. The emission potential of the ancillary roasting operations (dry grinding, pre-heating and quenching) are much less than those from the roaster because they are operated at much lower temperatures. Dry grinding of the ore prior to roasting is primarily a source of particulate matter (PM) emissions; consequently, baghouses are used for PM emission control. Ore preheaters used to raise the ore temperature to facilitate roasting are typically equipped with baghouses or wet scrubbers, which control particulate and some oxidized mercury. Emissions from quenching (when the roasted ore is cooled) are controlled by wet scrubbers, which remove particulate and some oxidized mercury.

Ore roasting is a combustion process where the milled ore is oxidized in a fluidized bed roaster. During the combustion process, ore components that interfere with the cyanide leaching of gold are oxidized and therefore removed. As the ore exits the combustion chamber, it typically enters a quench process, where the temperature is reduced by contact with cooling water and the generation of steam. The steam from the quench process is used as a heat source in other processes at the mill, or may be sent directly to a cooling tower.

There are three gold mine ore processing and production facilities that have a total of six roasters. The mercury emissions generated during roasting are mainly in gaseous elemental or oxidized forms of mercury. A very small portion of the mercury emitted is in particulate or particulate-bound form. Each of these roasters has complex gas treatment systems to control not only these forms of mercury, but also to control PM, sulfur dioxide ( $\text{SO}_2$ ), nitrogen oxides ( $\text{NO}_x$ ), and carbon monoxide (CO). The PM control devices remove particulate mercury and some oxidized mercury. A significant amount of the elemental mercury is removed and recovered by condensation (either in a condenser or gas cooling device), and the three facilities with roasters use mercuric chloride scrubbers. These scrubbers use a mercuric chloride scrubber liquor to complex with mercury in the exhaust gas to precipitate a mercurous chloride byproduct

(calomel). These scrubbers are also referred to as "calomel scrubbers." The calomel precipitate is subsequently removed and is either sent to electrowinning to recover the mercury, disposed of offsite as a waste material, or a portion may be chlorinated to create fresh mercuric chloride for the calomel scrubber liquor. An example of the emissions controls and gas treatment train for a roaster includes a hot gas electrostatic precipitator (ESP), wash tower, gas coolers, fluorine tower, wet ESP, calomel scrubber, acid plant (for removal of SO<sub>2</sub> and conversion to sulfuric acid product), peroxide scrubber (to control NO<sub>x</sub>), and regenerative thermal oxidizer (for CO).

Autoclaves. Autoclaves are pressure oxidation vessels that are used to pretreat ores to increase gold recovery by cyanide leaching. The milled ore is mixed with water to form a slurry, and is then acidified with sulfuric acid. The acidified slurry is then pumped into the autoclave vessel, where oxygen is used to increase the vessel pressure to over 300 pounds per square inch, and the slurry is heated to 350°F to 430°F. The slurry is agitated in the reaction vessel and is then discharged to a pressure relief chamber. There the liquid content is flashed to steam, recovered, and returned to the pressurized segment of the vessel.

Most mercury is present in the gold ore as mercury sulfide, and during autoclaving, the mercury sulfide combines with oxygen

to form mercury sulfate, which dissociates to some degree in the slurry. Consequently, the mercury present in gaseous emissions from the autoclave is mainly in the oxidized form.

Three facilities have a total of eight autoclaves. All of the autoclaves are equipped with wet venturi scrubbers, which remove most of the particulate mercury and a significant portion of the oxidized mercury present in the emissions. Venturi scrubbers have a specially designed "throat" that increases the gas speed through the throat and shears spray droplets to smaller sizes, which enhances mixing of the droplets and particles and increases coagulation and collection.

#### 4. Leaching

As mentioned above, leaching generally takes place either directly after crushing or milling, or after roasting or autoclaving. In heap leaching, a dilute alkaline cyanide solution is distributed onto crushed ore. The solution percolates through the ore, and the gold reacts with free cyanide to form soluble gold-cyanide complexes. The complexes migrate with the solution to an impermeable liner and flow to a collection pond.

The solution containing the precious metals is called the "pregnant" cyanide solution. During this process, mercury, also present in the ore, may be leached into the gold-cyanide solution.

Refractory ores, which have been roasted or autoclaved, are generally leached in reaction vessels, referred to as vat leaching. Activated carbon adsorbent is usually added to the leach vessels to improve gold recovery. All five facilities in the U.S. that employ roasters and/or autoclaves add activated carbon to these leach vessels, where the leaching and carbon adsorption occur simultaneously in the tank. This is called the "carbon-in-leach" process.

#### 5. Carbon Adsorption Process

As mentioned above, after leaching, the most common path for recovering gold from the cyanide solution is carbon adsorption, where the gold complexes in the pregnant solution are concentrated through adsorption onto activated carbon. If mercury is present in the gold-cyanide solution, it is also adsorbed onto the carbon. The gold-bearing solution may be extracted from the leaching process and subsequently introduced into a carbon adsorption column for concentration of the gold content (i.e., the carbon-in-column process), or carbon may be added into the leach process concurrent with leaching from the ore (i.e., the carbon-in-leach process). All of these carbon adsorption processes produce a "loaded" carbon, which contains gold and mercury (and some other metals such as copper) as adsorbed cyanide complexes.

#### 6. Carbon Desorption Processes

The loaded carbon is then separated from the rest of the solution or slurry by physical separation processes (such as with a screen). The remaining cyanide solution is now considered "barren" and can either be recycled back to the barren pond for use in the heap leaching process, sent directly to the tailings impoundment (if the cyanide concentrations are low), or sent to a cyanide destruction process and then to a tailings impoundment once the cyanide levels are sufficiently low.

The loaded carbon, which contains gold-cyanide complexes, mercury, and other metals, is stripped in a carbon strip tank to recover gold (and other metals) typically using a heated caustic cyanide solution. Adsorbed gold, as well as adsorbed silver, mercury, and other metals are stripped from the carbon through desorption under pressurized or atmospheric conditions, resulting in a more concentrated gold-containing solution.

#### 7. Description of thermal units used after carbon desorption.

Carbon kilns. After gold has been removed from the activated carbon through the stripping process, the carbon is usually regenerated and then recycled back to the adsorption process. Regeneration is performed to regain the adsorption capacity of the carbon. Rotary kilns known as carbon kilns are used to regenerate the spent carbon. Because the carbon can be oxidized in the kiln if air is present in the heating chamber,

steam is introduced to the kiln to prevent the infiltration of air. As the carbon moves through the carbon kiln, it is heated, and mercury and other remaining components are desorbed into the gas stream in the kiln. Regenerated carbon exits the kiln and is captured and quenched, and the gas stream is vented from the process, along with combustion gas from heating the kiln chamber. The off-gas, containing steam and mercury, is discharged to a pollution control device, such as a carbon adsorber. The potential for mercury emissions from carbon kilns is directly dependent on the mercury content of the stripped carbon and whether there is a carbon adsorber or other device to control mercury emissions.

There are approximately 16 facilities with 18 carbon kilns. Most of these carbon kilns have installed carbon adsorption units to control mercury emissions, and some other facilities in Nevada have proposed in their state permit applications under the NMCP to install carbon adsorbers on their carbon kilns. One facility uses a hypochlorite scrubber on its carbon kiln which oxidizes the elemental mercury to a more soluble form and removes it as mercuric chloride.

Pregnant storage solution tanks ("preg tanks"). The concentrated gold-containing solution that was stripped from the carbon is transferred to a preg tank, which serves as a storage and feed tank to the electrowinning process (discussed below).

The concentrated solution also contains mercury, and mercury vapor can be emitted from the preg tank vent. Two facilities have installed carbon adsorbers on their preg tanks. In addition, five facilities in Nevada have proposed in their state permit applications under the NMCP to install carbon adsorbers on their preg tanks.

Electrowinning cells. Recovery of gold, along with co-precipitated metals such as silver and mercury, from concentrated carbon strip solutions is performed in one of two ways: electrowinning (the most common process) or precipitation with zinc powder (discussed below). Separation of gold through electrowinning is achieved by using an electric potential to plate the gold (and other metals present) in solution onto a cathode; steel wool is typically used as the plating surface because of the large surface area it provides for gold deposition. The plated cathode, or sponge, is then either removed from the electrowinning cell, so that the gold-bearing sludge-like material can be removed from the plated cathode, or the plated cathode can be left in the electrowinning (EW) cell, but the current is turned off and the remaining solution is drained out, then the material is removed from the plated cathode. Either way, once the current has stopped, the gold-bearing sludge-like material (known as "EW concentrate") is separated from the cathode by physical means (such as shaking).

The gold-bearing EW concentrate is then ready for further processing. During electrowinning, elemental mercury can vaporize and escape from the cell with the other gases produced in the process; carbon adsorption filters are effective in controlling these mercury emissions.

There are approximately 17 electrowinning units located at 14 plants. Five facilities have installed carbon adsorbers to control mercury emissions from electrowinning. In addition, four facilities in Nevada have proposed in their State permit applications under the NMCP to install carbon adsorbers on their electrowinning units.

Retorts. The EW concentrate may contain up to sixty weight percent gold, depending on the mercury content of the cyanide solution, the presence of other metals and minerals in the material, and the configuration of the gold recovery process. EW concentrate with significant mercury content is treated in a retort to remove mercury moisture and other impurities. In this process, the EW concentrate is placed in a pot or tray that is loaded into a heated oven under vacuum pressure, usually for 12 to 24 hours at 600°C to 700°C to remove up to 99 percent of the mercury. The EW concentrate is heated, mercury is vaporized and then pulled through a condenser where it condenses forming liquid mercury. The liquid mercury is recovered and sent through a tube into a collection vessel. The remaining gold and

silver at the end of the retorting process typically contains less than 1 percent mercury (e.g., 1,000 to 8,000 mg/kg). The condenser allows some mercury to discharge in the off gas, and a loss of 0.4 to 0.7 percent of the mercury from the condenser has been reported. There are approximately 12 facilities that operate retorts, and all operate the retort with a condenser and a carbon adsorption filter. A properly designed and maintained carbon adsorption filter located downstream of the condenser is expected to capture about 95 percent of the mercury in the cooled gas.

Melt furnaces. Smelting is the last step in gold mine ore processing and production before the gold is sent to an off-site commercial gold refinery. Even after retorting, the retorted gold mixture still contains some impurities, including small concentrations of base and ferrous metals, and some residual mercury. During this last step, the retorted gold mixture (or EW concentrate for facilities that do not have retorts) is melted in a refinery melt furnace, along with a flux material that preferentially absorbs impurities, to produce a purified commercial mixture of gold known as dore. The furnace is heated to approximately 1500°C. Most of the remaining mercury is volatilized in the melt furnace as elemental mercury or oxidized mercury. The dore melt is poured into bars, and any flux slag that hardens on the bars is removed with a mechanical chipper.

The bars are then shipped to a commercial gold refinery, where they are further processed to produce gold bullion (99.9 percent pure gold).

There are approximately 24 melt furnaces at 17 gold mine ore processing and production facilities. All of the melt furnaces are equipped with either fabric filters, ESPs, wet scrubbers, or a combination thereof to control emissions of PM. The wet scrubbers also remove most of the oxidized mercury, but do not remove elemental mercury. Six facilities have installed carbon adsorbers to control both oxidized and elemental mercury emissions from their melt furnaces. In addition, three facilities in Nevada have proposed in their state permit applications under NMCP to install carbon adsorbers on their melt furnaces.

#### 8. Non-carbon concentrate process

After leaching, approximately four facilities recover the gold from the cyanide solution without using carbon by a process commonly known as the Merrill-Crowe (MC) method. The cyanide solution containing gold is separated from the ore by methods such as filtration and counter current decantation and clarified in special filters, usually coated with diatomaceous earth to produce a clarified solution. Zinc dust is then added to the clarified solution. Because zinc has a higher affinity for cyanide ions than does gold or other metals, zinc is dissolved

and gold, silver, and mercury precipitate as a solid. The fine particulate metals are recovered by filtration processes. This process is performed in deoxygenated, enclosed reaction cells.

The precipitate (also known as MC concentrate) is processed in retorts and melt furnaces, which are described above. The retorts and melt furnaces are the sources of mercury emissions at facilities that use non-carbon concentrate processes, and these processes are equipped with carbon adsorbers or venturi scrubbers to control mercury emissions. These facilities do not have carbon kilns since they do not use carbon.

#### **IV. Summary of the Proposed Standards**

##### **A. Do these proposed standards apply to my facility?**

These proposed mercury standards would apply to gold mine ore processing and production facilities that are area sources that use any of the following thermal processes: roasting operations, autoclaves, carbon kilns, preg tanks, electrowinning, retorts, and melt furnaces. Separate mercury standards are proposed for each of the following three affected sources: (1) ore pretreatment processes (roasting operations and autoclaves), (2) carbon processes (carbon kilns, preg tanks, electrowinning, retorts, and melt furnaces at facilities that use carbon to recover the gold from the cyanide solution), and (3) non-carbon concentrate processes (retorts and melt furnaces at facilities that do not use carbon to recover gold).

We are proposing standards for both new and existing affected sources. An affected source is an existing source if construction or reconstruction commenced on or before [INSERT DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER]. An affected source is a new source if construction or reconstruction commenced after [INSERT DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER].

B. When must I comply with the proposed standards?

We are proposing that the owner or operator of an existing affected source comply with the final rule no later than 2 years after publication of that rule in the Federal Register. The owner or operator of a new affected source is required to comply by the date of publication of the final rule in the Federal Register or upon startup of the affected source, whichever occurs later.

C. What are the proposed standards?

We are soliciting comments on all aspects of this proposed rule including, but not limited to, the data and calculations used to establish the emissions limits, the proposed testing and monitoring for emissions, and the parametric monitoring of control devices.

The proposed standards are summarized in Table 1 of this preamble and discussed in more detail below. These proposed standards establish mercury MACT emission limits for three

affected sources. The proposed MACT standard for new and existing ore pretreatment processes is 149 pounds of mercury per million tons of ore processed (149 lb/million tons). The proposed MACT standard for existing carbon processes is 2.6 pounds of mercury per ton of concentrate processed (2.6 lb/ton of concentrate), and for new carbon processes is 0.14 pounds of mercury per ton of concentrate (0.14 lb/ton of concentrate). Concentrate is the gold-bearing sludge material that is processed in retorts. For facilities without retorts, concentrate is the quantity processed in melt furnaces before any drying. For new carbon processes, we are proposing a compliance alternative of 97 percent control efficiency. This alternative provides at least equivalent HAP reductions as the MACT floor.

Table 1. Summary of Proposed Mercury Emission Limits

Affected source	Mercury emission limit	
	Existing source	New source
Ore pretreatment processes	149 lb/ton of ore	149 lb/ton of ore
Carbon processes	2.6 lb/ton of concentrate	0.14 lb/ton of concentrate or 97 percent reduction in uncontrolled emissions
Non-carbon concentrate processes	0.25 lb/ton of concentrate	0.20 lb/ton of concentrate

The proposed MACT standard for existing non-carbon concentrate processes is 0.25 pounds of mercury per ton of concentrate processed (0.25 lb/ton of concentrate processed),

and for new non-carbon concentrate processes is 0.20 lb/ton of concentrate processed.

D. What are the testing and monitoring requirements?

1. Testing for Compliance with Emission Limits

Any stack that is a discharge point for any thermal process at a gold mine ore processing and production facility would be tested for mercury emissions based on the average of a minimum of three runs per stack at least once annually (i.e., once every four successive calendar quarters) using EPA Method 29 in Appendix A-8 to part 60, the Ontario Hydro Method (ASTM D6784 - 02, "Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources"), EPA Method 30A, or EPA Method 30B, both in Appendix A-8 to part 60.

We are proposing that the initial compliance test for new sources be conducted within 180 days of the compliance date. The emissions for each process stack (in lb/hr) would be multiplied by the number of hours the process operated in the 6-month period following the compliance date to determine the total mercury emissions for the initial 6-month period. The process inputs used in the denominator of the emission limit, including ore and concentrate, would be measured and summed for each month to provide the total input (in tons) for the initial 6-month period following the compliance date. The sum of the

emissions (in lbs) for the 6-month period for all process units included in the affected source would be divided by the total input for the 6-month period to determine compliance with the emission limit. After the initial 6-month period, all the stacks for the thermal process units would be tested for mercury emissions annually.

We are proposing that existing sources also conduct their initial compliance test within 180 days of their compliance date. The emissions for each process stack (in lb/hr) would be multiplied by the number of hours the process operated in the 6-month period following the initial compliance date to determine the emissions for the 6-month period. The emissions for each process stack would be recorded in total pounds of mercury for the 6-month period. The total mercury emissions for the affected source for the 6 months would be determined by summing the emissions for each process stack included in the affected source. The total emissions for the 6-month period for the affected source would be divided by the process input (concentrate or ore) for the 6-month period to determine compliance with the emission limit.

After the initial 6-month period, all of the stacks for the thermal process units at new and existing sources would be tested for mercury emissions annually. The total mercury emissions and process inputs for each 12 month period would be

calculated as described below to determine compliance with the emissions limit.

The process inputs used in the denominator of the emission limit, including ore and concentrate, would be measured and summed to provide the total input (in tons) for each month. For facilities with ore pretreatment processes, the daily quantity of ore (in tons) would be determined either by calibrated weigh scales or by measuring volumetric flow rate and density and multiplying the two measurements. The daily totals would be summed for each calendar month to provide a monthly total for ore input. For facilities with carbon and/or non-carbon processes affected sources, each batch of concentrate would be weighed by scales, and the total of all batches would be summed for each calendar month to produce monthly weights of concentrate.

Emissions in lb/million tons of ore for each affected source of ore pretreatment processes would be determined by summing the emissions for all units in the pre-treatment processes affected source for the appropriate time period (e.g., a 6-month period initially for new and existing sources and the 12-month periods thereafter) and dividing this sum of the emissions by the sum of the total ore processed (expressed in millions tons) in all processes at the affected source for the appropriate time period (i.e., 6 months or 12 months).

Emissions in lb/ton of concentrate for each affected source of carbon processes would be determined by dividing the sum of the emissions from all carbon processes at the affected source for the appropriate time period by the sum of the tons of concentrate processed at the affected source for each time period. Emissions in lb/ton of concentrate for each non-carbon concentrate process affected source would be determined by dividing the sum of the emissions from all non-carbon concentrate process units at the affected source for each appropriate time period by the sum of the concentrate (expressed in tons) processed in all process units at the affected source for each time period.

Mercury testing at both the inlet and outlet of all mercury emissions control devices is proposed for new affected sources with carbon processes that choose to demonstrate a 97 percent reduction in emissions. The inlet and outlet of every process unit's control device would be sampled, and the mercury emissions before and after control (in lb/hr) would be multiplied by each process unit's operating hours for the appropriate time period to determine the mercury emissions for the time period. The initial tests would be done within 180 days of the compliance date. For the first 6 months of operation, the inlet emissions for all process units would be calculated and summed and compared to the sum of the calculated

outlet emissions for the 6-month period. After the initial 6 months, annual tests would be conducted and the calculations would be based on each 12 month period to determine the percent reduction in mercury emissions.

We have also considered other procedures for calculating the mercury emission rate in pounds per ton of input to determine compliance for the ore pretreatment group and possibly for the carbon and non-carbon affected sources as well. For example, one approach for the ore pre-treatment processes would be to divide the measured emission rate (in pounds per hour) from the compliance test for each autoclave and roasting operation by the ore throughput (in tons per hour) for each autoclave and roasting operation as measured during the performance tests. The result would be emissions in pounds per ton of ore for each autoclave and roasting operation. Then the fraction of the total ore processed in the previous 12 months would be calculated for each roasting operation and autoclave, and the emissions from all autoclaves and roasting operations in the group would be calculated as the weighted average pounds per ton of ore to determine compliance (i.e., the sum of fraction of total ore throughput times the pounds per ton for each roasting operation and autoclave). With this approach, it would not be necessary to monitor, record, and use the annual operating hours for each unit to calculate emissions. A similar approach could

possibly also be used for the carbon and non-carbon groups. We are requesting comment and supporting information on the advantages and disadvantages of this possible alternative procedure and the proposed procedure for determining compliance from the ore pretreatment processes and the other process groups.

## 2. Monitoring Requirements

Roasters. We are proposing two options for monitoring roaster emissions: (1) integrated sorbent trap mercury monitoring coupled with parametric monitoring of scrubbers and (2) monitoring using a continuous emission monitoring system (CEMS) for mercury. Both proposed monitoring options would require establishment of operating limits to detect and correct problems as soon as possible. An exceedance of an operating limit would trigger immediate corrective action and would require that the problem be corrected within 48 hours or that the feed of ore to the roaster be stopped.

The first option for monitoring emissions from roasters would be to use the EPA Performance Specification (PS) 12B for integrated sorbent trap mercury monitoring on a periodic basis coupled with parametric monitoring of mercury scrubbers. We propose that under this option the facility will sample and analyze weekly for mercury concentration according to PS 12B. To determine appropriate sampling duration, we propose that the

owner or operator review the available data from previous stack tests to determine the upper 99th percentile of the range of mercury concentrations in the exit stack gas. Based on this upper end of expected concentrations, the facility would select an appropriate sampling duration that is likely to provide a valid sample and not result in breakthrough of the sampling tubes. If breakthrough of the sampling tubes occurs, the facility would re-sample using a shorter sampling duration.

We are proposing that the owner or operator of an affected source would establish an operating limit for mercury concentration for PS 12B monitoring during the initial compliance test and maintain the mercury emissions below the established operating limit. The specific method and equation to be used to establish the operating limit are described in the proposed rule. If the operating limit is exceeded, the facility would report the exceedance as a deviation and take corrective actions within 48 hours to return the emissions control system back to proper operation.

In addition, we are proposing as part of this first monitoring option (i.e., sorbent trap monitoring) that facilities with roasters and calomel-based mercury control systems (also referred to as "mercury scrubbers") also establish operating limits for various control parameters described below during their annual mercury compliance stack test. We are

proposing that each mercury scrubber be equipped with devices to monitor the scrubber liquor flow rate, scrubber pressure drop, and inlet gas temperature. Minimum operating limits for the scrubber liquor flow rate and pressure drop would be established based on the lowest average value measured during any of the three runs of a compliant performance test. A maximum inlet temperature would be established based on the highest temperature measured during any of the three runs of the compliance test. In addition to the parameters described above, we are proposing that the facility must also monitor the mercuric ion concentration and the chloride ion concentration four times per day or continuously monitor the oxidation reduction potential and pH. These monitored parameters would be maintained within the range specified by the scrubber's manufacturer or within an alternative range approved by the permitting authority. If any of the parameters are outside the specified range or limit, corrective action would be taken to bring the parameters back to the operating range or limit or else the facility would commence shutdown of the roaster.

As mentioned above, we are including an alternative option for monitoring emissions from roasters, which is to install and operate a continuous emission monitoring system (CEMS) for mercury. Under this alternative option, facilities would not be required to do the parametric monitoring of the mercury

scrubbers described above under the first option. A facility choosing the CEMS option would operate the mercury CEMS according to EPA Performance Specification (PS) 12A (except that calibration standards traceable to the National Institute of Standards and Technology (NIST) are not required). This exception is necessary because the mercury concentrations in the exhaust gases from roasters can be higher than the range of concentrations that are covered with the existing calibration standards traceable to NIST. The current calibration standards traceable to NIST do not apply to the full range of mercury concentrations that can be present in the exhaust gases from roasters. However, calibration standards are available from the manufacturers of mercury CEMS which can be used to calibrate these CEMS for monitoring of roasters.

In addition to following PS 12A, the facility would perform a data accuracy assessment of the CEMS according to section 5 of Appendix F in part 60. We are proposing that the owner or operator would establish an operating limit for mercury concentration for the CEMS during a compliance test for the roaster stack and monitor the daily average mercury concentration in the roaster stack exhaust gas with the CEMS. The specific method and equation to be used to establish the operating limit are described in the proposed rule. If any daily average concentration as measured with the CEMS exceeds

the operating limit, the facility would report the exceedance as a deviation and take corrective actions within 48 hours to return the emission control system back to proper operation. Regardless of whether deviations occur, the owner or operator of any facility with a roaster would submit a monitoring plan that includes quality assurance and quality control (QA/QC) procedures sufficient to demonstrate the accuracy of the CEMS. At a minimum, the QA/QC procedures would include daily calibrations and an annual accuracy test for the CEMS.

For facilities that control roaster mercury emissions with mercury scrubbers, we are proposing not to require sorbent traps or mercury CEMS monitoring if a facility demonstrates that the mercury emissions from its roasters are consistently low and well controlled. Specifically, if a facility can demonstrate that mercury emissions from the roaster are less than 10 pounds of mercury per million tons of ore, then the facility would be allowed to discontinue the use of the sorbent trap or CEMS as described above. To demonstrate this, the facility would conduct three or more consecutive independent performance tests for mercury at least one month apart on the roaster exhaust stacks and show that emissions are less than 10 pounds per million tons of ore during normal operations for all tests. However, such a facility would be required to perform the parametric monitoring for mercury scrubbers and maintain

parameters within the operating ranges established in accordance with the proposed rule. Also, the facility would continue to perform annual compliance tests of the roaster stack. Moreover, if there is an increase in the mercury concentration in the ore processed by the roaster that is higher than any concentration measured during the previous 12 months, then the facility would need to perform a compliance test within 30 days of the first day that the new ore is processed to determine whether the mercury emissions are still below 10 lbs per million tons of ore. If any subsequent performance compliance test indicates that the roaster is emitting more than 10 pounds of mercury per million tons of ore input, then the facility would be required to monitor the roaster emissions using the sorbent trap method or CEMS.

Carbon Adsorbers. For process units (such as furnaces, kilns, retorts, electrowinning, and autoclaves) that control mercury emissions with a carbon adsorber, we are proposing three emissions monitoring options. One proposed option involves monitoring the mercury concentration at the exit of the carbon bed. A second option is based on sampling the carbon bed for mercury. The third option is based on changing out the carbon bed after a fixed period of time determined based on historical operating experience.

For the first option (i.e., the exit concentration

monitoring option), the mercury concentration would be measured periodically using a sorbent trap according to EPA Method 30B. An operating limit would be established through sorbent trap measurements obtained during the initial compliance test. The mercury concentration would be measured during each annual performance compliance test of each of the stacks for the carbon processes using Method 30B. An operating limit would be calculated from the average mercury concentration measured during the compliance test multiplied by a factor. The factor is the MACT emission limit for carbon processes divided by the sum of results of the compliance test for all units within the carbon processes affected source. Thereafter, if the established operating limit is exceeded, the exceedance would be reported as a deviation and corrective action would be triggered (e.g., replace the carbon in the bed). The specific equations to calculate the operating limit are described in the proposed rule. Initially, the facility would measure mercury concentration in the exit gas monthly using Method 30B. Once mercury concentrations reach 50 percent of the operating limit, the facility would then need to perform weekly sampling and analysis using Method 30B. When the concentration reaches 90 percent of the operating limit, to prevent an exceedance, the owner or operator would be expected to replace the carbon in the control device within 30 days (or before the operating limit is

actually exceeded).

The second proposed monitoring option, which is based on sampling the carbon bed for mercury, would require conducting an initial sampling of the carbon in the carbon bed 90 days after the replacement of the carbon to determine mercury loading. A representative sample would be collected from the carbon bed and analyzed using EPA Method 7471A, and the depth to which the sampler is inserted would be recorded. Based upon sample results, a carbon loading would be calculated for the system, and sampling would be performed quarterly thereafter. When the carbon loading reaches 50 percent of the design capacity of the carbon, monthly sampling would be performed until 90 percent of the carbon loading capacity is reached. The carbon would be removed and replaced with fresh carbon no later than 30 days after reaching 90 percent of capacity to ensure that the maximum mercury loading as recommended by the manufacturer is not exceeded.

The third proposed option would start with one of the two previous options. After collecting at least two years of data under one of the options described above, a facility would establish a change out time for the carbon based on the two years of monitoring and could implement this periodic change out instead of sampling and analysis after approval by the permitting authority. However, if there is any significant

change in the process, input materials, or mercury control system (e.g., an increase in operating rates or processing different ores with higher mercury levels) then sampling and analysis (according to the procedures in option 1 or option 2 described above) would be required within 30 days to re-establish the carbon change out time.

We are also proposing that the inlet stream to carbon adsorbers applied to autoclaves, carbon kilns, melt furnaces, and retorts be monitored for temperature and that the inlet temperature be maintained below the maximum temperature established during the compliance tests. If the maximum temperature is exceeded, the owner or operator would analyze the outlet concentration using Method 30B within 30 days as described above. If the concentration is below 90 percent of the operating limit, the owner or operator could set a new temperature operating limit 10°F above the previous operating limit. On the other hand, if the concentration is more than 90 percent of the operating limit, the facility would take corrective action to reduce the temperature back down to below the maximum temperature recorded during compliance tests and then retest emissions using Method 30B. If the concentration is more than 90 percent of the operating limit based on this subsequent test, then the facility must replace the carbon.

Wet scrubbers. For each wet scrubber, we are proposing

that pressure drop and water flow rate be maintained at a minimum level based on measurements during the initial or subsequent compliance test(s).

E. What are the notification, recordkeeping, and reporting requirements?

The owner or operator of an existing or new affected source would be required to comply with certain notification, recordkeeping, and reporting requirements of the NESHAP General Provisions (40 CFR part 63, subpart A), which are identified in Table 1 of this proposed rule. Each owner or operator of an affected source would submit an Initial Notification according to the requirements in 40 CFR § 63.9(a) through (d) and a Notification of Compliance Status according to the requirements in 40 CFR § 63.9(h).

Each owner or operator of an existing or new affected source would be required to keep records to document compliance with the mercury emission limits. Owners or operators of new and existing affected sources would maintain records of all monitoring data. Other records include monthly totals of ore quantity for ore pretreatment affected sources, monthly quantities of concentrate for all other affected sources, and monthly hours of operation for each process unit at each affected source.

If a deviation from this rule's requirements occurs, an affected source would be required to submit a compliance report for that reporting period. The proposed rule specifies the information requirements for such compliance reports.

We are also proposing to require electronic reporting of performance evaluation data collected using methods compatible with EPA's Electronic Reporting Tool (ERT). After December 31, 2011, within 60 days after the date of completing each performance evaluation conducted to demonstrate compliance, the owner or operator would submit the test data to EPA by entering the data electronically into EPA's WebFIRE data base through EPA's Central Data Exchange. The owner or operator of an affected facility would enter the test data into EPA's data base using the ERT or other compatible electronic spreadsheet. Only performance evaluation data collected using methods compatible with ERT would be subject to this requirement to be submitted electronically into EPA's WebFIRE database.

F. What are the title V permit requirements?

Under section 502(a) of the CAA, all major sources and certain other sources, including sources subject to section 112 standards, are required to operate in compliance with a title V permit. Today's proposal requires that gold mine ore processing and production area sources comply with the title V permitting requirements. However, section 502(a) of the CAA provides that

the Administrator may exempt an area source category (in whole or in part) from title V if she/he determines that compliance with title V requirements is "impracticable, infeasible, or unnecessarily burdensome" on such category. We are therefore soliciting comment on whether such an exemption is appropriate under section 502(a) for any particular sources in this category. Commenters should provide supporting data and rationale to explain the bases for their comments.<sup>1</sup>

#### G. Emissions of Non-Mercury HAPs

EPA recently gathered data and evaluated emissions of other HAP, including cyanide and non-mercury metals. The data indicate that the gold mining processing and production category consists of only area sources (i.e., facilities that emit less than ten tons per year of any one HAP and less than 25 tons per year of any combination of HAP). However, a few facilities are close to the major source threshold due to hydrogen cyanide (HCN). For example, the largest facility emits an estimated 5 to 9 tons of HCN per year. Emissions of all other HAPs, including mercury, are individually significantly lower than the 10 ton per year threshold for a single HAP and the 25 ton per

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<sup>1</sup> For the factors that EPA considers in evaluating whether to exercise the Agency's discretion to exempt area sources from title V, please see *National Emission Standards for Hazardous Air Pollutants for Area Sources: Clay Ceramic Manufacturing, Glass Manufacturing, and Secondary Nonferrous Metal Processing; Proposed rule*, 72 Fed. Reg. 53838, 53849-53853 (September 20, 2007).

year threshold for a combination of HAP. However, depending on how facilities manage their cyanide processes, EPA believes that cyanide emissions could potentially change a facility's status from area source to major source. Although EPA would develop MACT standards if it ever identified any major sources of gold mine ore processing and production, the MACT standards in today's proposal apply only to area sources because those are the only gold mine ore processing and production sources EPA has identified.

In light of the above, we are considering including in today's NESHAP a provision under which sources may certify and demonstrate that they are area sources of gold mine ore processing and production. We would include in this area source NESHAP management practices for cyanide processes that we believe would effectively limit cyanide emissions and thus assure that sources maintain their area source status. To the extent sources were concerned about their HCN emissions, they could implement the management practices for cyanide processes specified in this rule and certify to the Agency that they had done so. Some management practices we are considering include: maintaining pH of cyanide leach solutions greater than nine; burying leach lines whenever practical and feasible; monitoring cyanide concentrations at the perimeter and in a downwind direction of main emission sources; not allowing puddles to form

that are greater than 1 square meter on leach pads; and in locations that have the highest potential for concentrated emissions (e.g., mixing tanks, CIL tanks, loading stations) maintain HCN air concentrations below a prescribed level (e.g., 5 ppm).

We request comment on whether we should include the proposal described above or some modification of it. We also request comment on effective management practices to limit cyanide emissions, including the practices described above as well as other approaches to manage cyanide emissions.

#### H. Request for comments

As mentioned previously, we are soliciting comments on all aspects of this proposed rule, including, but not limited to, the data and calculations used to establish the emissions limits for mercury, the proposed requirements and options for emissions testing and monitoring, the parametric monitoring options for control devices, title V permit requirements, and emissions of non-mercury HAPs.

### **V. Rationale for the Proposed Standards**

#### A. How did we select the affected source?

We are proposing individual MACT standards for each of the following three affected sources in the gold mine ore processing and production source category: ore pretreatment processes, carbon processes, and non-carbon concentrate processes. These

three affected sources reflect the three primary different types of processes used in this source category to produce gold. Moreover, many gold mine ore processing and production facilities combine the emissions from multiple process units within a single affected source and route them to a single mercury emission control system and stack. Because we cannot determine the mercury emissions from individual process units that share a stack, it is difficult to establish emission standards for each process unit within an affected source. Setting MACT standards for each of the three affected sources accommodates the various stack and control configurations for the process units within an affected source. Emissions from all process units in the affected source would be summed to determine compliance with the proposed MACT standard for that affected source.

As described above, the three affected sources differ in process operations, the sources of mercury entering the processes, and the nature of the emissions. Ore pretreatment processes include roasting operations (roasters, ore dryers, ore pre-heaters, and quenchers) and autoclaves that are used to pretreat refractory ore, which contains organic carbon and/or sulfide mineral grains that prevent the initial use of cyanide leaching to extract the gold effectively from the ore. Mercury enters these processes with the ore. The potential for mercury

emissions from this affected source is directly related to the amount of ore processed in the autoclaves and roasters; the proposed standard for this affected source is therefore expressed in pounds of mercury emissions per million tons of ore processed (lb/million tons of ore).

Carbon processes include carbon kilns, electrowinning cells, melt furnaces, retorts, and preg tanks at facilities that use carbon to recover gold from pregnant cyanide solution. In developing a proposed format for the emission limit for carbon processes, we examined the use of loaded carbon, concentrate, and gold production in the denominator of a pound per ton format. In other NESHAPs, we have typically used the amount of feed throughput or the amount of product produced in the denominator of the emission limit. For example, in the proposed revisions to the Portland cement NESHAP (74 FR 21136, May 6, 2009), we analyzed the data and developed the MACT floor in terms of pounds per million tons of feed to the kiln and subsequently converted the emission limit to a format of pounds per million tons of clinker (i.e., the product from the kiln). Although loaded carbon can be considered the "primary feed", we discovered there were potential issues with its measurements (e.g., default values were used for density), we were unsure that the data from different facilities were comparable, and it was not a quantity that has been required to be reported under

existing State regulatory programs. We rejected the use of gold produced because some facilities do not produce gold (they send the intermediate product to offsite refineries), some facilities produce more silver than gold, and the quantity of gold varies depending on the percent of gold in the product. The primary intermediate product that is common to all of the facilities with these carbon processes is the gold-bearing EW concentrate, which is the input to retorts or melt furnaces. Further, concentrate is closely related to the final product because it contains about 60 percent gold, and because of its value, it is carefully and accurately weighed and records of the quantities are kept. Concentrate is also required to be reported under the NDEP program, so we had comparable and reliable data from the different gold mine ore processing and production facilities. Consequently, we decided that the most appropriate format of the emission limit for the carbon processes is lb/ton of concentrate.

For the reasons discussed above, we are proposing the concentrate format. However, we also considered using the amount of loaded carbon for the denominator of the emission limit format for carbon processes instead of concentrate, and we believe there may be merit in using loaded carbon as the denominator. Therefore, we are soliciting comments on the merits of both formats. In particular, we seek comments on

whether loaded carbon or concentrate would be the better format for compliance determinations (e.g., accuracy and reliability of the measurements, availability of records) or for other reasons or factors, such as the processes present at a given plant, operating layout, or offsite shipments for processing. We are also requesting comment on whether the quantity of concentrate should be determined on an "as fed" or dry basis, and if a dry basis, what methods could be used to determine dry weight accurately and reproducibly.

Non-carbon concentrate processes include retorts and melt furnaces at facilities that use the Merrill Crowe process to produce gold. These affected sources do not use carbon to recover gold and the only thermal process units used to recover gold ore are retorts and furnaces. As described above, during the non-carbon processes, zinc dust is added to the cyanide solution after leaching to precipitate gold and other metals (including mercury). The precipitate (or "MC concentrate") is then processed in retorts and metal furnaces, liberating mercury from the concentrate. The potential mercury emissions are therefore directly related to the amount of concentrate processed; consequently for this reason and the merits of using concentrate as discussed above, the proposed standard for this affected source is expressed in lb/ton of concentrate.

B. How did we determine MACT?

## 1. Selection of MACT Floors for Existing Sources for the Three Affected Sources

CAA section 112(d)(3)(B) requires that the MACT standards for existing sources be at least as stringent as the average emission limitation achieved by the best performing five sources (for which the Administrator has or could reasonably obtain emissions information) in a category with fewer than 30 sources. The gold mine ore processing and production source category consists of fewer than 30 sources. As mentioned above, we are proposing MACT standards for each of the following three affected sources: ore pretreatment processes, carbon processes, and non-carbon concentrate processes. We have mercury emissions data on ore pretreatment processes for all five facilities in the United States with ore pretreatment processes. We have mercury emissions data on carbon processes for 11 facilities and mercury emissions data on non-carbon concentrate processes for two facilities. Pursuant to section 112(d)(3), the MACT floor limits for existing ore pretreatment processes and carbon processes are based on the average emission limitation achieved by the best performing five facilities for each of these two affected sources, and the MACT floor limit for existing non-carbon concentrate processes are based on the average emission limitation achieved by the two facilities with such processes.

To calculate the MACT floor limit for each of the affected

sources, we established and ranked sources' emissions from lowest to highest. The data on which we based the limits are expressed in terms of pounds of mercury emitted per ton of input, where the gold mine ore is the input for the ore pretreatment processes and concentrate is the input for the carbon processes and the non-carbon concentrate processes.

We used the emissions data for those best performing affected sources to determine the emission limits to be proposed, with an accounting for variability. EPA must exercise its judgment, based on an evaluation of the relevant factors and available data, to determine the level of emissions control that has been achieved by the best performing sources under variable conditions. The Court has recognized that EPA may consider variability in estimating the degree of emission reduction achieved by best-performing sources and in setting MACT floors. See *Mossville Env't'l Action Now v. EPA*, 370 F.3d 1232, 1241-42 (D.C. Cir 2004) (holding EPA may consider emission variability in estimating performance achieved by best-performing sources and may set the floor at a level that a best-performing source can expect to meet "every day and under all operating conditions").

To calculate the achieved emission limit, including

variability, we used the equation:<sup>2</sup>

$$\text{UPL} = x_p + t * (v_T)^{0.5}$$

where

UPL = upper prediction limit (99 percent),  
 $x_p$  = average of the best performing MACT pool sources,  
 $t$  = Student's t-factor evaluated at 99 percent confidence, and  
 $v_T$  = total variance determined as the sum of the within-source variance and the between-source variance.

The between-source variance is the variance of the average of the best performing source averages. The within-source variance is the variance of the MACT source average considering "m" number of future individual test runs used to make up the average to determine compliance. We are proposing that a compliance test would be based on the average of three runs; consequently, the value of "m" used in the statistical analysis is 3. This value of "m" is used to reduce the variability to account for the lower variability when averaging of individual runs is used to determine compliance in the future. For example, if the average of three test runs is used to determine compliance (m=3), the variability based on 3-run averages is lower than the variability of the single run measurements in the data base, which results in a lower UPL for the 3-run average.

Our MACT floor limit calculations are based primarily on mercury emissions data from annual testing that was required by

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<sup>2</sup> More details on the calculation of the MACT floor limits are given in the technical memo in the docket.

NDEP for 2007 and 2008. However, we used data from 2006 for an autoclave at a Nevada facility that was not tested in 2007 and did not operate in 2008. We also used data from 2009 to replace 2008 test data at one Nevada facility that was invalidated due to not following the procedures in the State's testing protocol. In addition, we used 2010 test data for a Nevada facility that installed new mercury emission controls on its roasters and resumed operation in late 2009. The tests that generated the data described above generally consisted of three runs per test per process at each facility. There were cases where 2007 results represent emissions before a control device was installed, and 2008 test results were after a mercury emission control device had been installed. In those cases, we used only the 2008 (controlled) test results to determine the top performing facilities. Emissions from the tests (in lb/hr) were multiplied by the number of hours the process operated in the calendar year and then divided by the process input rate for the year (in tons) to calculate the facility's performance for an affected source (expressed as lbs of mercury emissions per ton of input material).

Source performance and the resulting MACT floor limits are summarized in Tables 2, 3, and 4, for ore pretreatment, carbon, and non-carbon concentrate processes, respectively.

Table 2. MACT Floor Results for Ore Pretreatment

Facility	Average performance (lb/million tons ore)
A	62
B	64
C	69
E	90
D	211
Average of top 5	99
99% UPL existing (MACT Floor)	175
99% UPL new (MACT Floor)	163

Table 3. MACT Floor Results for Carbon Processes

Facility	Average performance (lb/ton concentrate)
M	0.06
N	0.60
A	1.5
H	1.8
D	2.9
F	3.1
C	3.7
I	6.9
G	9.7
B	21
J	39
Average of top 5	1.4
99% UPL existing (MACT Floor)	2.6
99% UPL new (MACT Floor)	0.14

Table 4. MACT Floor Results for Non-Carbon Concentrate Processes

Facility	Average performance (lb/ton concentrate)
K	0.07

L	0.11
Average of top 2	0.09
99% UPL existing	0.25
99% UPL new	0.20

The average emission rates for ore pretreatment and carbon processes from the top five facilities performing these processes are 99 lbs/million tons ore and 1.4 lb/ton of concentrate, respectively. The average emission rate for non-carbon concentrate processes from the top two facilities performing these processes is 0.09 lb/ton of concentrate. As previously discussed above, we account for variability in setting floors, not only because variability is an element of performance, but also because it is reasonable to assess best performance over time. Here, for example, we know that the 2 to 5 lowest emitting affected sources' emission estimates are averages and we expect that the actual emissions will vary over time. If we do not account for this variability, we would expect that even the sources that perform better than the floor on average would potentially exceed the floor emission levels part of the time.

For the lowest emitting sources (2 to 5 sources, depending on the affected source), we calculated an average emission rate using the data from multiple test runs for multiple processes. The results are shown in Tables 2, 3, and 4 and represent the

average performance of each source from the sum of the average emissions from all process units within the affected source. We then calculated the average performance of the lowest emitting sources and the variances of the emission rates for each process unit, which is a direct measure of the variability of the data set. This variability includes the run-to-run and year-to-year variability in the total mercury input to each process unit and variability of the sampling and analysis methods over the testing period, and it includes the variability resulting from site-to-site differences for the lowest emitters. We calculated the MACT floor based on the UPL (upper 99th percent) as described earlier from the average performance of the lowest emitting sources, Student's t-factor, and the total variability, which was adjusted to account for the lower variability when using 3-run averages to determine compliance. Our calculations yield the following MACT floor limits for existing sources: 175 lbs/million tons of ore for ore pretreatment processes, 2.6 lb/ton of concentrate for carbon processes, and 0.25 lbs/ton of concentrate for non-carbon concentrate processes.

The technologies for achieving the MACT floor for existing ore pretreatment processes include mercury scrubbers on roasters and venturi scrubbers on autoclaves and ancillary roaster operations. The roasters and autoclaves at Facilities A, B, C, and E shown in Table 2 above are already equipped with these

controls. Our MACT floor analysis indicates that these facilities are achieving the MACT floor average of 99 lb/million tons of ore. The analysis also indicates that an emission reduction will be needed for Facility D to achieve the MACT floor. Currently Facility D also has venturi scrubbers on its autoclaves; however, the emission control performance of these scrubbers will need to be improved to achieve the MACT floor.

To achieve the MACT floor for existing carbon processes, we expect that facilities would need to install carbon adsorbers on all process units that do not already have them (i.e., carbon adsorbers for carbon kilns, electrowinning, preg tanks, retorts, and melt furnaces). Our MACT floor analysis indicates that only Facilities M and N in Table 3 are achieving the MACT floor level of control; consequently, the other nine facilities in Table 3 are expected to have to install carbon adsorbers on all process units that do not already have them. The two top performing facilities (M and N) are fully equipped with carbon adsorbers (i.e., all of their process units are controlled by carbon adsorbers). Facility M also processes ore which has significantly lower mercury concentrations compared to the ore processed at most other facilities. We believe the combination of processing ore with low mercury content and the use of state-of-the-art mercury emission controls result in emissions at Facility M that are considerably lower than the other

facilities.

For the non-carbon concentrate processes, the MACT floor technology is the use of carbon adsorbers on retorts and melt furnaces. We expect that Facility L would probably need to install a carbon adsorber on their melt furnace to achieve the MACT floor.

## 2. Selection of New Source Floors for the Three Affected Sources

CAA section 112(d)(3) requires that the MACT floor limit for new sources not be less stringent than the emission control that is achieved in practice by the best controlled similar source. Table 2 above shows that Facility A has the lowest emission rate for ore pretreatment processes and is therefore considered the "best controlled similar source" for such processes. As previously mentioned, this facility is equipped with calomel scrubbers on roasters and venturi scrubbers on autoclaves. The emission rate for ore-pretreatment processes at Facility A is 62 lbs/million tons ore, not accounting for variability. Applying the UPL formula discussed earlier to account for variability based on the emission test runs for all affected process units at the best performing ore pretreatment affected source (Facility A), we calculated the 99<sup>th</sup> percentile of performance, which results in a new source MACT level of 163 lb/million tons of ore for ore pre-treatment processes.

Table 3 shows that Facility M has the lowest emission rate

for carbon processes and is therefore considered the "best controlled similar source" for such processes. As previously mentioned, all carbon process units at Facility M are well controlled with carbon absorbers. The emission rate for carbon processes at Facility M is 0.06 lb/ton of concentrate. After applying the UPL formula as described above to account for variability, the new source floor for carbon processes based on the 99<sup>th</sup> percentile of performance is 0.14 lb/ton of concentrate.

For carbon processes at new sources, we are proposing a compliance alternative to provide flexibility in determining compliance because of the wide variety of process combinations and variations in input material that may be present at future new carbon process sources. A well-established and conventional metric for expressing the degree of emission control is the percent control of the target pollutant. As mentioned above, Facility M is considered the "best controlled similar source" for carbon processes. Test data were available for 2007 for Facility M when the processes were uncontrolled, for 2008 when the controls were newly installed, and from 2009 after over one year of operation. The test results showed a 99.6 percent mercury emission reduction in 2008 and 93.5 percent reduction in 2009. Based on these results and considering variability over time, we are proposing a compliance alternative of 97 percent reduction in mercury emissions for new carbon processes. This

compliance alternative was calculated based on the average reduction achieved by the best performing source in 2008 and 2009.

Table 4 shows that Facility K has the lowest emission rate for non-carbon concentrate processes and is therefore considered the "best controlled similar source" for such processes. The emission rate for non-carbon concentrate processes at Facility K is 0.07 lb/ton of concentrate (not accounting for variability). Again applying the UPL formula as described above to account for variability, the new source floor for non-carbon concentrate processes based on the 99<sup>th</sup> percentile of performance is 0.20 lb/ton of concentrate.

### 3. Beyond the Floor Determination

To evaluate opportunities for emission reductions beyond those provided by the MACT floor, we typically identify control techniques that have the ability to achieve an emissions limit more stringent than the MACT floor. As mentioned above, the facilities with ore pretreatment processes would have installed mercury scrubbers and venturi scrubbers on their roasters and autoclaves, respectively, to achieve the MACT floor for ore pretreatment processes. To achieve further reductions in mercury beyond what can be achieved using mercury scrubbers and venturi scrubbers, we identified as a beyond-the-floor option the installation of both a refrigeration unit (or condenser) and

a carbon adsorber on autoclaves. This additional control system would follow the existing venturi scrubbers to further reduce mercury emission from autoclaves. Because the exhaust is saturated with water, a refrigeration unit or condenser would be needed to remove water that would otherwise adversely affect the adsorptive capacity of the carbon adsorber. With this additional control system, all facilities with ore pretreatment processes could achieve an average performance of 90 lb/million tons of ore or less. This is lower than the average emission rate of 99 lbs/million tons ore for ore pretreatment processes from the top five facilities performing these processes.

In determining whether to control emissions "beyond-the-floor," we must consider the costs, non-air quality health and environmental impacts, and energy requirements of such more stringent control. See CAA Section 112(d)(2). We estimate that the capital cost for the additional controls on the autoclaves would be \$890,000 with a total annualized cost of \$720,000/yr. Mercury emissions would be reduced by 543 lbs, resulting in an estimated cost effectiveness of \$1,300/lb. Energy consumption would increase by about 730 megawatt-hours per year, primarily due to the refrigeration unit. Solid waste generation and disposal (spent carbon loaded with mercury) would increase by about 3 tons per year. (See Section VI.A for additional discussion of our consideration of emissions, cost, and non-air

impacts in developing MACT standards for this source category.) After considering the costs and the above-mentioned impacts associated with the use of a refrigeration unit (or condenser) and a carbon adsorber on autoclaves, we believe that the emission reduction that can be achieved with this additional control system is justified under section 112(d) of the CAA. Applying the UPL formula discussed earlier to account for variability, the 99<sup>th</sup> percent UPL would be 149 lb/million tons of ore. We therefore propose that the beyond-the-floor performance level of 149 lb/million tons of ore is MACT for new and existing ore pretreatment processes.

For the carbon processes, we estimate that 9 of the 11 facilities for which we have data will need to improve control to meet the floor limits because these 9 plants have an average emission control performance that is above the MACT floor average performance. There are a few facilities in the middle of the rankings that will probably only need marginal improvements, but several facilities (especially those at the bottom of the ranking that average several times the floor average) will need significant improvements in mercury emission control. We estimate that the MACT floor limit for the carbon processes will reduce emissions by about 1,100 lbs per year, a reduction of 89 percent from current levels. Our estimates of impacts for the MACT floor indicate that most of the carbon

processes currently have or will have carbon adsorbers installed to effectively control mercury emissions at the MACT floor level. Considering the very low mercury concentrations when the carbon processes are performing at the MACT level of control, it is difficult to identify a technology that can obtain efficient additional percent reductions from low concentration streams. For a beyond-the-floor analysis, we assumed that theoretically a second carbon adsorption system could be installed in series with the first one and would get an additional 90 percent reduction from the very low mercury concentrations that result from the MACT floor level of control. We acknowledge that there is uncertainty as to the additional percent reduction the second control system might achieve. Nevertheless, we estimate that the emission reduction would only be 12 lbs per year. The capital cost was estimated as \$3.2 million with a total annualized cost of about \$1.2 million/yr and a cost effectiveness of \$100,000/lb. Considering the significant cost and the small additional reduction in emissions associated with a second carbon adsorption system and the uncertainty that even that small reduction might be achieved, we believe that the additional emission reduction from this beyond-the-floor control option is not warranted under section 112(d).

For the non-carbon concentrate processes, we expect that Facility L would probably need to add a carbon adsorber to its

melt furnace to achieve the MACT floor level of control. For beyond the floor, we again assumed that the existing carbon adsorbers would be supplemented by adding a second control system of carbon adsorbers in series for all of the melt furnaces. We estimated the capital cost for the second set of control systems as \$0.7 million and a total annualized cost of \$306,000/year. Emissions would be reduced by 7 lb/year, which results in a cost effectiveness of \$44,000/lb. Considering the very small emission reduction from a second carbon adsorber system, and its high capital and operating costs, we believe that the emission reduction associated with this additional control system is not warranted under section 112(d) of the CAA.

C. How did we select the testing, monitoring and electronic reporting requirements?

We are proposing testing and monitoring requirements to assure compliance with the emission standards set forth in this proposed rule. These compliance assurance provisions are based, in part, on requirements that have been applied to this source category in State operating permits, EPA requirements applied to other industries that emit mercury, and an understanding of how control devices and processes perform and can be effectively monitored.

We are proposing initial compliance stack tests for mercury (using Method 29) within the first 180 days of the compliance

date and annual compliance tests thereafter for all thermal process units to determine compliance with the proposed emission limits. The testing frequency and procedures would be essentially the same as the NDEP requirements for the facilities that are located in Nevada partly because the stack test data that we used to develop the proposed emission limits were based on the test methods applied in Nevada. To provide additional flexibility, we propose to allow the use of the Ontario Hydro Method, Method 30A, or Method 30B as alternatives to EPA Method 29.

We also propose the following monitoring requirements to assure compliance with the proposed MACT standards.

Roasters. In addition to the annual stack test, we are proposing two options for monitoring roaster emissions: (1) integrated sorbent trap mercury monitoring coupled with parametric monitoring of scrubbers and (2) monitoring using a continuous emission monitoring system (CEMS) for mercury. Both proposed monitoring options would require establishment of operating limits to detect and correct problems as soon as possible. An exceedance of an operating limit for the sorbent trap or CEMS monitoring would trigger immediate corrective action and would require that the problem be corrected within 48 hours or that the feed of ore to the roaster be stopped.

As part of this first monitoring option (i.e., sorbent trap

monitoring), we are also proposing that facilities with roasters and mercury scrubbers establish operating limits for various parameters during their compliance test (i.e., the annual stack test for mercury emissions). The proposed parametric monitoring provides additional compliance assurance by ensuring that the process and control devices are operating properly. The proposed parameters for monitoring mercury scrubbers are similar to those currently required to be monitored in the title V operating permits issued by NDEP for roasters. We are proposing that each mercury scrubber be equipped with devices to monitor the scrubber liquor flow rate, scrubber pressure drop, and inlet gas temperature. Minimum operating limits for the scrubber liquor flow rate and pressure drop would be established based on the lowest average value measured during any of the three runs of a compliant performance test. A maximum inlet temperature would be established based on the highest temperature measured during any of the three runs of the compliance test. In addition to the parameters described above, we are proposing that the facility would also monitor the mercuric ion concentration and the chloride ion concentration four times per day or continuously monitor the oxidation reduction potential and pH. These monitored parameters would be maintained within the range specified by the scrubber's manufacturer or within an alternative range approved by the permitting authority. If any

of the parameters are outside the specified range or limit, corrective action would be taken to bring the parameters back within the operating range or the facility would commence shutdown of the roaster.

As mentioned above, we are including a mercury CEMS as an alternative for monitoring of mercury emissions from roasters. This monitoring option would not require parametric monitoring of the mercury scrubbers. Mercury CEMS have been applied at other industrial sources that emit mercury, such as coal-fired power plants and cement production plants, and these devices yield valuable information regarding continuous emissions performance. We realize that mercury CEMS have not yet been demonstrated on roasters at gold production facilities and that there are currently no calibration standards traceable to NIST within the range of mercury concentrations from roasters. However, calibration standards are available from the manufacturers of mercury CEMS. Based on the Agency's understanding and experience relative to continuous mercury monitoring at other industrial facilities, such as coal-fired power plants and cement plants, as well as research experience, EPA believes that the CEMS can be adequately calibrated with manufacturers' standards and be used as a valuable tool to monitor roasting operations to detect deviations in performance. We therefore believe that it is appropriate to propose the use

of mercury CEMS as a monitoring option for roasters. However, we believe that it is appropriate to also propose an alternative monitoring approach based on frequent (weekly) monitoring using a sorbent trap method.

We request comments on the viability of using mercury CEMS, specifically for monitoring mercury emissions from roasters at gold ore processing and production facilities. We request comments on calibration methods, costs, reliability and other aspects of the CEMS. We also request similar comments on the sorbent trap method.

For facilities that control roaster mercury emissions with mercury scrubbers, we are proposing that if a facility demonstrates, in accordance with the demonstration requirements in the proposed rule, that mercury emissions from the roaster are less than 10 pounds of mercury per million tons of input ore, they can cease monitoring via either the sorbent trap or the mercury CEMS. Such a facility would be required to conduct the parametric monitoring for mercury scrubbers as described above (under option one) and maintain parameters within the operating ranges established in accordance with the proposed rule. Also, the facility would continue to perform annual compliance tests of the roaster stack to demonstrate emissions continue to be less than 10 pounds of mercury per million tons of input ore. We believe that for roasters that are effectively

controlled with mercury scrubbers (i.e., emitting less than 10 pounds per million ton of ore during normal operations), parametric monitoring of the scrubbers would be sufficient. This monitoring option provides additional incentive for facilities to reduce emissions from roasters. However, if any subsequent compliance tests indicate that the roaster is emitting more than 10 pounds of mercury per million tons of ore input, then the facility would be required to monitor the roaster emissions using a sorbent trap method or CEMS.

We are specifically requesting comments on the advantages and disadvantages of the two options for monitoring emissions from roasters along with any supporting data and documentation to support one or both of the options. We are also requesting comment on the proposed daily averaging time when using the mercury CEMS option and the frequency of sampling when using the sorbent trap option. In addition, we are requesting comments on the proposed monitoring approach for low-emitting roasters with mercury scrubbers, as described in the paragraph above, and possible alternatives to this approach. Moreover, we are requesting comments on the parametric monitoring methods.

Carbon Adsorbers. For process units (such as furnaces, kilns, retorts, electrowinning, and autoclaves) that control mercury emissions with a carbon adsorber, we are proposing three options. One option involves monitoring the mercury

concentration at the exit of the carbon bed. A second option, adopted from requirements in some NDEP permits, is based on sampling the carbon bed for mercury. The third option is based on changing out the carbon bed after a fixed period of time determined based on historical operating experience.

We believe that all three options could provide reasonable assurance that the carbon adsorber is operating properly on a continuing basis and that the carbon is replaced before breakthrough occurs. Our current preference among the three proposed monitoring options for carbon beds described above is the option of sampling the exit gas from the carbon bed using EPA Method 30B along with continuous temperature monitoring because this option provides a direct measurement of the amount of mercury exiting the control device. We are specifically requesting comments on the advantages and disadvantages of the three options along with any supporting data and documentation. Based on public comments, we intend to promulgate one or more of these options or a modified version as necessary.

We are also proposing that the inlet stream to carbon adsorbers applied to autoclaves, carbon kilns, melt furnaces, and retorts be monitored for temperature and that the inlet temperature be maintained below the maximum temperature established during the compliance tests. We believe the temperature monitoring is needed to detect any excursions in

mercury emissions caused by excessively high temperatures. We are also considering a reduction in frequency of the sampling and analysis based on historical data on the life of a new carbon bed (e.g., quarterly sampling when the carbon bed is fresh and monthly sampling after a specified period of time) and for processes that are very small sources of mercury emissions. We are requesting comments and supporting data on these options and others that may be appropriate for monitoring carbon beds.

Wet scrubbers. For each wet scrubber, we are proposing that pressure drop and water flow rate be maintained at a minimum level based on measurements during the initial or subsequent compliance test(s). These parameters are the typical monitoring parameters required by other MACT standards and by State operating permits for wet scrubbers at gold mine ore processing and production facilities. Monitoring these parameters ensures that wet scrubbers are operating properly.

Electronic reporting. The EPA must have performance test data to conduct effective reviews of CAA Section 112 and 129 standards, as well as for many other purposes including compliance determinations, emissions factor development, and annual emissions rate determinations. In conducting these required reviews, we have found it ineffective and time consuming not only for us but also for other regulatory agencies and source owners and operators to locate, collect, and submit

emissions test data because of varied locations for data storage and varied data storage methods. One improvement that has occurred in recent years is the availability of stack test reports in electronic format as a replacement for cumbersome paper copies.

In this action, we are taking a step to improve data accessibility. Owners and operators of affected facilities would be required to submit to an EPA electronic database an electronic copy of reports of certain performance tests required under this rule. Data entry would be through an electronic emissions test report structure called the Electronic Reporting Tool (ERT) that will be used by the staff as part of the emissions testing project. The ERT was developed with input from stack testing companies who generally collect and compile performance test data electronically and offices within State and local agencies which perform field test assessments. The ERT is currently available, and access to direct data submittal to EPA's electronic emissions database (WebFIRE) will become available by December 31, 2011.

The requirement to submit source test data electronically to EPA would not require any additional performance testing and would apply to those performance tests conducted using test methods that are supported by ERT. The ERT contains a specific electronic data entry form for most of the commonly used EPA

reference methods. The website listed below contains a listing of the pollutants and test methods supported by ERT. In addition, when a facility submits performance test data to WebFIRE, there would be no additional requirements for emissions test data compilation. Moreover, we believe industry would benefit from development of improved emissions factors, fewer follow-up information requests, and better regulation development as discussed below. The information to be reported is already required for the existing test methods and is necessary to evaluate the conformance to the test method.

One major advantage of submitting source test data through the ERT is that it provides a standardized method to compile and store much of the documentation required to be reported by this rule while clearly stating what testing information we require. Another important benefit of submitting these data to EPA at the time the source test is conducted is that it will substantially reduce the effort involved in data collection activities in the future. Specifically, because EPA would already have adequate source category data to conduct residual risk assessments or technology reviews, there would likely be fewer or less substantial data collection requests (e.g., CAA Section 114 letters). This results in a reduced burden on both affected facilities (in terms of reduced manpower to respond to data collection requests) and EPA (in terms of preparing and

distributing data collection requests).

State/local/Tribal agencies may also benefit in that their review may be more streamlined and accurate as the States will not have to re-enter the data to assess the calculations and verify the data entry. Finally, another benefit of submitting these data to WebFIRE electronically is that these data will improve greatly the overall quality of the existing and new emissions factors by supplementing the pool of emissions test data upon which the emissions factor is based and by ensuring that data are more representative of current industry operational procedures. A common complaint we hear from industry and regulators is that emissions factors are outdated or not representative of a particular source category. Receiving and incorporating data for most performance tests will ensure that emissions factors, when updated, represent accurately the most current operational practices. In summary, receiving test data already collected for other purposes and using them in the emissions factors development program will save industry, State/local/Tribal agencies, and EPA time and money and work to improve the quality of emissions inventories and related regulatory decisions.

As mentioned earlier, the electronic data base that will be used is EPA's WebFIRE, which is a Web site accessible through EPA's Technology Transfer Network (TTN). The WebFIRE Web site

was constructed to store emissions test data for use in developing emissions factors. A description of the WebFIRE data base can be found at

<http://cfpub.epa.gov/oarweb/index.cfm?action=fire.main>.

The ERT will be able to transmit the electronic report through EPA's Central Data Exchange (CDX) network for storage in the WebFIRE data base. Although ERT is not the only electronic interface that can be used to submit source test data to the CDX for entry into WebFIRE, it makes submittal of data very straightforward and easy. A description of the ERT can be found at [http://www.epa.gov/ttn/chief/ert/ert\\_tool.html](http://www.epa.gov/ttn/chief/ert/ert_tool.html).

## **VI. Impacts of the Proposed Standards**

### **A. What are the emissions, cost, economic, and non-air environmental impacts?**

We estimate the proposed MACT standard will reduce mercury emissions from gold mine ore processing and production by 1,650 lb/year from current emissions levels down to a level of 1,390 lb/year post-MACT. The annual emissions expected after MACT (of 1,390 lbs) represent a 73 percent reduction from 2007 emissions (5,000 pounds), more than 90 percent reduction from the emissions level in 2001 (about 23,000 pounds), and more than 96 percent reduction from uncontrolled emissions levels (more than 37,000 pounds). The capital cost of emission controls is estimated as \$5 million with a total annualized cost of \$2.3

million per year. The capital costs for monitoring, reporting, and recordkeeping are estimated as \$1.0 to \$1.3 million with a total annualized cost of \$0.8 to \$1.5 million per year, depending on the monitoring option that is chosen. The cost of compliance is estimated to be less than 0.3 percent of sales. We therefore believe that the economic impact on an affected company would be insignificant. Electricity consumption is expected to increase by about 2,100 megawatt-hours per year due to increased fan capacity for carbon adsorbers and the installation of refrigeration units or condensers on a few process units. Non-hazardous solid waste (spent carbon containing mercury that must be regenerated or disposed of) would increase by about 7 tons per year.

B. What are the health benefits of reducing mercury emissions?

Mercury is emitted to the air from various man-made and natural sources. These emissions transport through the atmosphere and eventually deposit to land or water bodies. This deposition can occur locally, regionally, or globally, depending on the form of mercury emitted and other factors such as the weather. The form of mercury emitted varies depending on source type and other factors. Available data indicate that the majority of air emissions from gold mine ore processing and production facilities are in the form of gaseous elemental mercury. This form of mercury can be transported very long

distances, even globally, to regions far from the emissions source (becoming part of the global "pool") before deposition occurs. However, this source category also emits some gaseous inorganic ionic mercury forms (such as mercuric chloride), and smaller amounts of particulate bound mercury. These forms have a shorter atmospheric lifetime and can deposit to land or water bodies closer to the emissions source. Furthermore, elemental mercury in the atmosphere can undergo transformation into ionic mercury, providing a significant pathway for deposition of emitted elemental mercury.

As mentioned previously, the gold mine ore processing and production source category emitted about 2.5 tons of mercury to the air in 2007 in the U.S. Based on the EPA's National Emission Inventory, about 103 tons of mercury were emitted from all anthropogenic sources in the U.S. in 2005. Moreover, the United Nations has estimated that about 2100 tons were emitted worldwide by anthropogenic sources in 2005.<sup>3</sup> We believe that total mercury emissions in the U.S. and globally in 2007 were about the same magnitude as in 2005. Therefore, we estimate that in 2007 the gold mine ore processing and production source

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<sup>3</sup> United Nations Environment Programme/Arctic Monitoring and Assessment Program (UNEP/AMAP). *Study on mercury-emitting sources, including emissions trends and cost and effectiveness of alternative control measures: "UNEP Paragraph 29 study."* 2008. Available at: <http://www.chem.unep.ch/mercury/Paragraph29/Zero%20Draft%20Report%20March%2008.doc>

category emitted about 2.5 percent of the total anthropogenic mercury emissions in the U.S. and about 0.12 percent of the global emissions.

Potential exposure routes to mercury emissions include both direct inhalation, and consumption of fish containing methylmercury. The primary route of human exposure to mercury emissions from industrial sources is generally indirectly through the consumption of fish containing methylmercury. As described above, mercury that has been emitted to the air eventually settles into water bodies or onto land where it can either move directly or be leached into water bodies. Once deposited, certain microorganisms can change it into methylmercury, a highly toxic form that builds up in fish, shellfish and animals that eat fish. Consumption of fish and shellfish are the main sources of methylmercury exposure to humans. Methylmercury builds up more in some types of fish and shellfish than others. The levels of methylmercury in fish and shellfish vary widely depending on what they eat, how long they live and how high they are in the food chain. Most fish, including ocean species and local freshwater fish, contain some methylmercury. For example, in recent studies by EPA and the

United States Geological Survey (USGS) of fish tissues, every fish sampled contained some methylmercury.<sup>4,5</sup>

Research shows that most people's fish consumption does not cause a mercury-related health concern. However, certain sub-populations may be at higher risk because of their routinely high consumption of fish (e.g., tribal and other subsistence fishers and their families who rely heavily on fish for a substantial part of their diet). It has been demonstrated that high levels of methylmercury in the bloodstreams of unborn babies and young children may harm the developing nervous system, making the child less able to think and learn. Moreover, mercury exposure at high levels can harm the brain, heart, kidneys, lungs, and immune system of people of all ages.<sup>6</sup>

The majority of the fish consumed in the U.S. are ocean species. The methylmercury concentrations in ocean fish species are primarily influenced by the global mercury pool. However, the methylmercury found in local fish can be due, at least partly, to mercury emissions from local sources.

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<sup>4</sup> *The National Study of Chemical Residues in Lake Fish Tissue*. U.S. Environmental Protection Agency Office of Water Office of Science and Technology September 2009. Available at: <http://www.epa.gov/waterscience/fish/study/index.htm>.

<sup>5</sup> Scudder, B., L. Chasar, D. Wentz, N. Bauch, M. Brigham, P. Moran, and D. Krabbenhoft. (United States Geological Survey). *Mercury in Fish, Bed Sediment, and Water from Streams Across the United States, 1998-2005*. 2009. Available at: <http://pubs.usgs.gov/sir/2009/5109/>.

<sup>6</sup> For more information see <http://www.epa.gov/mercury/about.htm>.

Overall, this regulation will reduce mercury emissions from the gold ore processing and production source category by about 1,650 pounds per year from current levels and, therefore, contribute to reductions in mercury exposures and health effects.

## **VII. Statutory and Executive Order Reviews**

### **A. Executive Order 12866: Regulatory Planning and Review**

This action is a "significant regulatory action" under the terms of Executive Order 12866 (58 FR 51735, October 4, 1993) because it may raise novel legal or policy issues. Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under Executive Order 12866, and any changes made in response to OMB recommendations have been documented in the docket for this action.

### **B. Paperwork Reduction Act**

The information collection requirements in this proposed rule have been submitted for approval to OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. The Information Collection Request (ICR) document prepared by EPA has been assigned EPA ICR No. 2383.01.

The recordkeeping and reporting requirements in this proposed rule are based, in large part, on the information collection requirements in EPA's NESHAP General Provisions (40 CFR part 63, subpart A). The recordkeeping and reporting

requirements in the General Provisions are specifically authorized by section 114 of the CAA (42 U.S.C. 7414). All information other than emissions data submitted to EPA pursuant to the information collection requirements for which a claim of confidentiality is made is safeguarded according to CAA section 114(c) and EPA's implementing regulations at 40 CFR part 2, subpart B.

This proposed NESHAP would require applicable one-time notifications according to the NESHAP General Provisions. In addition, owners or operators must submit annual notifications of compliance status and report any deviations in each semiannual reporting period. Records of all performance tests, measurements of feed input rates, monitoring data, and corrective actions would be required.

The average annual burden for this information collection averaged over the first 3 years of this ICR is estimated to total 4,225 labor hours per year at a cost of approximately \$213,726 per year for the 21 facilities that would be subject to this proposed rule, or approximately 201 hours per year per facility. Capital costs are estimated as \$1.3 million, operation and maintenance costs are estimated as \$65,000 per year, and total annualized cost (including capital recovery) is estimated as \$256,000 per year for this proposed rule's information collection requirements. No costs or burden hours

are estimated for new sources because none is projected for the next 3 years. Burden is defined at 5 CFR 1320.3(b).

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the collection displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR part 63 are listed in 40 CFR part 9.

To comment on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, EPA has established a public docket for this rule, which includes this ICR, under Docket ID number EPA-HQ-OAR-2010-0239.

Submit any comments related to the ICR to EPA and OMB. See **ADDRESSES** section at the beginning of this notice for where to submit comments to EPA. Send comments to OMB at the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW, Washington, DC 20503, Attention: Desk Office for EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after **[Insert date of publication in the Federal Register.]**, a comment to OMB is best assured of having its full effect if OMB receives it by **[Insert date 30 days after publication in the Federal Register.]**. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that this rule would not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small not-for-profit enterprises, and small governmental jurisdictions.

For the purposes of assessing the impacts of this proposed NESHAP on small entities, a small entity is defined as: (1) a small business whose parent company meets the Small Business Administration size standards for small businesses found at 13 CFR 121.201 (less than 500 employees for gold mine ore processing and production facilities - NAICS 212221); (2) a small governmental jurisdiction that is a government of a city, county, town, school district, or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

After considering the economic impacts of this proposed rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. This proposed rule is estimated to impact about 21

gold mine ore processing and production facilities, none of which are owned by small entities. Thus, there are no impacts to small entities from this proposed rule. Although this proposed rule will contain requirements for new sources, EPA expects few, if any, new sources to be constructed in the next several years. Therefore, EPA did not estimate the impacts for new affected sources for this proposed rule.

Although this proposed rule will not have a significant economic impact on a substantial number of small entities, EPA nonetheless has tried to reduce the impact of this proposed rule on small and large entities. These standards establish emission limits that reflect practices and controls that are used throughout the industry and in many cases are already required by State operating permits. These standards also require only the essential monitoring, recordkeeping, and reporting needed to verify compliance. These proposed standards were developed based on information obtained from industry representatives in our surveys, consultation with business representatives and their trade association and other stakeholders. We continue to be interested in the potential impacts of this proposed rule on small entities and welcome comments on issues related to such impacts.

D. Unfunded Mandates Reform Act

This proposed rule does not contain a federal mandate that

may result in expenditures of \$100 million or more for state, local, and tribal governments, in the aggregate, or to the private sector in any one year. This proposed rule is not expected to impact state, local, or tribal governments. The nationwide annualized cost of this proposed rule for affected industrial sources is \$3.8 million/yr. Thus, this proposed rule is not subject to the requirements of sections 202 and 205 of the Unfunded Mandates Reform Act (UMRA).

This proposed rule is also not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments. This proposed rule will not apply to such governments and will not impose any obligations upon them.

E. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. This proposed rule does not impose any requirements on state and local governments. Thus, Executive Order 13132 does not apply to this action.

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and

local governments, EPA specifically solicits comment on this proposed action from State and local officials.

F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

This action does not have tribal implications, as specified in Executive Order 13175 (65 FR 67249, November 9, 2000). This proposed rule imposes no requirements on tribal governments; thus, Executive Order 13175 does not apply to this action. EPA specifically solicits additional comment on this proposed action from tribal officials.

G. Executive Order 13045: Protection of Children from Environmental Health and Safety Risks

EPA interprets Executive Order 13045 (62 F.R. 19885, April 22, 1997) as applying only to those regulatory actions that are based on health or safety risks, such that the analysis required under section 5-501 of the Executive Order has the potential to influence the regulation. This action is not subject to Executive Order 13045 because it is based solely on technology performance.

H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This action is not a "significant energy action" as defined in Executive Order 13211 (66 FR 28355, May 22, 2001) because it is not likely to have a significant adverse effect on the

supply, distribution, or use of energy. We have concluded that this proposed rule will not likely have any significant adverse energy effects because energy consumption would increase by only 2,100 megawatt-hours per year.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law No. 104-113 (15 U.S.C. 272 note), directs EPA to use voluntary consensus standards (VCS) in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. VCS are technical standards (e.g., materials specifications, test methods, sampling procedures, business practices) that are developed or adopted by voluntary consensus standards bodies. NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable VCS.

This proposed rulemaking involves technical standards. EPA proposes to use ASME PTC 19.10-1981, "Flue and Exhaust Gas Analyses," for its manual methods of measuring the oxygen or carbon dioxide content of the exhaust gas. These parts of ASME PTC 19.10-1981 are acceptable alternatives to EPA Method 3B. This standard is available from the American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990.

Another VCS, ASTM D6784-02, "Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method)" is an acceptable alternative to EPA Method 29. This performance test method is available from ASTM International. See <http://www.astm.org/>.

EPA has also decided to use EPA Methods 1, 1A, 2, 2A, 2C, 2D, 2F, 2G, 3, 3A, 3B, 4, 29, 30A, 30B, Method 7471A, "Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)," and ASTM D6784-02, "Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources," (incorporated by reference - see 63.14). Although the Agency has identified 14 VCS as being potentially applicable to these methods cited in this rule, we have decided not to use these standards in this proposed rulemaking. The use of these VCS would have been impractical because they do not meet the objectives of the standards cited in this rule. The search and review results are in the docket for this proposed rule.

EPA welcomes comments on this aspect of this proposed rulemaking and, specifically, invites the public to identify potentially-applicable voluntary consensus standards and to explain why such standards should be used in this regulation.

Under section 63.7(f) and section 63.8(f) of Subpart A of

the General Provisions, a source may apply to EPA for permission to use alternative test methods or alternative monitoring requirements in place of any required testing methods, performance specifications, or procedures in the proposed rule.

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898 (59 FR 7629, February 16, 1994) establishes federal executive policy on environmental justice. Its main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this proposed rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it will increase the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority or low-income population. This proposed rule is expected to

reduce mercury emissions from gold mine ore processing and production facilities and thus decrease the amount of such emissions to which all affected populations are exposed.

National Emission Standards for Hazardous Air Pollutants: Gold  
Mine Ore Processing and Production Area Source Category; and  
Addition to Source Category List for Standards  
Page 99 of 136

List of Subjects in 40 CFR Part 63

Environmental protection, Air pollution control, Hazardous  
substances, Incorporations by reference, Reporting and  
recordkeeping requirements.

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Dated:

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Lisa P. Jackson,  
Administrator.

For the reasons stated in the preamble, title 40, chapter I, of the Code of Federal Regulations is proposed to be amended as follows:

**PART 9—[AMENDED]**

1. The authority citation for part 9 continues to read as follows:

**Authority:** 7 U.S.C. 135, et seq., 136-136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601-2671; 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251, et seq., 1311, 1313d, 1314, 1318, 1321, 1326, 1330, 1342, 1344, 1345(d) and (e), 1361; E.O. 11735, 38 FR 21243, 3 CFR, 1971-1975 Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-1, 300j-2, 300j-3, 300j-4, 300j-9, 1857, et seq., 6901-6992k, 7401-7671q, 7542, 9601-9657, 11023, 11048.

**Subpart A—[Amended]**

\* \* \* \* \*

2. The table in Section 9.1 is amended by adding an entry in numerical order for 63.11647-63.11648 under the heading "National Emission Standards for Hazardous Air Pollutants for Source Categories" to read as follows:

**§9.1 OMB Approvals under the Paperwork Reduction Act.**

\* \* \* \* \*

40 CFR citation	OMB control No.
* * * * *	

National Emission Standards for Hazardous Air Pollutants for Source Categories <sup>3</sup>	
* * * * *	
63.11647-63.11648	2060-NEW
* * * * *	

\* \* \* \* \*

<sup>3</sup> The ICRs referenced in this section of the table encompass the applicable general provisions contained in 40 CFR part 63, subpart A, which are not independent information collection requirements.

\* \* \* \* \*

**PART 63—[AMENDED]**

3. The authority citation for part 63 continues to read as follows:

**Authority:** 42 U.S.C. 7401 et seq.

**Subpart A—[Amended]**

4. Section 63.14 is amended by revising paragraphs (b)(35) and (i)(1) and by adding paragraph (k)(1)(v) to read as follows:

**§63.14 Incorporation by reference.**

\* \* \* \* \*

(b) \* \* \*

(35) ASTM D6784-02, Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), IBR approved for §63.11646(a)(1)(v) and table 5 to subpart DDDDD of this part.

\* \* \* \* \*

(i) \* \* \*

(1) ANSI/ASME PTC 19.10-1981, "Flue and Exhaust Gas Analyses [Part 10, Instruments and Apparatus]," IBR approved for §§63.309(k)(1)(iii), 63.865(b), 63.3166(a)(3), 63.3360(e)(1)(iii), 63.3545(a)(3), 63.3555(a)(3), 63.4166(a)(3), 63.4362(a)(3), 63.4766(a)(3), 63.4965(a)(3), 63.5160(d)(1)(iii), 63.9307(c)(2), 63.9323(a)(3), 63.11148(e)(3)(iii), 63.11155(e)(3), 63.11162(f)(3)(iii) and (f)(4), 63.11163(g)(1)(iii) and (g)(2), 63.11410(j)(1)(iii), 63.11551(a)(2)(i)(C), 63.11646(a)(1)(iii), table 5 to subpart DDDDD of this part, and table 1 to subpart ZZZZZ of this part.

\* \* \* \* \*

(k) \* \* \*

(1) \* \* \*

(v) Method 7471A, "Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)," IBR approved for §63.11647(f)(2).

\* \* \* \* \*

5. Part 63 is amended by adding subpart EEEEEEE to read as follows:

**Subpart EEEEEEE—National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category**

**Applicability and Compliance Dates**

Sec.

63.11640 Am I subject to this subpart?

63.11641 What are my compliance dates?

### **Standards and Compliance Requirements**

63.11645 What are my mercury emission standards?

63.11646 What are my compliance requirements?

63.11647 What are my monitoring requirements?

63.11648 What are my notification, reporting, and recordkeeping requirements?

### **Other Requirements and Information**

63.11650 What General Provisions apply to this subpart?

63.11651 What definitions apply to this subpart?

63.11652 Who implements and enforces this subpart?

63.11653 [Reserved]

### **Tables to Subpart EEEEEEE of Part 63**

Table 1 to Subpart EEEEEEE of Part 63—Applicability of General Provisions to Subpart EEEEEEE

### **Subpart EEEEEEE—National Emission Standards for Hazardous Air**

**Pollutants: Gold Mine Ore Processing and Production Area Source**

#### **Category**

#### **Applicability and Compliance Dates**

§63.11640 Am I subject to this subpart?

(a) You are subject to this subpart if you own or operate a gold mine ore processing and production facility as defined in §63.11651, that is an area source.

(b) This subpart applies to each new or existing affected source. The affected sources are each collection of "ore pretreatment processes" at a gold mine ore processing and production facility, each collection of "carbon processes" at a

gold mine ore processing and production facility, and each collection of "non-carbon concentrate processes" at a gold mine ore processing and production facility, as defined in §63.11651.

(1) An affected source is existing if you commenced construction or reconstruction of the affected source on or before [INSERT DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER].

(2) An affected source is new if you commenced construction or reconstruction of the affected source after [INSERT DATE OF PUBLICATION OF THIS PROPOSED RULE IN THE FEDERAL REGISTER].

(c) This subpart does not apply to research and development facilities, as defined in section 112(c)(7) of the Clean Air Act (CAA).

(d) If you own or operate a source subject to this subpart, you must have or you must obtain a permit under 40 CFR part 70 or 40 CFR part 71.

§63.11641 What are my compliance dates?

(a) If you own or operate an existing affected source, you must comply with the applicable provisions of this subpart no later than 2 years after the date of publication of the final rule in the Federal Register.

(b) If you start up a new affected source on or before the date of publication of the final rule in the Federal Register,

you must comply with the provisions of this subpart no later than the date of publication of the final rule in the Federal Register.

(c) If you start up a new affected source after the date of publication of the final rule in the Federal Register, you must comply with the provisions of this subpart upon startup of your affected source.

### **Standards and Compliance Requirements**

#### §63.11645 What are my mercury emission standards?

(a) For existing ore pretreatment processes, you must emit no more than 149 pounds of mercury per million tons of ore processed.

(b) For existing carbon processes, you must emit no more than 2.6 pounds of mercury per ton of concentrate processed.

(c) For existing non-carbon concentrate processes, you must emit no more than 0.25 pounds of mercury per ton of concentrate processed.

(d) For new ore pretreatment processes, you must emit no more than 149 pounds of mercury per million tons of ore processed.

(e) For new carbon processes, you must either:

(1) Emit no more than 0.14 pounds of mercury per ton of concentrate processed, or

(2) Achieve a 97 percent reduction in mercury emissions as

measured before and after the mercury emission control devices.

(f) For new non-carbon concentrate processes, you must emit no more than 0.2 pounds of mercury per ton of concentrate processed.

(g) The standards set forth in this section apply at all times.

§63.11646 What are my compliance requirements?

(a) Except as provided in paragraph (b) of this section, you must conduct a mercury compliance emission test within 180 days of the compliance date for all process units at new and existing affected sources according to the requirements in paragraphs (a)(1) through (13) of this section. This compliance testing must be repeated annually thereafter (i.e., once every four successive calendar quarters).

(1) You must determine the concentration of mercury and the volumetric flow rate of the stack gas according to the following test methods and procedures:

(i) Method 1 or 1A (40 CFR part 60, appendix A-1) to select sampling port locations and the number of traverse points in each stack or duct. Sampling sites must be located at the outlet of the control device (or at the outlet of the emissions source if no control device is present) and prior to any releases to the atmosphere.

(ii) Method 2, 2A, 2C, 2D, 2F (40 CFR part 60, appendix A-

1), or Method 2G (40 CFR part 60, appendix A-2) to determine the volumetric flow rate of the stack gas.

(iii) Method 3, 3A, or 3B (40 CFR part 60, appendix A-2) to determine the dry molecular weight of the stack gas. You may use ANSI/ASME PTC 19.10-1981, "Flue and Exhaust Gas Analyses" (incorporated by reference-see §63.14) as an alternative to EPA Method 3B.

(iv) Method 4 (40 CFR part 60, appendix A-3) to determine the moisture content of the stack gas.

(v) Method 29 (40 CFR part 60, appendix A-8), ASTM D6784-02; "Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method)" (incorporated by reference - see §63.14); Method 30A (40 CFR part 60, appendix A-8); or Method 30B (40 CFR part 60, appendix A-8) to determine the concentration of mercury. If you use Method 29, the acetone rinse procedures in Section 8.2.6 of the method must be followed and are not optional (i.e., quantitative removal of particulate matter and any condensate from the sampling apparatus (probe nozzle, fitting, holder) and front half of the filter holder must be performed using acetone).

(vi) The absence of cyclonic flow must be determined prior to or during the test. For retorts and other narrow stacks where sampling is done at a single point with a standard pitot

tube, a "null" check must be performed prior to sampling.

(2) A minimum of three test runs must be conducted for each performance test of each process unit. Each test run must be conducted for at least two hours and collect a minimum sample volume of 1.7 dry standard cubic meters (60 dry standard cubic feet).

(3) Tests must be conducted under operating conditions (including process or production throughputs) that are based on representative performance. Record and report the process throughput for each test run.

(4) Calculate the mercury emission rate for each process unit using Equation (1) of this section:

$$E = C_s * Q_s * K \quad (\text{Eq. 1})$$

Where:

E = mercury emissions in lb/hr;  
C<sub>s</sub> = concentration of mercury in the stack gas, in milligrams per dry standard cubic meter (mg/dscm);  
Q<sub>s</sub> = volumetric flow rate of the stack gas, in dry standard cubic feet per hour; and  
K = conversion factor from mg/dscm to pounds per dry standard cubic foot, 6.23 x 10<sup>-8</sup>.

(5) Monitor and record the number of hours each process unit operates during each month.

(6) For the initial compliance determination for both new and existing sources, determine the total mercury emissions for the 6-month period following the compliance date by multiplying

the emission rate in lb/hr for each process unit by the number of hours each process unit operated during the 6-month period. After the initial 6 months following the compliance date, determine the annual mercury mass emissions in accordance with the procedures in paragraph (a)(7) of this section. Existing sources may use a previous emission test for their initial compliance determination in lieu of conducting a new test if the test was conducted within one year of the compliance date using the methods specified in paragraphs (a)(1) through (4) of this section, and the tests were representative of current operating processes and conditions.

(7) For compliance determinations following the initial compliance test for new and existing sources, determine the total mercury mass emissions for each process unit for the 12-month period preceding the performance test by multiplying the emission rate in lb/hr for each process unit by the number of hours each process unit operated during the 12-month period preceding the completion of the performance tests.

(8) You must install, calibrate, maintain and operate an appropriate weight measurement device or densitometers and volumetric flow meters to measure ore throughput for each roasting operation and autoclave and calculate hourly, daily and monthly totals in tons of as fed ore.

(i) Measure the weight or the density and volumetric flow

rate of the oxidized ore slurry as it exits the roaster oxidation circuit and before the carbon-in-leach tanks.

(ii) Measure the weight or the density and volumetric flow rate of the ore slurry as it is fed to the autoclave(s).

(9) Measure the weight of concentrate processed (by electrowinning, Merrill Crowe process, gravity feed, or other methods) using weigh scales for each batch prior to retorting. The concentrate must be weighed in the same state and condition as it is when fed to the retort. For facilities without retorts, the concentrate must be weighed prior to being fed to the melt furnace before drying in any ovens. For facilities that ship concentrate offsite, measure the weight of concentrate as shipped offsite. You must keep accurate records of the weights of each batch of concentrate processed and calculate and record the total weight of concentrate processed each month.

(10) You must maintain the systems for measuring density, volumetric flow rate, and weight within  $\pm 5$  percent accuracy. You must describe the specific equipment used to make measurements at your facility and how that equipment is periodically calibrated. You must also explain, document, and maintain written procedures for determining the accuracy of the measurements and make these written procedures available to your permitting authority upon request. You must determine, record, and maintain a record of the accuracy of the measuring systems

before the beginning of your initial compliance test and during each subsequent quarter of affected source operation.

(11) Record the weight in tons of ore for ore pretreatment processes and concentrate for carbon processes and for non-carbon concentrate processes on a daily and monthly basis.

(12) Calculate the emissions from each new and existing affected source for the 6-month period following the compliance date in pounds of mercury per ton of process input using the procedures in paragraphs (a)(12)(i) through (iii) of this section to determine initial compliance with the emission standards in §63.11645. After the initial 6-month period, determine annual compliance using the procedures in paragraph (a)(13) of this section for existing sources.

(i) For ore pretreatment processes, divide the sum of mercury mass emissions from all roasting operations and autoclaves during the initial 6-month period following the compliance date by the sum of the total amount of gold mine ore processed in these process units during the 6-month period following the compliance date.

(ii) For carbon processes, divide the sum of mercury mass emissions from all carbon kilns, preg tanks, electrowinning, retorts, and melt furnaces during the initial 6-month period following the compliance date by the total amount of concentrate processed in these process units during the initial 6-month

period following the compliance date.

(iii) For non-carbon concentrate processes, divide the sum of mercury mass emissions from retorts and melt furnaces during the initial 6-month period following the compliance date by the total amount of concentrate processed in these process units during the 6-month period following the compliance date.

(13) After the initial compliance test, calculate the emissions from each new and existing affected source for each 12-month period preceding each subsequent compliance test in pounds of mercury per ton of process input using the procedures in paragraphs (a)(13)(i) through (iii) of this section to determine compliance with the emission standards in §63.11645.

(i) For ore pretreatment processes, divide the sum of mercury mass emissions from all roasting operations and autoclaves in the 12-month period preceding a compliance test by the sum of the total amount of gold mine ore processed in that 12-month period.

(ii) For carbon processes, divide the sum of mercury mass emissions from all carbon kilns, preg tanks, electrowinning, retorts, and melt furnaces in the 12-month period preceding a compliance test by the total amount of concentrate processed in these process units in that 12-month period.

(iii) For non-carbon concentrate processes, divide the sum of mercury mass emissions from retorts and melt furnaces in the

12-month period preceding a compliance test by the total amount of concentrate processed in these process units in that 12-month period.

(b) If you have a new carbon processes affected source and elect to comply with the percent reduction standard in §63.11645(e)(2), you must perform annual tests of the inlet and outlet to each control device used in the new affected source and calculate emissions at the inlet and outlet using the methods and procedures in paragraphs (a)(1) through (7) of this section. The sampling and analysis of inlet emissions for retorts must be performed following the mercury condenser and before the carbon adsorber. Calculate the percent reduction in mercury emissions based on the difference in emission rates at the inlet and outlet to each control device. Perform a compliance determination for the initial 6-month period following the compliance date using the procedures in paragraph (a)(6) of this section. Perform compliance determinations annually following the initial 6-month period using the procedures in paragraph (a)(7) of this section.

(c) At all times, you must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.

§63.11647 What are my monitoring requirements?

(a) Except as provided in paragraph (a)(4) of this section, you must monitor each roaster for mercury emissions using one of the procedures in paragraphs (a)(1) or (2) of this section and establish operating limits for mercury concentration as described in paragraph (a)(3) of this section.

(1) Perform sampling and analysis of the roaster's exhaust for mercury concentration using EPA Performance Specification 12B each week and maintain the daily average concentration below the operating limit established in paragraph (a)(3) of this section.

(i) To determine the appropriate sampling duration, you must review the available data from previous stack tests to determine the upper 99th percentile of the range of mercury concentrations in the exit stack gas. Based on this upper end of expected concentrations, select an appropriate sampling duration that is likely to provide a valid sample and not result in breakthrough of the sampling tubes. If breakthrough of the sampling tubes occurs, you must re-sample within 30 days using a shorter sampling duration.

(ii) If you measure a daily average concentration above the operating limit, you must take corrective action and correct the problem within 48 hours of the exceedance or stop the feed of ore to the roaster, and report the exceedance as a deviation.

(2) Install, operate, calibrate, and maintain a continuous emissions monitoring system (CEMS) to continuously measure the mercury concentration in the final exhaust stream from each roaster according to the requirements of Performance Specification 12A (40 CFR part 60, appendix B) except that calibration standards traceable to the National Institute of Standards and Technology are not required. You must perform a data accuracy assessment of the CEMS according to section 5 of Appendix F in part 60 and follow the monitoring requirements in §63.8.

(i) You must continuously monitor the daily average mercury concentration from the roaster and maintain the daily average concentration below the operating limit established in paragraph (a)(3) of this section. If you measure a daily average concentration above the operating limit, you must take corrective action and correct the problem within 48 hours of the exceedance or stop the feed of ore to the roaster, and report the exceedance as a deviation.

(ii) You must submit a monitoring plan that includes quality assurance and quality control (QA/QC) procedures sufficient to demonstrate the accuracy of the CEMS to your permitting authority for approval 180 days prior to your initial compliance test. At a minimum, the QA/QC procedures must include daily calibrations and an annual accuracy test for the

CEMS.

(3) Use Equation (2) of this section to establish an upper operating limit for mercury concentration as determined by using the procedures in paragraphs (a)(1) or (2) of this section concurrently while you are also doing your annual compliance performance stack test according to the procedures in §63.11646(a).

$$\text{OLR} = C_{\text{test}} * (149/\text{CT}) \quad (\text{Eq 2})$$

where

OLR = mercury concentration operating limit for the roaster (in micrograms per cubic meter);  
 $C_{\text{test}}$  = average mercury concentration measured by the monitoring procedures (PS 12A or PS 12B) during the annual performance stack test (in micrograms per cubic meter);  
 149 = emission limit for ore pretreatment processes (in lb/ million tons of ore);  
 CT = compliance test results for ore pretreatment processes (in lb/ million tons of ore).

(4) For roasters that utilize calomel-based mercury control systems for emissions controls, you are not required to perform the monitoring for mercury emissions in paragraphs (a)(1) or (2) of this section if you demonstrate to the satisfaction of your permitting authority that mercury emissions from the roaster are less than 10 pounds of mercury per million tons of ore throughput. If you make this demonstration, you must conduct the parametric monitoring as described below in paragraphs (b) and (c) of this section.

(i) The initial demonstration must include three or more consecutive independent stack tests for mercury at least one month apart on the roaster exhaust stacks. Subsequent demonstrations may be based upon the single stack test required in paragraph (a) of section §63.11646. The results of each of the tests must be less than 10 pounds of mercury per million tons of ore. The testing must be performed according to the procedures in §63.11646(a)(1) through (4) to determine mercury emissions in pounds per hour.

(ii) Divide the mercury emission rate in pounds per hour by the ore throughput rate during the test expressed in millions of tons per hour to determine the emissions in pounds per million tons of ore.

(iii) You must continue to perform annual compliance tests of the roaster stack as required in §63.11646(a). In addition, if the mercury concentration in the ore processed in the roaster increases to a level higher than any mercury concentration measured in the previous 12 months, you must perform a compliance test within 30 days of the first day that the ore with higher mercury levels is processed to determine whether the mercury emissions are still below 10 lbs per million tons of ore. If any subsequent compliance tests indicates that the roaster is emitting more than 10 pounds of mercury per million tons of ore input, then you must implement the monitoring

required in paragraphs (a)(1) or (2) of this section within 30 days.

(b) For facilities with roasters and a calomel-based mercury control system that choose to monitor for mercury emissions using the procedures in paragraph (a)(1) of this section or that qualify for and choose to follow the requirements in paragraph (a)(4) of this section, you must establish operating parameters for scrubber liquor flow, scrubber pressure drop and scrubber inlet gas temperature and monitor these parameters. Monitor the scrubber liquor flow, scrubber pressure drop and scrubber inlet gas temperature during each run of your initial compliance test. The minimum operating rate for scrubber liquor flow and pressure drop are the lowest values during any run of the initial compliance test, and your maximum scrubber inlet temperature limit is the highest measured during any run of the initial compliance test. Subsequently, you must monitor the scrubber liquor flow, scrubber pressure drop and scrubber inlet gas temperature hourly and maintain the scrubber liquor flow and scrubber pressure drop at or above the operating parameters established during the initial compliance test and maintain the inlet gas temperature below the operating parameters established during the initial compliance test.

(c) For facilities with roasters and a calomel-based mercury control system that choose to monitor for mercury

emissions using the procedures in paragraph (a)(1) of this section or that qualify for and follow the requirements in paragraph (a)(4) of this section, you must establish operating parameters for mercuric ion and chloride ion concentrations or for oxidation reduction potential and pH using the procedures in either paragraph (c)(1) or (2) of this section.

(1) Establish the mercuric ion concentration and chloride ion concentration range for each calomel-based mercury control system. The mercuric ion concentration and chloride ion concentration for each calomel-based mercury control system must be based on the manufacturer's specifications. Alternatively, the mercuric ion concentration and chloride ion concentration range for each calomel-based mercury control system may be approved by your permitting authority. Measure the mercuric ion concentration and chloride ion concentrations at least once during each run of your initial compliance test. The measurements must be within the established concentration range for mercuric ion concentration and chloride ion concentration. Subsequently, you must sample four times daily and maintain the mercuric ion concentration and chloride ion concentrations within their established range.

(2) Establish the oxidation reduction potential and pH range for each calomel-based mercury control system. The oxidation reduction potential and pH range for each calomel-

based mercury control system must be based on the manufacturer's specifications. Alternatively, the oxidation reduction potential and pH range for each calomel-based mercury control system may be approved by your permitting authority. Install monitoring equipment to continuously monitor the oxidation reduction potential and pH of the calomel-based mercury control system scrubber liquor. Measure the oxidation reduction potential and pH of the scrubber liquor during each run of your initial compliance test. The measurements must be within the established range for oxidation reduction potential and pH. Subsequently, you must monitor the oxidation reduction potential and pH of the scrubber liquor continuously and maintain it within the established operating range.

(d) If you have an exceedance of an operating limit or range in paragraphs (b) or (c) of this section, you must take corrective action and bring the system operations back into the specified operational range or limit within 45 minutes or commence shutdown of the roaster.

(e) You may submit a request to your permitting authority for approval to change the operating limits established under paragraph (a)(3) of this section for the monitoring required in paragraph (a)(1) or (2) of this section. In the request, you must demonstrate that the proposed change to the operating limit detects changes in levels of mercury emission control. An

approved change to the operating limit under this paragraph only applies until a new operating limit is established during the next annual compliance test.

(f) You must monitor each process unit at each new and existing affected source that uses a carbon adsorber to control mercury emissions using the procedures in paragraphs (f)(1), (2), or (3) of this section.

(1) Continuously sample and analyze the exhaust stream from the carbon adsorber for mercury using Method 30B (40 CFR part 60, appendix A-8) for one week that includes the period of the annual performance test.

(i) Establish an upper operating limit for the process as determined using the mercury concentration measurements from the sorbent trap as calculated from Equation (3) of this section.

$$OLC = C_{\text{trap}} * (EL/CT) \quad (\text{Eq 3})$$

where

OLC = mercury concentration operating limit for the process as measured using the sorbent trap, (micrograms per cubic meter);  
 $C_{\text{trap}}$  = average mercury concentration measured using the sorbent trap during the week that includes the performance test, (micrograms per cubic meter);  
 EL = emission limit for the affected sources (lb/ton of concentrate);  
 CT = compliance test results for the affected sources (lb/ton of concentrate).

(ii) Sample and analyze the exhaust stream from the carbon adsorber for mercury at least monthly using Method 30B (40 CFR

part 60, appendix A-8). When the mercury concentration reaches 50 percent of the operating limit, begin weekly sampling and analysis. When the mercury concentration reaches 90 percent of the operating limit, replace the carbon in the carbon adsorber within 30 days.

(2) Conduct an initial sampling of the carbon in the carbon bed for mercury 90 days after the replacement of the carbon. A representative sample must be collected from the top of the bed and the exit of the bed and analyzed using EPA Method 7471A (incorporated by reference - see §63.14). The depth to which the sampler is inserted must be recorded. Calculate an average carbon loading from the two measurements. Sampling and analysis of the carbon bed for mercury must be performed quarterly thereafter. When the carbon loading reaches 50 percent of the design capacity of the carbon, monthly sampling must be performed until 90 percent of the carbon loading capacity is reached. The carbon must be removed and replaced with fresh carbon no later than 30 days after reaching 90 percent of capacity.

(3) Calculate the change out rate for the carbon in the carbon adsorber based on the carbon lifetime as determined from at least 2 years of data for the process unit from following the procedures in paragraphs (f)(1) or (2) of this section. You must submit supporting data and request approval from your

permitting authority to periodically change out the carbon instead of monitoring. After approval from your permitting authority, change out the carbon in the carbon adsorber no less frequently than the established lifetime. If you change the process or inputs in such a manner that mercury emissions might increase (e.g., increase throughput), you must re-establish the change out period based on two years of historical data as described in this paragraph.

(g) You must monitor gas stream temperature at the inlet to the carbon adsorber for each autoclave, carbon kiln, melt furnace, and retort equipped with a carbon adsorber during the annual performance test required in §63.11646(a) and establish a maximum value for the inlet temperature. Establish the temperature operating limit based on either the highest reading during the test or at 10°F higher than the average temperature measured during the performance test. Continuously monitor the inlet temperature thereafter. If an hourly average inlet temperature exceeds the temperature operating limit, you must follow the requirements for outlet concentration measurement in paragraph (f)(1) of this section. If the concentration is below 90 percent of the operating limit, you may set a new temperature operating limit 10°F above the previous operating limit. If the concentration is above 90 percent of the operating limit, you must take corrective action to reduce the temperature back below

the temperature operating limit and again measure the outlet concentration according to paragraph (f)(1) of this section. If the concentration is still above 90 percent of the operating limit, then you must change the carbon in the bed within 30 days.

(h) For each wet scrubber at each new and existing affected source, you must monitor the water flow rate and pressure drop during the performance test required in §63.11646(a) and establish a minimum value as the operating limit based on either the lowest average value during any test run or as no lower than 10 percent of the average value measured during the test. You must continuously monitor the water flow rate and pressure drop and take corrective action within 24 hours if any daily average is less than the operating limit.

(i) You may conduct additional compliance tests according to the procedures in §63.11646 and re-establish the operating limits required in paragraphs (a) through (c) and (f) through (h) of this section at any time.

§63.11648 What are my notification, reporting, and recordkeeping requirements?

(a) You must submit the Initial Notification required by §63.9(b)(2) no later than 120 calendar days after the date of publication of the final rule in the Federal Register or within 120 days after the source becomes subject to the standard. The

Initial Notification must include the information specified in §63.9(b)(2)(i) through (b)(2)(iv).

(b) You must submit an initial Notification of Compliance Status as required by §63.9(h).

(c) If a deviation occurs during a semiannual reporting period, you must submit a deviation report to your permitting authority according to the requirements in paragraphs (c)(1) and (2) of this section.

(1) The first reporting period covers the period beginning on the compliance date specified in §63.11641 and ending on June 30 or December 31, whichever date comes first after your compliance date. Each subsequent reporting period covers the semiannual period from January 1 through June 30 or from July 1 through December 31. Your deviation report must be postmarked or delivered no later than July 31 or January 31, whichever date comes first after the end of the semiannual reporting period.

(2) A deviation report must include the information in paragraphs (c)(2)(i) through (iv) of this section.

(i) Company name and address.

(ii) Statement by a responsible official, with the official's name, title, and signature, certifying the truth, accuracy and completeness of the content of the report.

(iii) Date of the report and beginning and ending dates of the reporting period.

(iv) Identification of the affected source, the pollutant being monitored, applicable requirement, description of deviation, and corrective action taken.

(d) If you had a malfunction during the reporting period, the compliance report must include the number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded. The report must also include a description of actions taken by an owner or operator during a malfunction of an affected source to minimize emissions in accordance with §63.11646(c), including actions taken to correct a malfunction.

(e) You must keep the records specified in paragraphs (e)(1) through (3) of this section.

(1) As required in §63.10(b)(2)(xiv), you must keep a copy of each notification that you submitted to comply with this subpart and all documentation supporting any Initial Notification, Notification of Compliance Status, and semiannual compliance certifications that you submitted.

(2) You must keep the records of all performance tests, monitoring data, and corrective actions required by §§63.11646 and 63.11647, and the information identified in paragraphs (c)(2)(i) through (vi) of this section for each corrective action required by §63.11647.

- (i) The date, place, and time of the monitoring event requiring corrective action;
- (ii) Technique or method used for monitoring;
- (iv) Operating conditions during the activity;
- (v) Results, including the date, time, and duration of the period from the time the monitoring indicated a problem (e.g., VE) to the time that monitoring indicated proper operation; and
- (vi) Maintenance or corrective action taken (if applicable).

(3) You must keep records of operating hours for each process as required by §63.11646(a)(5) and records of the monthly quantity of ore and concentrate processed as required by §63.11646(a)(10).

(f) Your records must be in a form suitable and readily available for expeditious review, according to §63.10(b)(1). As specified in §63.10(b)(1), you must keep each record for 5 years following the date of each recorded action. You must keep each record onsite for at least 2 years after the date of each recorded action according to §63.10(b)(1). You may keep the records offsite for the remaining 3 years.

(g) After December 31, 2011, within 60 days after the date of completing each performance evaluation conducted to demonstrate compliance with this subpart, the owner or operator of the affected facility must submit the test data to EPA by

entering the data electronically into EPA's WebFIRE data base through EPA's Central Data Exchange. The owner or operator of an affected facility shall enter the test data into EPA's data base using the Electronic Reporting Tool or other compatible electronic spreadsheet. Only performance evaluation data collected using methods compatible with ERT are subject to this requirement to be submitted electronically into EPA's WebFIRE database.

#### **Other Requirements and Information**

##### §63.11650 What General Provisions apply to this subpart?

Table 1 to this subpart shows which parts of the General Provisions in §§63.1 through 63.16 apply to you.

##### §63.11651 What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act, in §63.2, and in this section as follows:

Autoclave means a pressure oxidation vessel that is used to treat gold ores (primarily sulfide refractory ore) and involves pumping a slurry of milled ore into the vessel which is highly pressurized with oxygen and heated to temperatures of approximately 350 to 430°F.

Calomel-based mercury control system means a mercury emissions control system that uses scrubbers to remove mercury from the gas stream of a roaster or combination of roasters by complexing the mercury from the gas stream with mercuric

chloride to form mercurous chloride (calomel). Sometimes these scrubbers are also referred to as "mercury scrubbers."

Carbon kiln means a kiln or furnace where carbon is regenerated by heating, usually in the presence of steam, after the gold has been stripped from the carbon.

Carbon processes means the affected source that includes carbon kilns, preg tanks, electrowinning cells, mercury retorts, and melt furnaces at gold mine ore processing and production facilities that use activated carbon to recover (adsorb) gold from the pregnant cyanide solution.

Concentrate means the sludge-like material that is loaded with gold along with various other metals (such as silver, copper, and mercury) and various other substances, that is produced by electrowinning, the Merrill-Crowe process, flotation and gravity separation processes. Concentrate is measured as the input to retorts, or for facilities without retorts, as the input to melt furnaces before any drying takes place. For facilities without retorts or melt furnaces, concentrate is measured as the quantity shipped.

Deviation means any instance where an affected source subject to this subpart, or an owner or operator of such a source:

(1) Fails to meet any requirement or obligation established by this subpart, including but not limited to any

emissions limitation or work practice standard;

(2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or

(3) Exceeds any operating limit established under this subpart.

Electrowinning means a process that uses induced voltage on anode and cathode plates to remove metals from the continuous flow of solution, where the gold in solution is plated onto the cathode. Steel wool is typically used as the plating surface.

Electrowinning Cells means a tank in which the electrowinning takes place.

Gold mine ore processing and production facility means any facility engaged in the processing of gold mine ore that uses any of the following processes: roasting operations, autoclaves, carbon kilns, preg tanks, electrowinning, retorts, or melt furnaces. A facility that produces primarily copper (where copper is 95 percent or more of the total metal production) that may also recover some gold as a byproduct is not a gold mine ore processing and production facility.

Melt furnace means a furnace (typically a crucible furnace) that is used for smelting the gold-bearing material recovered from retorting, or the gold-bearing material from

electrowinning, the Merrill-Crowe process or other processes for facilities without retorts.

Merrill-Crowe process means a precipitation technique using zinc oxide for removing gold from a cyanide solution. Zinc dust is added to the solution, and gold is precipitated to produce a concentrate.

Non-carbon concentrate processes means the affected source that includes retorts and melt furnaces at gold mine ore processing and production facilities that use the Merrill-Crowe process or other processes and do not use carbon to recover (adsorb) gold from the pregnant cyanide solution.

Ore dry grinding means a process in which the gold ore is ground and heated (dried) prior to additional preheating or prior to entering the roaster.

Ore preheating means a process in which ground gold ore is preheated prior to entering the roaster.

Ore pretreatment processes means the affected source that includes roasting operations and autoclaves that are used to pre-treat gold mine ore at gold mine ore processing and production facilities prior to the cyanide leaching process.

Pregnant solution tank (or preg tank) means a storage tank for pregnant solution, which is the cyanide solution that contains gold-cyanide complexes that is generated from leaching gold ore with cyanide solution.

Pregnant cyanide solution means the cyanide solution that contains gold-cyanide complexes that are generated from leaching gold ore with a dilute cyanide solution.

Quenching means a process in which the hot calcined ore is cooled and quenched with water after it leaves the roaster.

Retort means a vessel that is operated under a partial vacuum at approximately 1,100 to 1,300°F to remove mercury and moisture from the gold bearing sludge material that is recovered from electrowinning, the Merrill-Crowe process or other processes. Retorts are usually equipped with condensers that recover liquid mercury during the processing.

Roasting operation means a process that uses an industrial furnace in which milled ore is combusted across a fluidized bed to oxidize and remove organic carbon and sulfide mineral grains in refractory gold ore. The emissions points of the roasting operation subject to this subpart include ore dry grinding, ore preheating, the roaster stack, and quenching.

§63.11652 Who implements and enforces this subpart?

(a) This subpart can be implemented and enforced by the U.S. EPA or a delegated authority, such as your state, local, or tribal agency. If the U.S. EPA Administrator has delegated authority to your state, local, or tribal agency, then that agency has the authority to implement and enforce this subpart. You should contact your U.S. EPA Regional Office to find out if

this subpart is delegated to your state, local, or tribal agency.

(b) In delegating implementation and enforcement authority of this subpart to a state, local, or tribal agency under 40 CFR part 63, subpart E, the authorities contained in paragraph (c) of this section are retained by the Administrator of the U.S. EPA and are not transferred to the state, local, or tribal agency.

(c) The authorities that will not be delegated to state, local, or tribal agencies are listed in paragraphs (c)(1) through (4) of this section.

(1) Approval of alternatives to the applicability requirements in §63.11640, the compliance date requirements in §63.11641, and the applicable standards in §63.11645.

(2) Approval of an alternative nonopacity emissions standard under §63.6(g).

(3) Approval of a major change to a test method under §63.7(e)(2)(ii) and (f). A "major change to test method" is defined in §63.90(a).

(4) Approval of a major change to monitoring under §63.8(f). A "major change to monitoring" is defined in §63.90(a).

(5) Approval of a waiver of recordkeeping or reporting requirements under §63.10(f), or another major change to

recordkeeping/reporting. A "major change to recordkeeping/reporting" is defined in §63.90(a).

**§63.11653** [Reserved]

**Tables to Subpart EEEEEEE of Part 63**

Table 1 to Subpart EEEEEEE of Part 63—Applicability of General Provisions to Subpart EEEEEEE

As stated in §63.11650, you must comply with the applicable General Provisions requirements according to the following table:

Citation	Subject	Applies to subpart EEEEEEE	Explanation
§63.1(a)(1), (a)(2), (a)(3), (a)(4), (a)(6), (a)(10)–(a)(12), (b)(1), (b)(3), (c)(1), (c)(2), (c)(5), (e)	Applicability	Yes	
§63.1(a)(5), (a)(7)–(a)(9), (b)(2), (c)(3), (c)(4), (d)	Reserved	No	
§63.2	Definitions	Yes	
§63.3	Units and Abbreviations	Yes	
§63.4	Prohibited Activities and Circumvention	Yes	
§63.5	Preconstruction Review and Notification Requirements	Yes	
§63.6(a), (b)(1)–(b)(5), (b)(7), (c)(1), (c)(2), (c)(5), (e)(1)(iii), (f)(2), (f)(3), (g), (i), (j)	Compliance with Standards and Maintenance Requirements	Yes	
§63.6(e)(1)(i) and	Startup, Shutdown and	No	Subpart

(ii), (e)(3), and(f)(1)	Malfunction Requirements (SSM)		EEEEEEE standards apply at all times.
§63.6(h)(1), (h)(2), (h)(4),(h)(5)(i), (ii), (iii) and (v), (h)(6)-(h)(9)	Compliance with Opacity and Visible Emission Limits	No	Subpart EEEEEEE does not contain opacity or visible emission limits.
§63.6(b)(6), (c)(3), (c)(4), (d), (e)(2), (e)(3)(ii), (h)(3), (h)(5)(iv)	Reserved	No	
§63.7, except (e)(1)	Applicability and Performance Test Dates	Yes	
§ 63.7(e)(1)	Performance Testing Requirements Related to SSM	No	
§63.8(a)(1), (b)(1), (f)(1)-(5), (g)	Monitoring Requirements	Yes	
§63.8(a)(2), (a)(4), (b)(2)-(3), (c), (d), (e), (f)(6), (g)	Continuous Monitoring Systems	Yes	Except cross references to SSM requirements in §63.6(e)(1) and (3) do not apply
§63.8(a)(3)	[Reserved]	No	
§63.9(a), (b)(1), (b)(2)(i)-(v), (b)(4), (b)(5), (c), (d), (e), (g), (h)(1)-(h)(3), (h)(5), (h)(6), (i), (j)	Notification Requirements	Yes	
§63.9(f)		No	
§63.9(b)(3), (h)(4)	Reserved	No	

§63.10(a), (b)(1), (b)(2)(vi)-(xiv), (b)(3), (c), (d)(1)- (4), (e), (f)	Recordkeeping and Reporting Requirements	Yes	
§ 63.10(b)(2)(i)-(v), (d)(5)	Recordkeeping/Reporting Associated with SSM	No	
§63.10(c)(2)-(c)(4), (c)(9)	Reserved	No	
§63.11	Control Device Requirements	No	
§63.12	State Authority and Delegations	Yes	
§§63.13-63.16	Addresses, Incorporations by Reference, Availability of Information, Performance Track Provisions	Yes	