

EPCRA Section 313
Industry Guidance

METAL MINING FACILITIES

TRI

**Section 313 of the
Emergency Planning and
Community Right-to-Know Act**

Toxic Chemical Release Inventory

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OVERVIEW

On May 1, 1997, the U.S. Environmental Protection Agency (EPA) promulgated a final rule (62 FR 23834) adding several new industrial sectors to the list of facilities subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) Section 313 reporting requirements. Facilities affected by this rule are subject to the annual reporting requirements beginning with activities conducted during the 1998 calendar year, with their first reports due by July 1, 1999.

This document supersedes the document entitled *Section 313 Emergency Planning and Community Right-to-Know Act, Guidance for Metal Mining Facilities (Version 1.1)*, dated April 1998. It is intended to assist establishments and facilities designated by Standard Industrial Classification (SIC) Major Group 10 (except SIC codes 1011, 1081, and 1094) in making compliance determinations under the EPCRA Section 313 reporting requirements and preparing Form R(s) or the Form A certification statement(s) as required. The EPCRA Section 313 program is commonly referred to as the Toxic Chemical Release Inventory (TRI) program.

The principal differences in the new document include the following:

- More detailed examples;
- Additional interpretive guidance prepared by EPA on various issues specific to metal mining facilities;
- Industry process issues not discussed in the earlier document; and
- General format changes for program consistency.

This document is designed to be a supplement to the *Toxic Chemical Release Inventory Reporting Forms and Instructions (TRI Forms and Instructions)*, issued annually. It is organized to provide a step-by-step guide to compliance with EPCRA Section 313, starting with how you determine if your facility must report through completion of the Form R or Form A. While certain information provided in this document may be used as a reference, specific information available to facilities, such as amounts of chemicals in mixtures and other trade name products used at the facility, may be more accurate and more appropriate for use in developing threshold determinations and estimating releases and other waste management amounts. Under EPCRA Section 313, facilities are instructed to use the best “readily available data”, or when such data are not available, use “reasonable estimates”, in fulfilling their reporting requirements. This document is organized in the following manner.

Chapter 1 serves as an introduction to TRI reporting and provides a brief background on the Emergency Planning and Community Right-to-Know Act and information on where to obtain additional compliance assistance.

Chapter 2 begins with how to determine if your facility must report. This determination is based on your answers to a series of four questions:

1. Is your facility's primary SIC code on the EPCRA Section 313 list?
2. Does your facility employ ten or more full time equivalent employees?
3. Does your facility manufacture, process, or otherwise use any EPCRA Section 313 chemicals?
4. Does your facility exceed any of the activity thresholds for an EPCRA Section 313 chemical?

If the answer to ANY ONE of the four questions above is "No" you are not required to submit an EPCRA Section 313 report. If you answer "Yes" to ALL four questions, the next step is determining which form(s), Form R or Form A, your facility should file. Chapter 2 provides detailed information on the requirements for each kind of submission.

Chapter 2 concludes with a discussion on how you address trade secrets in your reporting and the kinds of records you should be keeping to support your reporting.

Chapter 3 discusses how you calculate the activity thresholds (manufacture, process, and otherwise use) for the EPCRA Section 313 chemicals. Information is provided on how you determine which EPCRA Section 313 chemicals your facility manufactures, processes, or otherwise uses and how you calculate the quantities of each. Detailed information is also provided on the various exemptions.

Chapter 3 concludes with a discussion of how to determine which EPCRA Section 313 chemicals exceed a reporting threshold, including focused discussions on issues specific to metal mining facilities.

Chapter 4 discusses how you calculate the release and other waste management amounts for those EPCRA Section 313 chemicals for which you must prepare a report. This chapter provides a step-by-step approach designed to minimize the risk of overlooking an activity involving an EPCRA Section 313 chemical and any potential sources or types of releases and other waste management activities that your facility may conduct. This procedure consists of the following steps:

- Identification of potential **sources** of EPCRA Section 313 chemicals released and otherwise managed as wastes;
- Preparation of a detailed **process flow diagram**;
- Identification of the potential **types** of releases and other waste management activities from each source; and
- Determination of the most appropriate methods for **estimating the quantities** of EPCRA Section 313 chemical releases and other waste management activities.

The main part of Chapter 4 is organized around activities common to metal mining facilities where EPCRA Section 313 chemicals are manufactured, processed, or otherwise used. Process descriptions; guidance on thresholds determinations; release and other waste management estimation techniques; and problems these types of facilities are likely to face in complying with EPCRA Section 313 are also presented in this chapter.

This document includes examples of chemical management activities that metal mining facilities may conduct, illustrating how these activities should be considered for EPCRA Section 313 reporting purposes. This chapter also notes areas where potential errors in reporting might be encountered generally by metal mining facilities, which are based on information from written comments received from industry representatives as well as from comments made by participants in EPA-sponsored EPCRA workshops.

Chapter 1 - Introduction

1.0 PURPOSE

The purpose of this guidance document is to assist metal mining facilities in Major Group 10 except for SIC codes 1011, 1081, and 1094 to comply with the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and of Section 6607 of the Pollution Prevention Act of 1990 (PPA), commonly referred to as the Toxic Release Inventory (TRI). On May 1, 1997, EPA promulgated a rule (62 FR 23834) to require metal mining facilities, along with other industry groups, to be included on the list of facilities subject to the EPCRA Section 313 reporting requirements. The new facilities are subject to annual reporting requirements beginning with activities occurring in the 1998 calendar year, with the first reports due by July 1, 1999.

This document explains the EPCRA Section 313 and PPA Section 6607 reporting requirements (collectively referred to as the EPCRA Section 313 reporting requirements) and discusses specific release and other waste management activities encountered at many facilities in this industry. Because each facility is unique, the recommendations presented may have to be adjusted to the specific nature of operations at your facility.

This document supersedes the document entitled *Section 313 Emergency Planning and Community Right-to-Know Act, Guidance for Metal Mining Facilities*, dated October 1997.

The document is intended to supplement the *Toxic Chemical Release Inventory Reporting Forms and Instructions (TRI Forms and Instructions)* document which is updated and published annually by the U.S. Environmental Protection Agency (EPA). It is essential that you use the most current version of the *TRI Forms and Instructions* to determine whether (and how) you should report. Changes or modifications to TRI reporting requirements are reflected in the annual *TRI Forms and Instructions* and should be reviewed before compiling information for the report.

The objectives of this manual are to:

- Clarify EPCRA Section 313 requirements for industry;
- Increase the accuracy and completeness of the data being reported by metal mining facilities; and
- Reduce the level of effort expended by those facilities that prepare an EPCRA Section 313 report.

While it is not possible to anticipate every potential issue or question that may apply to your facility, this document attempts to address those issues most prevalent or common to metal mining facilities. Facilities should also rely on EPA's *Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form* document to assist in providing complete and accurate information for EPCRA Section 313 reporting. Additional discussion addressing specific issues can be found in EPA's current version of *EPCRA Section 313*

Questions and Answers. All of these documents are available on the EPA's TRI website (<http://www.epa.gov/opptintr/tri>) or by contacting the EPCRA Hotline at 1-800-424-9346. In the Washington, DC metropolitan area, call 703-412-9810. The EPCRA Hotline TDD number is 1-800-553-7672, or in the Washington, DC metropolitan area, call 703-412-3323.

1.1 Background on EPCRA

One of EPCRA's primary goals is to increase the public's knowledge of, and access to, information on both the presence and release and other waste management activities of EPCRA Section 313 chemicals in their communities. Under EPCRA Section 313, certain facilities (see SIC code discussion, Chapter 2.3) exceeding certain thresholds (see Chapter 2.5) are required to submit reports (commonly referred to as Form Rs or Form A certification statements) annually for over 600 EPCRA Section 313 chemicals and chemical categories and the amounts that enter an environmental medium or are otherwise managed as waste, even if there are no releases or other waste management quantities associated with these chemicals. Chemicals are considered by EPA for inclusion on the EPCRA Section 313 list based on their potential for acute health effects, chronic health effects, and environmental effects. Chemicals may be added or deleted from the list. Therefore, before completing your annual report, be sure to check the most current list included with the *TRI Forms and Instructions* when evaluating the chemicals managed at your facility. Copies of the reporting package can be requested from the EPCRA Hotline, as indicated above, or from the Internet at <http://www.epa.gov/opptintr/tri/report.htm>.

All facilities meeting the EPCRA Section 313 reporting criteria must submit either a Form R or Form A. A separate submission is required for each EPCRA Section 313 chemical or chemical category that is manufactured (including imported), processed, or otherwise used above the reporting threshold. Reports must be submitted to EPA and State or Tribal governments, on or before July 1, for activities in the previous calendar year. The owner/operator of the facility on July 1 of the reporting deadline is primarily responsible for the report, even if the owner/operator did not own the facility during the reporting year. However, property owners with no business interest in the operation of the facility, for example, owners of an industrial park who only have a real estate interest, are not responsible for any reporting requirements.

EPCRA also mandates that EPA establish and maintain a publicly available database consisting of the information reported under Section 313, and applicable PPA information. This database, known as the Toxic Chemical Release Inventory (TRI), can be accessed through the following sources:

- National Library of Medicine (NLM) TOXNET on-line system;
- EPA's Internet site, <http://www.epa.gov/opptintr/tri>;
- Envirofacts Warehouse Internet site, http://www.epa.gov/enviro/html/tris/tris_overview.html;
- CD-ROM from the Government Printing Office (GPO);
- Microfiche in public libraries;
- Magnetic tape and diskettes from the National Technical Information Service; and
- EPA's annual TRI data release materials (summary information).

In addition to being a resource for the public, TRI is also used in the research and development of regulations related to EPCRA Section 313 chemicals.

Alternative Submission (Form A)

To reduce the burden for facilities that must comply with EPCRA Section 313, EPA has established an alternate threshold of one million pounds manufactured, processed, or otherwise used for facilities with total annual reportable amounts of 500 pounds or less of the EPCRA Section 313 chemical. Provided the facility does not exceed either the reportable amount or the alternate threshold, the facility may file a certification form (Form A) rather than a Form R. By filing the Form A, the facility certifies that it did not exceed the reportable amount or exceed the alternate threshold. (See Chapter 2.9 for more detail.)

Note that the annual reportable amount includes the quantity of EPCRA Section 313 chemicals in all production-related waste management activities, not just releases (see the waste management discussion in Chapter 4 for more detail). Also, a covered facility must submit either a Form A or a Form R for each EPCRA Section 313 chemical exceeding an applicable reporting threshold even if there are no releases or other waste management quantities.

Enforcement

Violation of Section 313 reporting provisions may result in federal civil penalties of up to \$27,500 per day. State enforcement provisions may also be applicable depending on the state's adoption of any "EPCRA Section 313-like" reporting regulations.

Regulatory Assistance Resources

The *TRI Forms and Instructions* also contain a discussion of common problems in completing the Form R. You are encouraged to read this section before filling out the Form R (or Form A) for your facility. If, after reading both the *TRI Forms and Instructions* and this guidance document, you still have questions about EPCRA Section 313 reporting, please contact the EPCRA Hotline at 1-800-424-9346, or 703-412-9810 in the Washington, DC metropolitan area. The EPCRA Hotline TDD number is 1-800-553-7672, or in the Washington, DC metropolitan area, call 703-412-3323. Assistance is also available from the designated EPCRA Section 313 Coordinator in the EPA regional office and the EPCRA contact in your state (see the *TRI Forms and Instructions* for a current list of these contacts). Appendix C contains a list of additional reference sources.

Chapter 2 - Reporting Requirements

2.0 PURPOSE

The purpose of this chapter is to help you determine whether you must prepare an EPCRA Section 313 submission(s) and, if so, what kind of a submission(s) you should prepare (Form R or Form A). This chapter presents the EPCRA Section 313 reporting requirements to help you determine whether these requirements apply to your facility. It also discusses the records that you must keep. The following terms and concepts are described in this chapter to help you understand the scope of Section 313 reporting and determine whether you need to report, including:

- Definition of facility;
- SIC code determination;
- Employee determination;
- Definitions of manufacture, process, and otherwise use; and
- Determination of whether you exceed one of the thresholds.

2.1 Must You Report?

How do you determine if your facility must prepare an EPCRA Section 313 report? This is decided by your answers to the following four questions (illustrated by Figure 2-1):

- 1) Is the primary SIC code(s) for your facility included in the list covered by EPCRA Section 313 reporting (see Chapter 2.3)?
- 2) Does your facility employ 10 or more full time employees or the equivalent (see Chapter 2.4)?
- 3) Does your facility manufacture (which includes importation), process, or otherwise use EPCRA Section 313 chemicals (see Chapter 2.5)?
- 4) Does your facility exceed any applicable thresholds of EPCRA Section 313 chemicals (25,000 pounds per year for manufacturing; 25,000 pounds per year for processing; or 10,000 pounds per year for otherwise use - see Chapter 3)?

If you answered “No” to any of the four questions above, you are not required to prepare any submissions under EPCRA Section 313. If you answered “Yes” to ALL of the first three questions, you must perform a threshold determination for each EPCRA Section 313 chemical at the facility, and submit a Form R **or** Form A for each chemical exceeding a threshold.

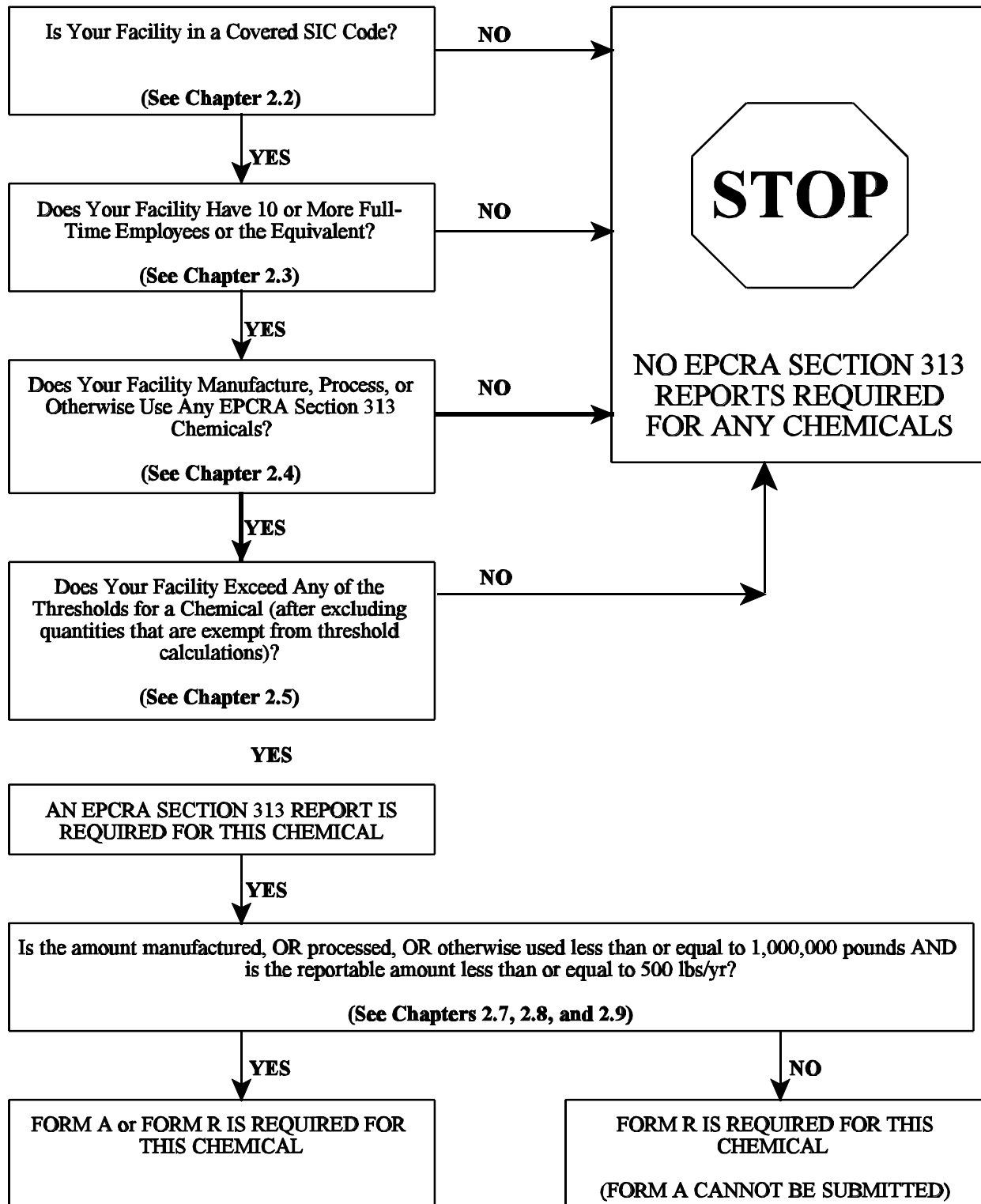


Figure 2-1. TRI Reporting Determination Diagram

2.2 Definition of “Facility”

To understand the applicability of EPCRA Section 313, you must first understand how EPCRA defines a facility. The term “facility” is defined as “all buildings, equipment, structures, and other stationary items which are located on a single site or on contiguous or adjacent sites and which are owned or operated by the same person (or by any person which controls, is controlled by, or is under common control, with such person). A facility may contain more than one establishment” (40 CFR 372.3). An “establishment” is defined as “an economic unit, generally at a single physical location, where business is conducted, or services or industrial operations are performed” (40 CFR 372.3).

EPA recognizes that some facilities have unique and separate activities (“establishments”) taking place at the same facility, and for some of these facilities it may be easier and more appropriate for individual establishments to manage their chemical usage and management information separately. EPA provides for these cases and allows individual establishments at the same facility to report separately. However, for threshold determinations, quantities of EPCRA Section 313 chemicals manufactured, processed, or otherwise used in all establishments in that facility must be combined and considered together. Also, the combined releases and other waste management activities reported separately for each establishment must equal those for the facility as a whole.

Example - Multiple Establishments

Your facility is comprised of two different establishments, and has determined that it is covered by EPCRA Section 313. One establishment used 3,000 pounds of an EPCRA Section 313 chemical to beneficiate an ore during the year. Another establishment used 8,000 pounds of the same chemical for on-site cleaning processes during the year. Both activities constitute an “otherwise use” of the EPCRA Section 313 chemical (as presented in Section 2.5 and described in detail in Chapter 3) and together, the total quantity otherwise used at the facility exceeded the 10,000 pound otherwise use threshold for the year. If your facility meets the employee threshold, you must file either a Form R or a Form A for that chemical. EPA allows multi-establishment facilities to submit Form Rs from each establishment for an EPCRA Section 313 chemical when thresholds have been exceeded at the facility level. Please note that Form A eligibility is also made at the facility-level, but only one Form A should be submitted per chemical for the entire facility.

Contiguous and/or Adjacent Facilities. In defining the parameters of your facility, you must consider all buildings and other stationary items located on multiple contiguous or adjacent sites that are owned or operated by the same person for EPCRA reporting purposes. For example, a mining company could own a very large piece of property with a copper mine at one end, a gold mine at the other, and a public road separating the two mines. The amount of each EPCRA Section 313 chemical manufactured, processed, or otherwise used and the number of employees must be aggregated for all of these contiguous or adjacent sites to determine whether the entire facility meets reporting thresholds. If a company’s operations are carried out at two distinctly separate, physical sites that are not contiguous or adjacent, that company is operating two separate facilities for the purposes of EPCRA reporting. The company, therefore, must make SIC code, employee, threshold determinations, and if appropriate, release and other waste management estimates individually for each facility.

If two establishments owned or operated by the same company are connected to each other by a piece of property that is owned by one of the establishments or the same parent corporation, or if they are separated by an easement (e.g., railroad tracks, public road, public catchment basin), they are still considered to be contiguous or adjacent and are therefore part of the same facility. Both “establishments” may report together as the same facility or they may report separately provided threshold determinations are based on activities at the entire facility and that the sum of the releases of the establishments reflects the total releases of the whole facility. Facility operations that are not connected to each other by a piece of property, that is commonly owned, controlled, or operated by the same person(s), are not considered contiguous and may be considered two separate facilities. However, if these operations are relatively near each other, they may be considered adjacent; in which case, they would be part of the same facility.

2.3 SIC Code Determination

Facilities with the SIC codes presented in Table 2-1 are covered by the EPCRA Section 313 reporting requirements.

**Table 2-1
SIC Codes Covered by EPCRA Section 313 Reporting**

SIC Code Industry Sectors		
SIC Codes	Industry	Qualifiers
10	Metal Mining	Except SIC codes 1011, 1081, and 1094
12	Coal Mining	Except SIC code 1241
20 through 39	Manufacturing	None
4911, 4931, and 4939	Electric and Other Services and Combination Utilities	Limited to facilities that combust coal and/or oil for the purpose of generating electricity for distribution in commerce
4953	Refuse Systems	Limited to facilities regulated under RCRA Subtitle C
5169	Chemicals and Allied Products	None
5171	Petroleum Bulk Stations and Terminals	None
7389	Business Services	Limited to facilities primarily engaged in solvent recovery services on a contract or fee basis

Metal mining facilities subject to EPCRA Section 313 are in SIC Major Group 10. This major group includes establishments primarily engaged in mining, developing mines, or exploring for metallic minerals (ores). These ores are valued chiefly for the metals they contain. The metals generally are recovered for uses as such or as constituents of alloys, chemicals, pigments or other products. This major group also includes all ore dressing and beneficiating operations, whether

performed at mills operated in conjunction with the mines served or at mills, such as custom mills, operated separately. These include mills that crush, grind, wash, dry, sinter, calcine, or leach ore, or perform gravity separation or flotation operations. When performed by operators of the properties, exploration under preliminary phases of operation should be classified according to the type of ore expected to be found. Table 2-2 describes all 4-digit SIC codes in Major Group 10. For further descriptions of these SIC codes, consult the *Standard Industrial Classification Manual, 1987*, published by the Office of Management and Budget.

Three 4-digit SIC codes within SIC Major Group 10 are not subject to EPCRA Section 313. Facilities with primary SIC codes 1011 (iron ores), 1081 (metal mining services), and 1094 (uranium-radium-vanadium ores) are not subject to EPCRA Section 313. Table 2-2 provides descriptions of these SIC codes. Although facilities whose primary SIC code is 1011, 1081, or 1094 are not covered by EPCRA Section 313, if a facility whose primary SIC code is covered has an establishment in one of these three SIC codes (1011, 1081, or 1094), the facility must still consider the activities conducted by these establishments towards the facility's employee and activity threshold determinations and, as appropriate, release and other waste management calculations. For example, a facility whose primary SIC code is 1061 - ferroalloy ores, a covered SIC code, may have an establishment in SIC code 1011 - iron ores, which is not a covered SIC code. If the facility exceeds the employee threshold, it must include activities that occur at the iron ore establishment in the facility's threshold determination along with ferroalloy activities. If the facility exceeds an activity threshold for an EPCRA Section 313 chemical, the facility must report any releases and other waste management activities of that chemical, including those that occur at the iron ore establishment.

SIC Code 1081 - Metal Mining Services

SIC code 1081 represents establishments primarily engaged in performing metal mining services for others on a contract or fee basis, such as the removal of overburden (see Table 2-2 for more detail about SIC code 1081). Facilities in this SIC code are not subject to EPCRA Section 313. However, if your facility is in a covered SIC code, and contracts a business in SIC code 1081 to do work at your facility, you must consider the contractor's work when making employee and activity threshold determinations, and when calculating release and other waste management quantities for your "covered" facility.

For example, El Silver Mine, a facility in SIC code 1044, contracts Drillers Inc. to perform drilling operations at the facility. El Silver Mine is in a covered SIC code, while Drillers Inc. is not in a covered SIC code. El Silver Mine must include Drillers Inc. in its employee and activity thresholds, and if filing a Form R, the mine must include releases and other waste management activities associated with the drilling activities.

**Table 2-2
Metal Mining SIC Codes**

SIC Codes Subject to EPCRA Section 313
<p>1021 - Copper Ores:</p> <p>Chalcocite mining; Chalcopyrite mining; Copper ore mining; Cuprite mining</p>
<p>1031 - Lead And Zinc Ores:</p> <p>Blende (zinc) mining; Calamine mining; Cerrusite mining; Galena mining; Lead ore mining; Lead-zinc ore mining; Smithsonite mining; Sphalerite mining; Willemite mining; Zinc ore mining; Zinc-blende (sphalerite) mining; Zincite mining</p>
<p>1041 - Gold Ores:</p> <p>Bullion, gold: produced at mine, mill, or dredge site; Calaverite mining; Lode gold mining; Placer gold mining; Sylvanite mining; Telluride (gold) mining</p>
<p>1044 - Silver Ores:</p> <p>Bullion, silver: produced at mine or mill site; Silver ore mining</p>
<p>1061 - Ferroalloy Ores, Except Vanadium:</p> <p>Chromite mining; Chromium ore mining; Cobalt ore mining; Columbite mining; Ferberite; mining; Huebnerite mining; Manganese ore mining; Manganite mining; Molybdenite mining; Molybdenum ore mining; Molybdate mining; Nickel ore mining; Psilomelane mining; Pyrolusite mining; Rhodochrosite mining; Scheelite mining; Tantalite mining; Tantalum ore mining; Tungsten ore mining; Wolframite mining; Wulfenite mining</p>
<p>1099 - Miscellaneous Metal Ores, Not Elsewhere Classified:</p> <p>Aluminum ore mining; Antimony ore mining; Bastnasite ore mining; Bauxite mining; Beryl mining; Beryllium ore mining; Cerium ore mining; Cinnabar mining; Ilmenite mining; Iridium ore mining; Mercury ore mining; Microlite mining; Monazite mining; Osmium ore mining; Palladium ore mining; Platinum group ore mining; Quicksilver (mercury) ore mining; Rare-earths ore mining; Rhodium ore mining; Ruthenium ore mining; Rutile mining; Thorium ore mining; Tin ore mining; Titaniferous-magnetite mining value chiefly for titanium content; Titanium ore mining; Zirconium ore mining</p>

While you are currently required to determine your facility's reporting eligibility based on the SIC code system described above, it is important to be aware that the SIC code system will be replaced by a new system in the future. On April 9, 1997 (62 FR 17287), the Office of Management and Budget promulgated the North American Industrial Classification System (NAICS). NAICS is a new economic classification system that replaces the SIC code system as a means of classifying economic activities for economic forecasting and statistical purposes. The transition to the new NAICS may require statutory and/or regulatory actions. As a result, the SIC code system is still required to be used as the mechanism to determine your facility's reporting eligibility. EPA will issue notice in the *Federal Register* to inform you and other EPCRA Section

313 facilities of its plans to adopt the NAICS and how facilities should make their NAICS code determination.

Primary SIC Code Determination. Assuming your facility has several establishments with different SIC codes that are owned or operated by the same entity, you will need to determine if your facility has a primary SIC code that is subject to EPCRA Section 313. Your facility is subject to EPCRA Section 313 reporting requirements if:

- All the establishments have SIC codes covered by EPCRA Section 313; OR
- The total value of the products shipped or services provided at establishments with covered SIC codes is greater than 50% of the value of the entire facility's products and services; OR
- Any one of the establishments with a covered SIC code ships and/or produces products or provides services whose value exceeds the value of services provided or products produced and/or shipped by all of the other establishment within the facility on an individual basis.

To determine the value of production or service attributable to a particular establishment, you can subtract the product or service value obtained from other establishments from the total product or service value of the facility. This procedure eliminates the potential for "double counting" production or service in situations where establishments are engaged in sequential production activities at a single facility.

Example - Primary SIC Code

A facility has two establishments. The first, a ferroalloy ore mine in SIC code 1061, is in a covered SIC code. The second establishment, an iron ore mine in SIC code 1011, is not in a covered SIC code. The facility determines that the ferroalloy ore mine's value is \$1,000,000 per year whereas the value of the iron ore mine is \$500,000 per year. The value of the ferroalloy ore mining establishment is more than 50% of the facility's value; therefore, the primary SIC code of the facility is 1061 and the entire facility is subject to EPCRA Section 313 reporting.

Auxiliary Facilities. Some companies may own and/or operate a non-contiguous and non-adjacent facility that primarily supports a covered EPCRA Section 313 facility. These auxiliary facilities assume the SIC code of a covered facility that it directly supports. For example, an off-site warehouse that directly supports a copper mine (SIC code 1021) must assume the SIC code 1021 itself. For the purposes of EPCRA Section 313, auxiliary facilities must be engaged in performing support services for another facility or establishment within a covered facility. Therefore, if an auxiliary facility's primary function is to support/service a covered metal mining facility, the auxiliary facility may assume the SIC code of the main facility and may then be covered by the EPCRA Section 313 reporting requirements for purposes of the facility's SIC code.

2.4 Number of Employees

Facilities must also meet or exceed the 10 or more full-time employees or equivalent criterion to be subject to EPCRA Section 313 reporting requirements. A full-time employee equivalent is defined as a work year of 2,000 hours. If your facility's staff (including contractors and certain other non-company personnel) work 20,000 or more hours in a calendar year, you meet the 10 or more full-time employee criterion. While many facilities may easily exceed this criterion, your facility may be small or highly automated and your on-site staff may be small. In these cases, in particular, you should carefully consider all personnel supporting your operations to determine if you meet the 10 or more full-time employee criterion.

The following personnel and time should be included in your employee calculations:

- Owners working at the facility;
- Operations staff;
- Clerical staff;
- Temporary employees;
- Sales personnel;
- Truck drivers (employed by the facility);
- Other off-site facility employees directly supporting the facility;
- Paid vacation and sick leave; and
- Contractor employees (excluding contract truck drivers).

In general, if an individual is employed or hired to work at the facility, all the hours worked by that individual must be counted in determining if the 20,000 hour criterion has been met.

Example - Calculating Employees

Your facility is a small metal mine with eight full-time employees. These full-time employees work throughout the year, except three weeks over the winter holidays when the mine is shut down. Two of the full-time employees are administrative personnel, and work an average of eight hours per day, five days per week, 49 weeks per year. The other six full-time employees work in the mine 12 hours per day, 4 days per week, 49 weeks per year. The beneficiation plant (on-site and owned by the facility) is operated by a contractor who has three personnel, each working 2,000 hours per year. A two-person exploration crew, based at the facility, work 500 hours per year each, conducting geophysical surveys off-site during the summer. Finally, you hired a contractor to remove overburden from a new portion of the mine. The contractor used two personnel who were on site full time for six months (working on average of 1,000 hours each). You would calculate the number of full-time employee equivalents as follows:

- Hours for your two administrative full-time employees are:
 $2 \text{ employees} \times 8 \text{ hours/day} \times 5 \text{ days/week} \times 49 \text{ weeks/year} = 3,920 \text{ hours};$
- Hours for the six employees working in the mine are:
 $6 \text{ employees} \times 12 \text{ hours/day} \times 4 \text{ days/week} \times 49 \text{ weeks} = 14,112$
- Hours for the contractor operating the beneficiation plant are:
 $3 \text{ contractor personnel} \times 2,000 \text{ hours} = 6,000 \text{ hours.}$
- Hours for the exploration crew are:
 $2 \text{ employees} \times 500 \text{ hours/year} = 1,000 \text{ hours};$
- Hours for the contractor removing overburden:
 $2 \text{ contractor personnel} \times 1,000 \text{ hours} = 2,000 \text{ hours.}$

This is a total of 27,032 hours for the year, which is above the 20,000 hours/year threshold; therefore, you meet the employee criterion.

2.5 Manufacturing, Processing, and Otherwise Use of EPCRA Section 313 Chemicals

If you have determined that your facility meets the SIC code and employee threshold determinations, you must determine what EPCRA Section 313 chemicals are manufactured, processed, or otherwise used at your facility during the reporting year and whether an activity threshold was exceeded. This section of the chapter will introduce the terms and concepts behind this determination; whereas, Chapter 3 will take you through a detailed step-by-step process to determine whether you need to report for any EPCRA Section 313 chemicals.

Identifying Chemicals. If you are in a covered SIC code and have 10 or more full-time employee equivalents, you must determine which EPCRA Section 313 chemicals are manufactured, processed, or otherwise used at your facility in excess of threshold quantities. To assist in doing this, you should prepare a list of all chemicals manufactured, processed, or otherwise used by all establishments at the facility, including the chemicals present in mixtures and other trade name products and managed in wastes received from off-site. This list should then be compared to the CURRENT list of EPCRA Section 313 chemicals found in the *TRI Forms and Instructions* document for that reporting year (available from the EPCRA Hotline, 1-800-424-9346 or at the website: <http://www.epa.gov/opptintr/tri>). In addition to the individually listed

chemicals, the list of EPCRA Section 313 chemicals includes several chemical categories (discussed in detail in Chapter 3). You must include chemical compounds that are members included in any of these categories when evaluating activities at the facility for threshold determinations and release and waste management calculations. Once you identify the EPCRA Section 313 chemicals and chemical categories at your facility, you must evaluate the activities involving each chemical or chemical category and determine whether any activity thresholds have been met.

Note that chemicals are periodically added, delisted, or modified. Therefore, it is imperative that you refer to the appropriate reporting year's list. Also, note that a list of synonyms for EPCRA Section 313 chemicals can be found in the EPA publication *Common Synonyms for Chemicals Listed Under Section 313 of the Emergency Planning and Community Right-To-Know Act* (updated March 1995).

2.6 Activity Thresholds

There are three activity thresholds for the EPCRA Section 313 chemicals defined in EPCRA Section 313: manufacturing (which includes importing), processing, and otherwise use. The activity thresholds are 25,000 pounds per year for manufacturing, 25,000 pounds per year for processing, and 10,000 pounds per year for otherwise use. These thresholds apply to each chemical individually. The determination is based solely on the quantity actually manufactured (including imported), processed, or otherwise used. Only the amounts of the EPCRA Section 313 chemical that meet activity definitions are considered towards threshold determinations. Any other amounts not considered to be manufactured, processed, or otherwise used are not considered toward threshold determinations. For example, EPCRA Section 313 chemicals that are brought on-site (excluding amounts imported) and stored for future use or disposal, but are not incorporated into a product for distribution or are not otherwise used on-site during the reporting year, are NOT considered towards any activity threshold for that reporting year.

More detailed explanations of threshold activities (manufactured, processed, or otherwise used), with examples of each are found in Chapter 3, Tables 3-3, 3-4, and 3-5. These terms are briefly defined in Table 2-3, with a detailed discussion to follow:

**Table 2-3
Activity Thresholds**

Activity	Definition	Threshold (lbs/yr)
Manufacture	To produce, prepare, import, or compound an EPCRA Section 313 chemical. "Manufacture" applies to an EPCRA Section 313 chemical that is produced coincidentally during the manufacture, processing, otherwise use, or disposal of another chemical or mixture of chemicals as a byproduct or impurity. Examples would be the production of ammonia or nitrate compounds in a wastewater treatment system or the creation of metal compounds during the combustion of coal.	25,000
Process	<p>The preparation of an EPCRA Section 313 chemical, after its manufacture, for distribution in commerce:</p> <p>(1) In the same form or physical state as, or in a different form or physical state from, that in which it was received by the person so preparing such chemical; or</p> <p>(2) As part of an article containing the EPCRA Section 313 chemical.</p> <p>For example, if you receive a mixture containing an EPCRA Section 313 chemical, and package it, including transferring it from a storage tank to a tank truck, and then distribute it into commerce, this chemical has been processed by your facility.</p>	25,000
Otherwise Use	<p>Generally, use of an EPCRA Section 313 chemical that does not fall under the manufacture or process definitions is classified as otherwise use. An EPCRA Section 313 chemical that is otherwise used is not intentionally incorporated into a product that is distributed in commerce, but may be used instead as a manufacturing or processing aid (e.g., catalyst), in waste processing, or as a fuel (including waste fuel). For example, methanol used as a cleaning solvent is classified as otherwise used.</p> <p>Otherwise use means "any use of a toxic chemical contained in a mixture or other trade name product or waste, that is not covered by the terms "manufacture" or "process." Otherwise use of an EPCRA Section 313 chemical does not include disposal, stabilization (without subsequent distribution in commerce), or treatment for destruction unless the:</p> <p>1) EPCRA Section 313 chemical that was disposed, stabilized, or treated for destruction was received from off-site for the purposes of further waste management; or</p> <p>2) EPCRA Section 313 chemical that was disposed, stabilized, or treated for destruction that was manufactured as a result of waste management activities on materials received from off-site for the purposes of further waste management activities."</p>	10,000

There are some activities which do not meet the definitions of manufacture, process, or otherwise use. For instance, storage, relabeling, or redistribution of an EPCRA Section 313

chemical where no repackaging occurs does not constitute manufacturing, processing, or otherwise use of that chemical. This type of activity should not be included in threshold calculations. In addition, transfers of wastes for energy recovery, treatment, or disposal are not considered “distribution into commerce.” For example, if you receive a waste from off-site and repack the waste and send it to a landfill off-site, that activity should not be included in threshold determinations.

Also, note that the threshold determinations for the three threshold activities (manufacturing, processing, and otherwise use) are mutually exclusive. That is, you must conduct a separate threshold determination for each threshold activity and if you exceed any threshold, all releases and other waste management activities of EPCRA Section 313 chemicals at the facility must be considered for reporting.

2.7 How Do You Report?

You must file a report (Form R) for each EPCRA Section 313 chemical that exceeds a threshold for manufacturing, OR processing, OR otherwise use (providing you meet the employee and SIC code criteria). As an alternative, you may file a Form A certification statement rather than a Form R if you meet certain criteria as explained in Chapter 2.9. The *TRI Forms and Instructions* contain detailed directions for the preparation and submittal of Form R and Form A for each EPCRA Section 313 chemical for the reporting year. The *TRI Forms and Instructions* are sent to all facilities which submitted Form Rs or Form As the preceding year. However, if you do not receive a courtesy copy or did not report in the preceding year, then copies of the *TRI Forms and Instructions* can be requested from the EPCRA Hotline (1-800-424-9346) or obtained from EPA’s TRI website (<http://www.epa.gov/opptintr/tri>).

2.8 Form R

If you are submitting a Form R, it is essential that you use the *TRI Forms and Instructions* for the appropriate reporting year. EPA encourages the electronic submittal of the Form R, via the Automated TRI Reporting System (ATRS). Use of the ATRS saves time in data entry and photocopying and reduces errors by means of automated validation procedures. The ATRS produces a certification letter with each validated submission (set of EPCRA Section 313 reports) which provides for an original signature to certify that the submission is accurate and correct. The ATRS is available free of charge from EPA’s TRI website at <http://www.epa.gov/opptintr/afr>.

The ATRS is available in both DOS and Windows versions. More information can be found in the *TRI Forms and Instructions*, EPA’s TRI website, or by calling the ATRS User Support Hotline at (703) 816-4434.

Each Form R must consist of two parts:

Part I, Facility Identification Information. This part of the form provides general information to identify the facility, including the name and address of the facility, parent company information, and identification numbers used under reporting regulations. When

submitting hard copies of Form R, this part may be photocopied and re-used for each Form R you submit, except for the signature which must be original for each Form R; and

Part II, Chemical Specific Information. This part of the form provides chemical-specific information on the reportable activities, releases, other waste management estimates, and source reduction activities for the reporting year. This must be completed separately for each EPCRA Section 313 chemical or chemical category and not reused year to year even if reporting has not changed.

Submission of incomplete Form Rs may result in an issuance of a Notice of Technical Error (NOTE), Notice of Significant Error (NOSE), or Notice of Non-compliance (NON). See the current *TRI Forms and Instructions* for more detailed information on completing and submitting the Form R. The ATRS has a validation program which helps to identify and eliminate many potential data entry errors.

2.9 Form A

EPA developed the Form A, also referred to as the “Certification Statement,” to reduce the annual burden for facilities with lesser amounts of EPCRA Section 313 chemicals released and/or otherwise managed as a waste, applicable beginning reporting year 1995 and beyond (59 FR 61488; November 30, 1994). A facility must meet the following two criteria in order to use a Form A:

- First, the amount of the chemical manufactured, processed, OR otherwise used cannot exceed 1,000,000 pounds. It is important to note that the quantities for each activity are mutually exclusive and must be evaluated independently. If the quantity for any one of the activities exceeds 1,000,000 pounds, a Form A cannot be submitted.
- Second, the total annual reportable amount of the EPCRA Section 313 chemical cannot exceed 500 pounds per year. The “reportable amount” is defined as the sum of the on-site amounts released (including disposal), treated, recycled, and combusted for energy recovery, combined with the sum of the amounts transferred off-site for recycling, energy recovery, treatment, and/or release (including disposal). This total corresponds to the total of data elements, 8.1 through 8.7 in Part II of the Form R (explained in Chapter 4).

Example - Form A Threshold

During the reporting year, a facility adds 30,000 pounds of an EPCRA Section 313 chemical to a beneficiation step, which exceeds the 10,000 pound threshold for otherwise use. The chemical is used in a closed loop reuse system, and the total annual reportable amount for that chemical (the sum of Sections 8.1 through 8.7 of the chemical’s Form R) is less than 500 pounds. Because the facility did not exceed the alternate threshold of one million pounds for manufacturing, processing or otherwise use and the facility’s total reportable quantity does not exceed 500 pounds, the facility has the option of submitting either a Form R or Form A.

The Form A Certification Statement must be submitted for each eligible EPCRA Section 313 chemical. The information on the Form A is included in the publicly accessible TRI database, however these data are marked to indicate that they represent certification statements rather than Form Rs. Note that separate establishments at a facility cannot submit separate Form As for the same chemical; rather, only one Form A per EPCRA Section 313 chemical can be submitted per facility.

Like the Form R, Form A includes facility identification information. However, no release and other waste management estimations to any media are provided. You must simply certify that the total annual reportable quantity of the chemical or chemicals addressed in the Form A did not exceed 500 pounds and that amounts manufactured, or processed, or otherwise used did not exceed one million pounds. Once a facility has completed estimates to justify the submission of a Form A, there is a considerable time savings in using the Form A especially in subsequent years provided activities related with the chemical do not change significantly. It is strongly recommended that you document your initial rationale and reconfirm it every year to verify that you have not made any modifications to the process that would invalidate the initial rationale supporting submission of a Form A.

2.10 Trade Secrets

EPCRA's trade secrets provision only applies to the EPCRA Section 313 chemical identity. If you submit trade secret information, you must prepare two versions of the substantiation form as prescribed in 40 CFR Part 350, published in the Federal Register on July 29, 1988, (53 FR 28801) as well as two versions of the Form R. One set of forms should be "sanitized" (i.e., it should provide a generic name for the EPCRA Section 313 chemical identity). This version will be made available to the public. The second version, the "unsanitized" version, should provide the actual identity of the EPCRA Section 313 chemical and have the trade secret claim clearly marked in Part I, Section 2.1 of the Form R or Form A. All other parts of the Form R or Form A must be filled out accordingly.

Individual states may have additional criteria for confidential business information and the submittal of both sanitized and unsanitized reports for EPCRA Section 313 chemicals. Facilities may jeopardize the trade secret status of an EPCRA Section 313 chemical by submitting an unsanitized version to a state agency or Indian tribe that does not require an unsanitized version.

More information on trade secret claims, including contacts for individual state's submission requirements, can be found in the most current version of the *TRI Forms and Instructions*.

2.11 Recordkeeping

Complete and accurate records are absolutely essential to meaningful compliance with EPCRA Section 313 reporting requirements. Compiling and maintaining good records will help you to reduce the effort and cost in preparing future reports and to document how you arrived at the reported data in the event of an EPA compliance audit. EPA requires you to maintain records substantiating the Form R or Form A submission for a minimum of three years from the date of

submission. Each facility must keep copies of the Form R or Form A along with all supporting documents, calculations, work sheets, and other forms that you use to prepare the Form R or Form A. EPA may request this supporting documentation during a regulatory audit.

Specifically, EPA requires that the following records be maintained for a period of three years from the date of the submission of a report (summarized from 40 CFR 372.10):

- 1) A copy of each report that is submitted;
- 2) All supporting materials and documentation used by the person to make the compliance determination that the facility or establishment is a covered facility;
- 3) Documentation supporting the report that is submitted, including documentation supporting:
 - - Threshold determinations;
 - Employee threshold determinations (including timesheets);
 - Claimed allowable exemptions;
 - Calculations for each quantity reported as being released, either on or off site, or otherwise managed as waste;
 - Activity use determinations, including dates of manufacturing, processing, or otherwise use;
 - Basis of all estimates;
 - Receipts or manifests associated with transfers of waste to off-site locations; and
 - Waste treatment methods, estimates of treatment efficiencies, ranges of influent concentrations to treatment, sequential nature of treatment steps, and operating data to support efficiency claims.
- 4) All supporting materials used to make the compliance determination that the facility or establishment is eligible to submit a Form A;
- 5) Documentation supporting the Form A, including:
 - Data supporting the determination that the alternate threshold applies;
 - Calculations of annual reporting amounts; and
 - Receipts or manifests associated with the transfer of each chemical in waste to off-site locations.

Because EPCRA Section 313 reporting does not require additional testing or monitoring, you must determine the best “readily available data” to make reporting determinations. Alternatively, you may use “reasonable estimates” to make reporting determinations. The amount and type of data and records will vary from facility to facility. Examples of records that you should keep, if applicable, include the following:

- Each Form R or Form A submitted;

- Section 313 Reporting Threshold Worksheets (sample worksheets can be found in Chapter 3 of this document as well as in the *TRI Forms and Instructions*);
- Engineering calculations and other notes;
- Purchase records and MSDSs from suppliers;
- Inventory and receipt data;
- Analytical results and profiles for wastes received from off site;
- NPDES/SPDES permits and monitoring reports;
- EPCRA Section 312, Tier II reports;
- Monitoring records;
- Air permits;
- Flow measurement data;
- RCRA hazardous waste generator's reports;
- Pretreatment reports filed with local governments;
- Invoices from waste management firms;
- Manufacturer's estimates of treatment efficiencies;
- CERCLA Reportable Quantity (RQ) reports;
- EPCRA Section 304 follow-up release notifications;
- RCRA manifests; and
- Process flow diagrams (including emissions, releases and other waste management activities).

Chapter 3 - EPCRA Section 313 Threshold Determinations

3.0 PURPOSE

This chapter provides a step-by-step procedure for determining if any EPCRA Section 313 chemicals or chemical categories exceed a reporting threshold at your facility.

- Step 1)* Determine if you manufacture (including import), process, or otherwise use any EPCRA Section 313 chemicals.
- Step 2)* Determine the quantity of each EPCRA Section 313 chemical you manufacture (including import), process, or otherwise use.
- Step 3)* Determine which EPCRA Section 313 chemicals exceed a threshold.

3.1 **Step 1 - Determining which EPCRA Section 313 chemicals are manufactured (including imported), processed, or otherwise used**

Compiling Chemical Lists. Compile lists of all chemicals, mixtures, or other trade name products, and wastes at your facility. Metal mining facilities may find it helpful to create two lists. The first list names metals and metal compounds processed at the facility, including target and non-target metals and metal compounds present in extracted ore. This first list should also include metals and metal compounds manufactured and processed as intermediates, and metals and metal compounds distributed into commerce. The second list names chemicals otherwise used at the facility, including, where applicable, chemicals received from off-site for further waste management. For chemicals otherwise used, identify the name of each mixture or other trade name product, or waste name or waste code (e.g., chemicals in sludge received from off-site for on-site disposal or sodium cyanide for leaching activities) and list the names of all chemicals contained in each mixture or other trade name product, or waste. Next, compare the individual chemicals on both lists to the current EPCRA Section 313 chemical list found in the *TRI Forms and Instructions* (remember that chemicals may be periodically added and deleted and you should always use the most current *TRI Forms and Instructions* which contains an updated list of chemicals). Highlight the EPCRA Section 313 chemicals that are on your list. You must perform threshold determinations for these chemicals.

Review the list to be sure each chemical is shown by its correct EPCRA Section 313 name. For example, sulfuric acid (acid aerosols) is often used in leaching processes at mines. Sulfuric acid (CAS No. 7664-93-9) has several synonyms, including dihydrogen sulfate and sulphuric acid. It must be reported on Form R (or Form A), Item 1.2, by its EPCRA Section 313 chemical name, sulfuric acid (acid aerosols). Synonyms can be found in EPA's document *Common Synonyms for Chemicals Listed Under Section 313 of the EPCRA* (EPA 745-R-95-008) (updated March 1995). EPA's Automated TRI Reporting System (ATRS) has a pick list containing a complete list of EPCRA Section 313 chemical and chemical category names and the corresponding CAS numbers and category codes which helps to simplify this reporting element.

While every chemical and chemical category on the EPCRA Section 313 chemical list must be considered, certain chemicals are more likely than others to be encountered at metal mining facilities. As a guide, certain chemicals that metal mining facilities may manufacture, process, or otherwise use are provided in Table 3-1. While this is not a comprehensive list of all EPCRA Section 313 chemicals that may be manufactured, processed, or otherwise used at metal mining facilities, it is a starting point to assist facilities in identifying chemicals for threshold determinations. Facilities should also be aware of EPCRA Section 313 chemicals manufactured during beneficiation, in particular, metals and metal compounds. These will be discussed later in this chapter.

Information that is useful in performing threshold determinations and preparing your reports includes the following:

- Mixture or mineral complex names and associated EPCRA Section 313 chemical names;
- Associated CAS numbers;
- Trade name for mixtures;
- Throughput quantities; and
- Whether the chemical is manufactured, processed, or otherwise used at the facility (be sure to include quantities that are coincidentally manufactured and imported, as appropriate).

Use of Spreadsheets or Databases. A computerized spreadsheet or database may be helpful in developing your facility's chemical list and performing threshold calculations. The type of information useful as input in a spreadsheet or database includes the chemical name, mixture or other trade name product, or waste name with corresponding chemical component, concentrations, the CAS number, and the yearly quantity manufactured, processed, or otherwise used. The spreadsheet or database could also be designed to identify the total quantity by activity threshold (amounts manufactured, processed, and otherwise used) for each EPCRA Section 313 chemical in every waste, mixture, and other trade name product.

Smaller facilities that do not have an established electronic method of tracking their chemical usage and waste management, should consider developing a spreadsheet to assist them in their chemical management activities. Developing a spreadsheet will require an initial investment of time; however, the time and effort saved in threshold calculations in subsequent years can be significant. Such a system will also reduce the potential of inadvertently overlooking EPCRA Section 313 chemicals that are present in wastes received or mixtures purchased from off-site sources.

Table 3-1
EPCRA Section 313 Chemicals Commonly Manufactured, Processed, and
Otherwise Used at Metal Mining Facilities

EPCRA Section 313 Chemicals in Ore that Metal Mining Facilities May Manufacture and/or Process	EPCRA Section 313 Chemicals that Metal Mining Facilities May Otherwise Use
Aluminum (fume or dust)	Acrylamide
Antimony/Antimony compounds	Ammonia
Arsenic/Arsenic compounds	Benzene
Barium/Barium compounds	Bromine
Beryllium/Beryllium compounds	Bromoform
Cadmium/Cadmium compounds	Chlorine
Chromium/Chromium compounds	Cresols
Cobalt/Cobalt compounds	Cyanide Compounds
Copper/Copper compounds	Cyclohexane
Cyanide/Cyanide compounds	Ethylbenzene
Lead/Lead compounds	Formaldehyde
Manganese/Manganese compounds	Glycol ethers
Mercury/Mercury compounds	Hydrazine
Nickel/Nickel compounds	Hydrochloric acid (acid aerosols)
Selenium/Selenium compounds	Naphthalene
Silver/Silver compounds	Nitric acid
Thallium/Thallium compounds	Phenol
Vanadium (fume or dust)	Phosphoric acid
Zinc (fume or dust)/Zinc compounds	Propylene
	Sulfuric acid (acid aerosols)
	Thiourea
	Toluene
	Xylene

Identifying EPCRA Section 313 Chemicals in Ore

A significant portion of the manufacturing, processing, and otherwise use activities at metal mining facilities will involve EPCRA Section 313 chemicals present in ores being extracted. To identify which EPCRA Section 313 chemicals are present in ore, look to available information resources, including:

- Mineral assays;
- Analyses conducted prior to extraction;
- Historical information collected during exploration and discovery;
- Analyses conducted during beneficiation;
- Geological or chemical expertise;
- Technical reference documents;

- Process knowledge;
- Financial information;
- Information on releases or other wastes leaving the facility.

In some cases, facilities may know that compounds of a non-target metal exist in an ore extracted for distribution into commerce, but may not know the specific identity of the metal compounds in the ore. For example, a facility may know that mercury compounds are present in an antimony ore, but they may not know the specific identity of the mercury compound(s) present in this ore. Facilities should use the best “readily available data” to determine the exact metal compound or compounds present. This information can include mineral assays, metal analyses, geological reference documents identifying commonly associated minerals, and literature documenting mineral types specific to a geographic region. In the absence of better information, facilities that know only the type of metal compound (e.g., mercury sulfide in antimony ore) may assume that the metal compound exists as the lowest weight metal compound of that type (e.g., lowest weight mercury sulfide - HgS, the mineral cinnabar). If the facility has no knowledge to indicate the type of metal compound present in the ore, they may assume that the metal exists as the lowest weight oxide. For example, a facility may only know that arsenic compounds are present in gold ore, but may not have any information indicating the identity of the arsenic compounds, or even the general type (e.g., sulfide) of arsenic compound. For threshold determination purposes, the facility may assume that the arsenic exists as its lowest weight oxide - As₂O₃.

EPCRA Section 313 Chemicals in Purchased Chemicals

To develop the chemical list and identify the associated threshold activities for purchased chemicals you may want to consult the following:

- Material Safety Data Sheets (MSDS);
- Facility purchasing records;
- Inventory records;
- Process requirements/Equipment specifications;
- Operation and process knowledge.

For purchased chemicals, MSDSs are generally considered to be good sources of information for the type and composition of chemicals in mixtures and other trade name products. Metal mining facilities may receive MSDSs for any mixture or other trade name product used as flotation agents, leaching solutions, electrowinning aids, reducing agents, fuel, equipment cleaning and maintenance chemicals, water treatment chemicals, or for use in other operations. As of 1989, chemical suppliers of facilities in SIC codes 2000 through 3999 are required to notify customers of any EPCRA Section 313 chemicals present in mixtures or other trade name products that are distributed to facilities. The notice must be provided to the receiving facility and may be attached or incorporated into that product’s MSDS. If no MSDS is required, the notification must be in a letter that accompanies the first shipment of the product to your facility. This letter must contain the chemical name, CAS number, and the weight or volume percent of the chemical (or a range) in the mixture or other trade name product. Beginning with the 1998 reporting year, seven new industries will be covered by most of the EPCRA Section 313 reporting requirements

and, therefore, facilities in SIC codes 2000 through 3999 will be required to provide these new industries with this supplier notification information. While the new industries are not required to prepare supplier notifications for materials that they distribute, they are encouraged to pass along the notification to customers receiving these materials who may be subject to EPCRA Section 313. For more information on supplier notification requirements, see *TRI Forms and Instructions, EPCRA Section 313 Question and Answers, Revised 1998 Version - Appendix A, Directive 9 (EPA-745-B-98-004)* or *Supplier Notification Requirements (EPA-560/4-91-006)*.

Carefully review the entire MSDS for your purchased chemicals. Although MSDSs must list whether EPCRA Section 313 chemicals are present, the language and location of this notification is not currently standardized. Depending on the supplier, this information can be found in different sections of the MSDS. The most likely sections of an MSDS to provide information on identity and concentration of EPCRA Section 313 chemicals in purchased chemicals are:

- Hazardous components section;
- Regulatory section;
- Physical properties/chemical composition section;
- Labeling section; and
- Additional information section.

EPCRA Section 313 Chemical List

In order to identify which chemicals are EPCRA Section 313 chemicals, and (in some cases) the form in which they are reportable, you need to compare your list of chemicals managed at your facility to the current Section 313 list of chemicals. The most current list of EPCRA Section 313 chemicals can be found in the *TRI Forms and Instructions* document for the current reporting year. The following discussion is a brief overview of the EPCRA Section 313 list of chemicals, including a description of possible chemical qualifiers.

The original list of EPCRA Section 313 chemicals and chemical categories was comprised from two lists developed by New Jersey and Maryland. EPA refined the list and anticipates changes to continue. The list can be modified by an EPA initiative or through a petition process. When evaluating a chemical for addition or deletion, EPA must consider potential acute and chronic human health effects and adverse environmental effects and the Agency publishes its findings and any regulatory action through the *Federal Register*.

The EPCRA Section 313 chemical list includes individually listed chemicals and several chemical categories. If you meet the SIC code criterion and exceed the employee threshold, you must file a Form R or Form A for each EPCRA Section 313 chemical or chemical category manufactured, processed, or otherwise used above threshold quantities. When conducting threshold determinations for individually listed chemicals, simply compare the amount of that chemical manufactured, processed, or otherwise used, to each threshold quantity. If you exceed the threshold, you must file a Form R or Form A for that chemical. When determining thresholds for chemical categories, you must total the weights of all members of the category, and compare this sum to each activity threshold. It is important that you compare the amount of compounds in a category separately to each individual activity threshold (manufacturing, processing, or

otherwise use). If you exceed any of the three activity thresholds for a chemical category, you must file a Form R or Form A for that chemical category.

Many of the EPCRA Section 313 chemical categories are metal compound categories (e.g., chromium compounds). Metal compound categories include any unique chemical substance that contains the metal as part of that chemical's infrastructure. When calculating thresholds for metal compound categories, you must consider the entire weight of the metal compound, not just the weight of the parent metal. However, if you exceed an activity threshold for a metal compound category and you are filing a Form R for that metal compound category, you need only use the weight of the parent metal when calculating quantities released or otherwise managed as waste. Elemental forms of metals (e.g., chromium) are also individually listed on the EPCRA Section 313 chemical list. You must make separate threshold determinations for the elemental metal and the metal compound category (e.g., chromium and chromium compounds). If you exceed thresholds for both the metal and metal compound category, you may submit separate

Examples - Chemical Categories

Example 1 A facility otherwise uses 5,000 pounds of 1,3-bis(methylisocyanate)-cyclohexane, 3,000 pounds of 1,5-naphthalene diisocyanate, and 3,000 pounds of 2,2,4-trimethylhexamethylene diisocyanate. All three of these chemicals are members of the diisocyanates category, an EPCRA Section 313 chemical category. The facility otherwise uses 11,000 pounds of diisocyanates, which exceeds the 10,000 pound threshold for otherwise use. The facility must file a Form R or Form A for diisocyanates category.

Example 2 A facility otherwise uses 6,000 pounds of zinc oxide, manufactures 20,000 pounds of zinc sulfate, and processes 18,000 pounds of zinc sulfide. All three compounds are members of the zinc compounds category, an EPCRA Section 313 chemical category. Because the facility does not exceed the otherwise use, manufacturing, or processing thresholds, the facility is not required to file a Form R or Form A for the zinc compound category.

Form Rs, or one Form R for both the metal and metal compound category. However, if both the metal and the metal compound qualify for Form A reporting, you must submit separate Form A certifications for the metal and metal compound category.

Example - Lead and Lead Compounds

A facility has determined that it needs to report under EPCRA Section 313 for both elemental lead and lead compounds. Can this facility file one Form R that takes into account both the releases and other waste management activities of lead and lead compounds, or is it required to report separately?

If a covered facility exceeds thresholds for both the parent metal and compounds of that same metal, it is allowed to file one joint report (e.g., one report for lead compounds and elemental lead). EPA allows this because the release and other waste management information reported in connection with metal compounds will be the total pounds of the parent metal released and otherwise managed as a waste. For data management purposes, EPA requires that the chemical category name and code be placed on the Form R (Section 1.1 and 1.2).

Several chemicals on the EPCRA Section 313 chemical list include qualifiers related to use or form. A few chemicals are reportable ONLY if manufactured by a specified process or in a specified threshold activity. For example, isopropyl alcohol is only reportable if it is manufactured using the strong acid process and saccharin is reportable only if it is manufactured. Some other chemicals are only reportable if present in certain forms. For example, only yellow or white phosphorus are reportable, while black and red phosphorus are not.

The qualifiers associated with these chemicals which may be applicable to the metal mining industry are presented below. A detailed discussion of the qualifier criteria can be found in the *TRI Forms and Instructions*.

- **Fume or dust** - Three metals (aluminum, vanadium, and zinc) are qualified as “fume or dust forms only.” This definition excludes “wet” forms such as solutions or slurries, but includes powder, particulate, or gaseous forms of these metals. For example, on-site disposal of a waste received from off-site containing elemental zinc metal needs to be considered in threshold determinations if the zinc is in the form of a fume or dust. However, if zinc (fume or dust) are found during treatment of a zinc-containing waste stream, then these amounts would need to be considered toward the facility’s manufacturing threshold. Additionally, the entire weight of all zinc compounds should be included in the threshold determination for zinc compounds. Keep in mind that most metals in most wastes are expected to be in the compound form.
- **Ammonia** has the following qualifier: “ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable salts and other sources; 10% of total aqueous ammonia is reportable under this listing).” Aqueous ammonia is formed from the dissociation of ammonium salts (including ammonium sulfate, ammonium nitrate, and ammonium chloride) in water and is an EPCRA Section 313 chemical. You must determine the amount of aqueous ammonia generated from solubilizing these chemicals in water and apply it toward the threshold for ammonia. EPA has published guidance on reporting for ammonia, and ammonium salts in *EPCRA Section 313 Question and Answers, Revised 1997 Version - Appendix A, Directive 8*. Additionally, ammonium nitrate in aqueous solutions must be included in threshold determinations and release and other waste management calculations for the nitrate compounds category. (See below)
- **Nitrate Compounds (water dissociable; reportable only in aqueous solution)**
- A nitrate compound is covered by this listing only when in water and if dissociated. Although the complete weight of the nitrate compound must be used for threshold determinations for the nitrate compounds category, only the nitrate ion portion of the compound must be considered for release and other waste management determinations. Nitrate compounds are manufactured during the neutralization of nitric acid and in biological treatment of wastewater. EPA has published guidance for these chemicals in *Water Dissociable Nitrate Compounds Category and Guidance for Reporting* (see Appendix C for more information).

- **Phosphorus (yellow or white)** - Only manufacturing, processing, or otherwise use of phosphorus in the yellow or white chemical forms require reporting. Black and red phosphorus are not subject to EPCRA Section 313 reporting.
- **Asbestos (friable)** - Asbestos only need be considered when it is handled in the friable form. Friable refers to the physical characteristic of being able to crumble, pulverize, or reduce to a powder with hand pressure.
- **Aluminum oxide (fibrous)** - Beginning with reports for calendar year 1989, aluminum oxide is only subject to threshold determination when it is handled in fibrous forms. EPA has characterized fibrous aluminum oxide for purposes of EPCRA Section 313 reporting as a man-made fiber that is commonly used in high-temperature insulation applications such as furnace linings, filtration, gaskets, joints, and seals.
- **Sulfuric acid (acid aerosols) and hydrochloric acid (acid aerosols)** - EPA delisted non-aerosol forms of sulfuric acid (CAS No. 7664-93-9) and hydrochloric acid (CAS No. 7647-01-0) from the EPCRA Section 313 chemical list beginning in the 1994 and 1995 reporting years, respectively. Threshold determinations and release and other waste management estimates now only apply to the aerosol forms. EPA considers the term aerosol to cover any generation of airborne acid (including mists, vapors, gas, or fog) without any particle size limitation. Sulfuric acid and hydrochloric acid (acid aerosols) are manufactured during the combustion of sulfur containing wastes (for sulfuric acid) and chlorine containing wastes (for hydrochloric acid). EPA has published guidance for sulfuric acid (acid aerosols) in *Guidance for Reporting Sulfuric Acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)* (see Appendix C for more information).

3.2 Step 2. Determining the quantity of each EPCRA Section 313 chemical manufactured (including imported), processed, or otherwise used

The next step is to determine the quantities manufactured (including imported), processed, and otherwise used for each EPCRA Section 313 chemical on your list (developed in Step 1). Table 3-2 lists the annual reporting thresholds for each of these threshold activities (Tables 3-3 through 3-5 provide detailed definitions of subcategories for each Threshold Activity).

**Table 3-2
Reporting Thresholds**

Activity	Threshold
Manufacturing (including importing)	More than 25,000 pounds per EPCRA Section 313 chemical
Processing	More than 25,000 pounds per EPCRA Section 313 chemical
Otherwise used	More than 10,000 pounds per EPCRA Section 313 chemical

For each EPCRA Section 313 chemical or chemical category during the reporting year, each threshold must be individually calculated; they are mutually exclusive and are not additive.

Example -Threshold Determination

If your facility manufactures 22,000 pounds of an EPCRA Section 313 chemical and you also otherwise use 8,000 pounds of the same chemical, you have not exceeded either activity threshold and an EPCRA Section 313 report for that chemical is not required. However, if your facility manufactures 28,000 pounds per year of an EPCRA Section 313 chemical and otherwise uses 8,000 pounds of the same chemical, you have exceeded the manufacturing threshold and all non-exempt releases and other waste management activities of that chemical must be reported on the Form R, including those from the “otherwise use” activity. Additionally, you must also indicate on the Form R in Part II, Section(s) 3.1, 3.2, and 3.3, all non-exempt activities involving the reportable EPCRA Section 313 chemical.

Example -Threshold Determination

The amount of the EPCRA Section 313 chemical that is actually manufactured (including the quantity imported), processed, or otherwise used, not the amount in storage or previously disposed, is the amount applied to the threshold determination. For example, your facility disposes of nickel compounds in an on-site landfill. The landfill contains hundreds of thousands of pounds of nickel compounds. Over the course of the reporting year, you dispose of an additional 5,000 pounds of nickel compounds in wastes received from off-site. In this example, only the 5,000 pounds that were disposed of in the current year count toward the “otherwise use” threshold. Therefore, unless you “otherwise use” more than 5,000 pounds elsewhere at the facility, the “otherwise use” threshold has not been exceeded and you would not have to report for nickel compounds.

Each of the threshold activities is divided into subcategories. As discussed in the *TRI Forms and Instructions*, you are required to designate EACH activity and subcategory that applies to your facility not only those for which a threshold was exceeded.

POSSIBLE ERROR - Threshold Determination

The amount of the EPCRA Section 313 chemical that is actually manufactured (including the quantity imported), processed, or otherwise used, not the amount that may be in storage, should be the amount applied to the threshold determination. For example, your facility uses a recirculating cooling system containing 15,000 pounds of anhydrous ammonia. To replace fugitive releases and small losses that occur during use, you add 5,000 pounds of anhydrous ammonia to the cooling system. In this example, only the 5,000 pounds that were added to the system count toward the “otherwise use” threshold. Therefore, unless you “otherwise use” more than 5,000 pounds elsewhere at the facility, the “otherwise use” threshold of 10,000 pounds has not been exceeded and you would not have to report for ammonia.

Manufacturing

Manufacturing means producing, preparing, importing, or compounding an EPCRA Section 313 chemical. You will need to consider if any EPCRA Section 313 chemicals are manufactured during beneficiation, separation activities, waste treatment, and other on-site activities, including both intentional and coincidental manufacturing. You must consider coincidental manufacturing of EPCRA Section 313 chemicals regardless of whether the chemical only exists for a short period of time and is converted to another chemical. The following discussion describes the various activities included under manufacturing (see Table 3-3), and other manufacturing threshold issues that are relevant to metal mining facilities.

Table 3-3
Definitions and Examples of Manufactured Chemicals

Manufacturing Activity Subcategory	Examples
Produced or imported for on-site use/processing	-Cyanide compounds manufactured as intermediates during cyanide leaching of gold. -Beneficiation agents (e.g., flotation agents) that may contain EPCRA Section 313 chemicals imported into the customs territory of the United States.
Produced or imported for sale/distribution	-Metals or metal compounds manufactured for distribution into commerce (e.g., elemental copper manufactured from copper sulfate during electrowinning). -Ores imported into the customs territory of the United States that are prepared for distribution into commerce.
Produced as a by-product	-Sulfuric acid (acid aerosols) manufactured during spraying for ore leaching. -Coincidental manufacture of metal compounds during beneficiation.
Produced as an impurity	-Non-target metal compounds produced during beneficiation that remain in the metal product distributed into commerce. For example, conversion of silver compounds to elemental silver in gold dore distributed into commerce.

* More complete discussions of the industry-specific examples can be found in Chapter 4 of this guidance manual.

Manufacture of Metals and Metal Compounds During Beneficiation. Metal mining facilities may manufacture metals and metal compounds during beneficiation or other activities. Metal mining facilities should be aware of chemical conversions that may take place during beneficiation. The following types of conversions constitute manufacturing:

- Conversion of one metal compound to another within the same compound category. For example, a lead mine may convert galena (lead sulfide in ore) to lead oxide during beneficiation.
- Conversion of metal compounds to elemental metals. For example, a gold mine may convert silver compounds in extracted ore to elemental silver in dore.
- In some cases, facilities may convert elemental metals to metal compounds. For example if native copper is present in ore, a facility may convert the elemental copper to a copper compound during beneficiation.

Example - Manufacture of Silver Compounds and Cyanide Compounds

A gold mining facility extracts ore containing silver compounds, and uses sodium cyanide to leach metals from the ore. During leaching, the sodium cyanide converts to silver cyanide. The mine manufactures silver cyanide compounds. Silver cyanide is a member of two EPCRA Section 313 chemical compound categories: silver compounds and cyanide compounds. The facility must count the entire weight of the silver cyanide when determining thresholds for silver compounds AND toward the threshold for cyanide compounds. If the facility manufactures more than 25,000 pounds of silver cyanide during the reporting year, the facility must file a Form R (or Form A) for silver compounds, and a separate Form R (or Form A) for cyanide compounds.

As previously discussed, if you manufacture both a metal compound and the elemental form of the same metal (e.g., copper sulfide and elemental copper), you must conduct two separate threshold determinations - one for the metal compound, and one for the elemental metal. For more detail about this and other issues related to thresholds for metals and metal compounds, see the previous discussion in this chapter.

Manufacture of Acid Aerosols. Sulfuric acid (acid aerosols) and hydrochloric acid (acid aerosols) are EPCRA Section 313 chemicals when they are in aerosol form (including mists, vapors, fog, and other airborne species of any particle size). The conversion of non-aerosol forms of sulfuric acid or hydrochloric acids (e.g., solutions) to aerosol forms are considered a “manufacturing” activity under EPCRA Section 313. In some leaching operations, metal mines spray dilute sulfuric acid onto ore. Mines usually collect the solution after it passes through the ore, remove the target metal from the solution using various beneficiation steps, and regenerate sulfuric acid, which is sprayed back onto the pile. The spraying of sulfuric acid results in the manufacture of sulfuric acid (acid aerosols). Each time the spray system aerosolizes the sulfuric acid, the facility manufactures sulfuric acid (acid aerosols). The facility must total every amount that passes through the spray system to calculate the manufacturing threshold. The facility “manufactures” and then “otherwise uses” the acid aerosol, and the 10,000 pound “otherwise use” threshold would be the threshold that would first trigger reporting. For guidance on conducting threshold determinations for sulfuric acid (acid aerosols), refer to: *Emergency Planning and Community Right-to-Know Act--Section 313: Guidance for Reporting Sulfuric Acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)*, EPA, March, 1998, available on EPA’s website (<http://www.epa.gov/opptintr/tri/>).

Example - Copper Compounds in Solution

If a facility has a solution containing a chromium compound, does the facility need to report on the entire mixture or just the chromium when making a threshold determination under Section 313?

To determine if a facility meets an applicable threshold for the chromium compound (or any EPCRA Section 313 chemical) in a solution, the facility is required to determine the weight percent of chromium compound in the solution and use that amount for the threshold determination.

Example - Sulfuric Acid (Acid Aerosols) Drip System

Would a sulfuric acid drip system that is in contact with an ore leach pile (described as analogous to a gardener's drip hose) be manufacturing sulfuric acid in an aerosol form?

No, the sulfuric acid does not become airborne; so it does not become an aerosol form of sulfuric acid and, therefore, it is not considered an EPCRA Section 313 chemical.

Sulfuric Acid (Acid Aerosols)

At a mining facility, sulfuric acid (acid aerosols) is sprayed onto a copper ore pile to leach copper sulfate for further processing. How should the facility make threshold determinations for sulfuric acid (acid aerosols)?

Sulfuric acid is reportable only in the aerosol form. Therefore, the facility "manufactures" sulfuric (acid aerosols) each time the acid passes through the spray mechanism. In this particular example, the acid reacts with the copper compounds in the ore to produce copper sulfate, which is subsequently reacted to generate sulfuric acid and applied to the ore pile. Because the facility generates another EPCRA Section 313 chemical (copper sulfate), the facility must count the amount of sulfuric acid (acid aerosols) "manufactured" each time it passes through the spray mechanism, and apply this amount to the "manufacturing" threshold of 25,000 pounds for sulfuric acid (acid aerosols), in addition to considering amounts of copper sulfate that is also "manufactured." Because all the sulfuric acid (acid aerosols) "manufactured" is subsequently "otherwise used," the facility must apply this same amount towards the "otherwise use" threshold of 10,000 pounds. Facilities are also directed to refer to the *Guidance for Reporting Sulfuric Acid* (EPA-745-R-97-007; November 1997) for further assistance.

Importing. The "manufacture" threshold includes importing an EPCRA Section 313 chemical if the facility has *caused* the chemical to be imported. If your facility orders or enters into an agreement to obtain or accept an EPCRA Section 313 chemical (or a mixture or other trade name product or waste containing an EPCRA Section 313 chemical) from a source outside the customs territory of the United States (the 50 states, the District of Columbia, and Puerto Rico) then your facility has imported a listed EPCRA Section 313 chemical and amounts must be considered toward the manufacturing threshold. Note that if an entity other than the facility, such as a third party not directly associated with the facility (e.g., a waste or chemical broker), ordered the waste or chemical without specific direction from the facility, then that third party has "caused" the chemical to be imported, and the facility does not need to consider the EPCRA Section 313 chemical toward the manufacturing threshold. Imported chemicals, as well as any others that undergo a manufacturing activity, may also be subsequently processed and/or otherwise used, and amounts associated with these activities need to be applied to all appropriate threshold determinations.

Example - Importing

Should the amounts of an EPCRA Section 313 chemical created and imported be added together to count towards the manufacture threshold?

Yes. Because EPCRA defines both creation and importation as manufacturing, you must add the amounts of the chemical undergoing each activity together to determine the manufacturing threshold.

Processing

Processing means preparing an EPCRA Section 313 chemical, or a mixture or other trade name product containing an EPCRA Section 313 chemical (usually the intentional incorporation of an EPCRA Section 313 chemical into a product) for distribution in commerce. Metal mining facilities are likely to process EPCRA Section 313 chemicals, since a metal mine's primary function is to distribute metals or metal compounds into commerce.

Perhaps the most pivotal element of the processing definition is that the EPCRA Section 313 chemical must be *prepared for distribution into commerce*. Distribution into commerce does not only mean that the material must be sold to a customer. Distributed in commerce includes any distributive activity in which benefit is gained by the transfer, even if there is no direct monetary gain (e.g., intra-company transfers). Also, if a material is produced or recovered, for use on-site and no amount of the EPCRA Section 313 chemical is prepared for distribution into commerce, then the EPCRA Section 313 chemical has not been processed, and thus is not counted towards the processing threshold (see the discussion of otherwise use for the applicability of chemicals used on-site). The following discussion describes the subsections of processing for reporting purposes (see Table 3-4), and other processing threshold issues that are relevant to metal mining facilities.

Table 3-4
Definitions and Examples of Processed Chemicals

Processing Activity Subcategory	Examples
As a reactant	-Flotation agents and leaching agents used in mineral beneficiation that remain with the metal concentrate that is distributed into commerce.
As a formulation component	-Extracted metals and metal compounds in concentrate distributed into commerce.
As an article component	-Copper cathodes produced from electrowinning.
Repackaging for Distribution into Commerce	-Chemicals in mine water distributed into commerce.

* More complete discussions of the industry-specific examples can be found in Chapter 4 of this guidance manual.

Target Metals and Metal Compounds. Metal mining facilities must count amounts of metals and metal compounds extracted for distribution into commerce toward the 25,000 pound processing threshold. Even if the extracted metal or metal compound converts to another metal compound which is then distributed into commerce, you must consider the amount of the original EPCRA Section 313 extracted metal or metal compound toward the processing threshold. If you extract EPCRA Section 313 chemicals in ore for distribution in commerce and do not actually distribute those chemicals during the reporting year, you must count them toward your processing threshold, because they were *prepared* for distribution during the reporting year. If more than one EPCRA Section 313 metal compound within an EPCRA Section 313 metal compound category is present in the ore, the concentration is determined by the total weight percent of all compounds within a specific EPCRA Section 313 chemical category. Facilities should have sufficient information to estimate amounts of target metals and metal compounds. Sources might include mineral assays, ore analyses, operating records, and financial information.

Example - Processing at a Zinc Mine

A zinc mine in SIC code 1031 extracts ore containing the minerals, sphalerite (ZnS) and smithsonite (ZnCO₃). The ore is beneficiated and distributed into commerce. To determine the processing threshold for zinc compounds, the facility must add the entire weights of both zinc compounds (ZnS and ZnCO₃). The facility must also add the weights of any intermediate or final zinc compounds created during beneficiation.

Non-Target Metals and Metal Compounds. When processing the target metals and metal compounds at your facility, the ore you are beneficiating may also contain other non-target EPCRA Section 313 metals and metal compounds. If any portion of these non-target metals and metal compounds remain in the metal concentrate distributed into commerce, you must consider them toward the processing threshold of 25,000 pounds. If the EPCRA Section 313 chemicals are completely removed from your product prior to distribution into commerce, the chemicals are not considered processed and do not have to be considered toward the processing threshold.

Waste Rock

Waste rock is generally considered that portion of the ore body that is barren or submarginal rock, or ore which has been mined but is not of sufficient value to warrant treatment, and is therefore removed ahead of the milling process (May 1, 1997; 62 FR 23859). Removal of waste rock to gain access to an ore body does not constitute processing, manufacturing, or otherwise use, and therefore EPCRA Section 313 chemicals in waste rock are not considered for threshold determinations. Waste rock is part of the ore body and may, depending on economic conditions, become a valuable source of a desirable mineral. If you decide to beneficiate your waste rock or distribute it into commerce for direct reuse (e.g., as road aggregate), you must consider amounts of EPCRA Section 313 chemicals in the rock (no longer waste rock) that you prepared for distribution into commerce towards the processing threshold.

Facilities may use the same sources of information they use to estimate amounts of EPCRA Section 313 target metals and metal compounds extracted. If you do not track non-target metals as closely as target metals, you should refer to historical mine records, metal analyses, and

geological knowledge of associated minerals to determine the types and amounts of non-target metals and metal compounds extracted in ore. Facilities may have numerous ore samples from various locations and periods in time. If facilities wish to average very large amounts of data from sampling, the facility must use its best judgment to decide whether the raw data from which it might base any average concentration are “readily available”. In any event, a facility should carefully document its decision making. For example, if a facility decides to use average concentration levels, it should document why the raw data from which the averages are based are not “readily available”, how it arrived at any average concentration level, and why the average concentration level is a “reasonable estimate” of the amount of the EPCRA Section 313 chemical in materials managed.

Intermediates. Facilities must also consider intermediate EPCRA Section 313 chemicals when determining the processing threshold, if part of the intermediate is distributed into commerce. Intermediates are chemicals or chemical compounds that exist only for a period of time and are converted to another chemical. For example, a copper mine extracts copper compounds in ore to produce copper sulfate during sulfuric acid leaching. The facility uses solvent extraction and electrowinning to produce elemental copper. In this case, copper sulfate is considered an intermediate that must be considered toward the manufacturing threshold. In addition, because part of the copper sulfate (copper) is eventually distributed into commerce (i.e., elemental copper) the copper sulfate is considered processed, and the facility must consider the entire amount of the copper sulfate toward the processing (and manufacturing) threshold for the copper compound category.

Transfers Off-site for Direct Reuse. Amounts of EPCRA Section 313 chemicals sent off-site for direct reuse must be considered toward the processing threshold of 25,000 pounds. Materials are considered to be sent off-site for direct reuse if the materials are distributed into commerce and are going to be directly used in an operation or application without any recovery steps including the extraction of contaminants. Materials sent off-site for direct reuse are not reported on the Form R in Sections 6 and 8 as recycled or released because the materials are not considered wastes. Because materials sent off-site for direct reuse are not considered wastes, these materials may qualify for the *de minimis* exemption if any EPCRA Section 313 chemical in the material is below the *de minimis* level (see Chapter 3.2.2.3). EPCRA Section 313 chemicals in waste that are sent off-site for further waste management, e.g., disposal, are not considered to be reused.

Transfers Off-site for Recycling. Amounts of EPCRA Section 313 chemicals sent off-site for recycling also must be considered toward the processing threshold of 25,000 pounds. Amounts of materials containing EPCRA Section 313 chemicals sent off-site for recycling are prepared for distribution into commerce. Materials sent off-site for recycling must undergo a recovery step and are, therefore, considered a waste and not eligible for the *de minimis* exemption. Wastes destined for off-site recycling are considered wastes sent off-site for further waste management, which are not eligible for the *de minimis* exemption and must be reported on the Form R in Sections 6 and 8.

Otherwise Use

“Otherwise use” is any use of an EPCRA Section 313 chemical that does not fall under the definitions of “manufacture” or “process.” Chemicals otherwise used are not incorporated into a product that is distributed into commerce and includes such uses as a processing or manufacturing aid and for such ancillary uses as treating wastes.

Otherwise use of an EPCRA Section 313 chemical also includes disposal, stabilization (without subsequent distribution in commerce), and treatment for destruction if the:

- (1) EPCRA Section 313 chemical that was disposed, stabilized, or treated for destruction was received from off-site for the purposes of further waste management, or
- (2) EPCRA Section 313 chemical that was disposed, stabilized, or treated for destruction was manufactured as a result of waste management activities of materials received from off-site for the purpose of further waste management.

The following discussion describes the subsections of the otherwise use threshold for reporting purposes (see Table 3-5).

**Table 3-5
Definitions and Examples of Otherwise Used Chemicals**

Activity	Examples
As a chemical processing aid	-Zinc dust used to precipitate gold from pregnant gold-cyanide solutions. -Chemicals used in solvent extraction/electrowinning. -Chemicals used in leaching, or flotation. -Lead-based steel wool used as a cathode in the electrowinning process.
As a manufacturing aid	-Lubricants, coolants, and hydraulic fluids used in equipment. -Fuel used to power stationary equipment. -Nitric acid used to regenerate carbon adsorption beds used in cyanide leaching process.
Ancillary or other use	-Naphthalene in diesel fuel used in stationary equipment. -Chlorine used to treat cyanide in waste water. -Cleaners, degreasers, chemicals used to treat wastes.

* More complete discussions of the industry-specific examples can be found in Chapter 4 of this guidance manual.

Reclamation. Mines will often use a variety of materials, including overburden, waste rock, fertilizers, and ash (received from off-site), for land contouring, structural backfill, or soil building, during mine reclamation. Under EPCRA Section 313, use of materials containing EPCRA Section 313 chemicals for reclamation activities must be considered towards threshold determinations and release and other waste management calculations. EPCRA Section 313 chemicals used in mine reclamation are subject to the otherwise use threshold of 10,000 pounds.

Various materials otherwise used during reclamation may or may not be subject to certain exemptions, as discussed below:

- **Overburden:** EPCRA Section 313 chemicals in overburden used for reclamation are eligible for the overburden exemption for metal mining operations.
- **Waste Rock:** In cases where waste rock is simply displaced and disposed of, the waste rock is not associated with a processing, manufacturing, or otherwise use activity, and any EPCRA Section 313 chemicals contained in the waste rock are not eligible for the *de minimis* exemption. However, if for example, the waste rock is sent off-site to be used as landscape rock, any EPCRA Section 313 chemicals in the waste rock would be considered processed and eligible for the *de minimis* exemption.
- **Mixtures and Other Trade Name Products:** EPCRA Section 313 chemicals in mixtures and other trade name products (such as commercial fertilizers) applied to land in mine reclamation activities are eligible for the *de minimis* exemption.
- **Ash:** The direct application of ash to the land as fill or for pH control of soil is considered to be waste management of the ash. Because the *de minimis* exemption does not apply to wastes, EPCRA Section 313 chemicals in ash directly applied to land are not eligible for the *de minimis* exemption.

Example - Soil Reclamation

A covered mining facility receives waste sewage sludge from off-site for use in soil reclamation. Is the application of waste sewage sludge to land considered an otherwise use? Are the EPCRA Section 313 chemicals used in the soil reclamation activity eligible for the *de minimis* exemption, and if so, how are amounts reported (e.g. released to land)?

The metal mine is otherwise using the EPCRA Section 313 chemicals contained in the waste sewage sludge as soil building material. However, because the EPCRA Section 313 chemicals contained in the sludge are being managed as a waste, the amounts of EPCRA Section 313 chemicals being otherwise used are not eligible for the *de minimis* exemption. Amounts of EPCRA Section 313 chemicals are reported as a release to land. The otherwise use of EPCRA Section 313 chemicals, such as nitrate compounds for farming, is to be reported as a release to land in Section 5.5 of the Form R.

If an activity threshold is exceeded and you are filing a Form R for an EPCRA Section 313 chemical, you must report all non-exempt applications of that chemical to land during reclamation or other activities in Section 5.5 of Form R, Releases to Land. This will be discussed in greater detail in Chapter 4 of this document.

Froth Flotation. Various metal mining facilities use flotation as a method of concentrating minerals. Facilities may use a variety of reagents during flotation, such as frothers, collectors, pH modifiers, activators, depressants, dispersants, or flocculents. You should check MSDSs, purchasing records and equipment and process specifications to determine identities and quantities of EPCRA Section 313 chemicals that may be in flotation agents. To help you identify

EPCRA Section 313 chemicals commonly used as flotation agents in copper beneficiation and lead/zinc beneficiation, use Tables 3-6 and 3-7, respectively. Some facilities may use petroleum fuels as collectors (promoters). Table 3-8 shows the chemical constituents and their concentrations in petroleum fuels commonly used as collecting agents. If you do not have better facility-specific data (e.g., MSDSs, process specifications, and other sources), you may use the concentrations in Table 3-8 as default values.

Table 3-6
Common Copper Beneficiation Flotation Agents
Containing EPCRA Section 313 Chemicals

Flotation Agent	EPCRA Section 313 Chemical
Copper sulfate	Copper compounds
Cresylic acid	Cresols
Nokes reagent	Arsenic compounds
Kerosene	Cyclohexane, naphthalene, benzene, xylene, and ethyl benzene (all typically below de minimis)
Polyacrylamide	Acrylamide (monomer)
Sodium cyanide	Cyanide compounds
Sodium ferrocyanide	Cyanide compounds
Zinc sulfate	Zinc compounds

**Table 3-7
Common Lead/Zinc Beneficiation Flotation Agents
Containing EPCRA Section 313 Chemicals**

Flotation Agent	EPCRA Section 313 Chemical
Copper Sulfate	Copper Compound
Cresylic Acid	Cresols
Sodium Ferrocyanide	Cyanide Compounds
Sodium dichromate	Chromium compounds
Zinc Sulfate	Zinc Compounds

**Table 3-8
Estimated Concentration Values of EPCRA Section 313 Constituents in Crude Oil and
Petroleum Products (Weight Percent)**

EPCRA Section 313 Chemical	De Minimis Level*	Crude Oil	Gasoline (Various Grades)	No.2 Fuel Oil/ Diesel Fuel	Jet Fuel (JP-4)	Kerosene	Lubricating Oil	No. 6 Fuel Oil	Aviation Gasoline
Benzene	0.1	0.446 ^R	1.608 ^R	8.0E-04 ^A	1.0 ^A	0.004 ^A	N/A	0.001	0.515 ^R
Biphenyl	1.0	0.060 ^R	0.010 ^R	0.100	0.120 ^R	0.120 ^R	N/A	N/A	N/A
Bromine	1.0	N/A	N/A	N/A	N/A	N/A	N/A	3.0E-06	N/A
Chlorine	1.0	N/A	N/A	N/A	N/A	N/A	N/A	0.0131 ^D	N/A
Cyclohexane	1.0	0.700	0.240	N/A	1.240	N/A	N/A	N/A	N/A
Ethylbenzene	1.0	0.346 ^R	1.605 ^R	0.013 ^A	0.50 ^A	0.127 ^A	N/A	0.0022	0.432 ^R
n-Hexane	1.0	2.463 ^R	7.138 ^R	1.0 ^A	5.60 ^A	0.005 ^A	N/A	N/A	0.126 ^R
MTBE ^B	1.0	N/A	15.00	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	1.0	0.219 ^R	0.444 ^R	0.550	0.468 ^R	0.733 ^R	N/A	0.10	0.10 ^R
Phenanthrene	1.0	N/A	N/A	0.125	N/A	N/A	N/A	N/A	N/A
Phenol	1.0	0.323	0.055	0.064	N/A	0.770	N/A	N/A	N/A
PACs ^C	0.1	0.0004	N/A	N/A	N/A	N/A	N/A	1.13	N/A
Styrene	0.1	N/A	N/A ^E	0.032 ^R	N/A	N/A	N/A	N/A	N/A
Toluene	1.0	0.878 ^R	7.212 ^R	0.032 ^A	3.20 ^A	1.330 ^A	N/A	0.006	7.327
1,2,4-Trimethylbenzene	1.0	0.326	2.50 ^F	1.0 ^J	N/A	N/A	N/A	N/A	N/A
Xylene	1.0	1.420 ^R	7.170 ^R	0.290 ^A	3.20 ^A	0.31 ^A	N/A	0.013	2.204
Antimony ^A	0.1	1.0E-05	N/A	N/A	N/A	N/A	N/A	1.0E-06	N/A
Arsenic ^A	0.1/1.0 ^C	2.0E-05	N/A	8.5 ^{E-06}	N/A	N/A	N/A	3.06E-05 ^D	N/A
Beryllium ^A	0.1/1.0 ^C	2.0E-07	N/A	5.0 ^{E-06}	N/A	N/A	N/A	2.7E-06 ^D	N/A
Cadmium ^A	0.1/1.0 ^C	4.0E-07	N/A	2.1 ^{E-05}	N/A	N/A	N/A	2.0E-06 ^D	N/A

EPCRA Section 313 Chemical	De Minimis Level*	Crude Oil	Gasoline (Various Grades)	No.2 Fuel Oil/ Diesel Fuel	Jet Fuel (JP-4)	Kerosene	Lubricating Oil	No. 6 Fuel Oil	Aviation Gasoline
Chromium ^a	0.1/1.0 ^d	4.0E-05	N/A	9.5 E-05	N/A	N/A	N/A	3.1E-05 ^D	N/A
Cobalt ^a	1.0	0.0003	N/A	N/A	N/A	N/A	N/A	1.63E-04 ^D	N/A
Copper ^a	1.0	4.0E-05		5.6E-04	N/A	N/A	N/A	3.0E-05	N/A
Lead Compounds	1.0 (organic) 0.1 (inorg.)	N/A	N/A	N/A	N/A	N/A	N/A	1.41E-04 ^D	0.14 ^c (organic)
Manganese ^a	1.0	N/A	N/A	2.1E-05	N/A	N/A	N/A	3.5E-05 ^D	N/A
Mercury ^a	1.0	0.0006	N/A	4.0E-05	N/A	N/A	N/A	9.2E-07 ^D	N/A
Nickel ^a	0.1	0.0055	N/A	3.38E-04	N/A	N/A	N/A	2.6E-03 ^D	N/A
Selenium ^a	1.0	4.0E-05	N/A	N/A	N/A	N/A	N/A	9.5E-06 ^D	N/A
Silver ^a	1.0	N/A	N/A	N/A	N/A	N/A	N/A	2.0E-08	N/A
Zinc Compounds	1.0	N/A	N/A	N/A	N/A	N/A	1.0	N/A	N/A

Unless otherwise noted, Source: *Economic Analysis of the Final Rule to Add Certain Industry Groups to EPCRA Section 313*, Appendix B "Composition of Crude Oil and Petroleum Products."

^a American Petroleum Institute report prepared for Mr. Jim Durham, EPA (December 23, 1993), regarding revised estimates of heavy petroleum product liquid constituents that are listed as hazardous air pollutants (HAPs) under section 112 of the Clean Air Act Amendments (CAAA).

^b Radian Corporation report prepared for Mr. James Durham, EPA (August 10, 1993), regarding liquid HAP concentrations of various petroleum products.

^D Appendix D, Study of Hazardous Air Pollution Emissions from Electric Utility Steam Generating Units--Final Report to Congress, USEPA, OAQPS (February 1998) 453/R-98-004b.

* The *de minimis* concentration values for the metals is for the metal compound.

^c Lead compounds concentration for Aviation Gasoline 100 (Exxon-MSDS).

[†] Concentrations updated with comments received from API.

^a Constituents are most likely metal compounds rather than the elements. Elements are listed in this table because concentration data are for only the metals occurring in the fuel. Concentrations for metal compounds would be somewhat higher depending on the metal compound. For threshold determination, if the weight of the compound is not known, facilities may use the weight of the lowest metal compound likely to be present.

[@] Data from EPA report prepared by Radian Co. for this constituent are considered suspect and are not recommended for use, based on discussion with Jim Durham of EPA on November 30, 1998.

^b MTBE may be present to enhance octane in concentrations from 0-15% (industry practice, not sampling results).

^c The *de minimis* level for inorganic compounds is 0.1; for organic compounds is 1.0.

^d The *de minimis* level for chromium VI compounds is 0.1; for chromium III compounds is 1.0.

^e The petroleum products may contain one or more of the following chemicals under the polycyclic aromatic compounds (PACs) category: benzo(a)anthracene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(rst)pentaphene, benzo(a)phenanthrene, benzo(a)pyrene, dibenz(a,h)acridine, dibenz(a,j)acridine, dibenzo(a,h)anthracene, 7H-Dibenzo(c,g)carbazole, dibenzo(a,e)fluoranthene, dibenzo(a,e)pyrene, dibenzo(a,h)pyrene, dibenzo(a,l)pyrene, 7,12-dimethylbenz(a)anthracene, indeno[1,2,3-cd]pyrene, 5-methylchrysene, 1-nitropyrene. For No. 6 fuel oil, the value given is for benzo(a)anthracene.

Special "Otherwise-Use" Activities to Consider for Metal Mining Facilities

- EPCRA Section 313 chemicals used in beneficiation activities such as froth flotation, conditioning, leaching, are otherwise use activities.
- EPCRA Section 313 chemicals in manufactured items (e.g., anodes, crushers grinders) used in beneficiation activities, should be considered toward the otherwise use threshold if the item is installed during the reporting year, and does not qualify for the article exemption.
- Any EPCRA Section 313 chemicals that a facility uses to treat waste is otherwise used.
- EPCRA Section 313 chemicals in materials purchased to be used as fuel or for maintaining equipment operations, other than for maintaining motor vehicles, should be included in the threshold determination for "otherwise use" activities.

- EPCRA Section 313 chemicals in materials that are used to maintain process equipment (e.g., lubricants, solvents, wear parts).

Waste Management Activities. For purposes of the otherwise use definition, EPA interprets waste management activities to include recycling, combustion for energy recovery, treatment for destruction, waste stabilization, and release, including disposal. However, for calculating thresholds, the only quantity that should be applied to the otherwise use definition are those that are treated for destruction, stabilized, or disposed on-site. Waste management does not include the storage, container transfer, or tank transfer of an EPCRA Section 313 chemical if no recycling, combustion for energy recovery, treatment for destruction, waste stabilization, or release of the chemical occurs at the facility (62 FR 23850; May 1, 1997).

Table 3-9
EPA Guidance Related to Waste Management Activities

Waste Management Activity	Description
<i>Recycling</i>	As referenced in the May 1, 1997, <i>Federal Register</i> and defined in the document, <i>Interpretations of Waste Management Activities: Recycling, Combustion for Energy Recovery, Treatment for Destruction, Waste Stabilization, and Release</i> (April 1997), recycling means: (1) the recovery for reuse of an EPCRA Section 313 chemical from a gaseous, aerosol, aqueous, liquid, or solid stream; or (2) the reuse or the recovery for use of an EPCRA Section 313 chemical that is a RCRA hazardous waste as defined in 40 CFR Part 261. Recovery is the act of extracting or removing the EPCRA Section 313 chemical from a waste stream and includes: (1) the reclamation of the EPCRA Section 313 chemical from a stream that entered a waste treatment or pollution control device or process where destruction of the stream or destruction or removal of certain constituents of the stream occurs (including air pollution control devices or processes, wastewater treatment or control devices or processes, Federal or state permitted treatment or control devices or processes, and other types of treatment or control devices or processes); and (2) the reclamation for reuse of an “otherwise used” EPCRA Section 313 chemical that is spent or contaminated and that must be recovered for further use in either the original or any other operations.
<i>Combustion for energy recovery</i>	Combustion for energy recovery is interpreted by EPA to include the combustion of an EPCRA Section 313 chemical that is (1) (a) a RCRA hazardous waste or waste fuel, (b) a constituent of a RCRA hazardous waste or waste fuel, or (c) a spent or contaminated “otherwise used” material; and that (2) has a significant heating value and is combusted in an energy or materials recovery device. Energy or materials recovery devices are boilers and industrial furnaces as defined in 40 CFR §372.3 (See 62 FR 23891). If a reported toxic chemical is incinerated but does not contribute energy to the process (e.g., metal, metal compounds, and chloroflorocarbons), it must be considered treatment for destruction. In determining whether an EPCRA Section 313 chemical is combusted for energy recovery, the facility should consider the heating value of the EPCRA Section 313 chemical and not the heating value of the chemical stream.

<i>Treatment for destruction</i>	Means the destruction of an EPCRA Section 313 chemical in waste such that the substance is no longer the EPCRA Section 313 chemical subject to reporting. Treatment for destruction does not include the destruction of an EPCRA Section 313 chemical in waste where the EPCRA Section 313 chemical has a heat value greater than 5,000 British Thermal Units (BTU) and is combusted in any device that is an industrial boiler or furnace. (See 40 CFR §372.3.) “Treatment for destruction” includes acid or alkaline neutralization if the EPCRA Section 313 chemical is the entity that reacts with the acid or base. “Treatment for destruction” does not include: (1) neutralization of a waste stream containing EPCRA Section 313 chemicals if the EPCRA Section 313 chemicals themselves do not react with the acid or base (See 40 CFR §372.3), (2) preparation of an EPCRA Section 313 chemical for disposal, (3) removal of EPCRA Section 313 chemicals from waste streams, and (4) activities intended to render a waste stream more suitable for further use or processing, such as distillation or sedimentation. (Note: Amounts of metals CAN NOT be destroyed and therefore should not be reported as treated for destruction.)
<i>Waste stabilization</i>	Means any physical or chemical process used to either reduce the mobility of hazardous constituents in a hazardous waste or eliminate free liquid as determined by a RCRA approved test method (e.g., Test Method 9095). A waste stabilization process includes mixing the hazardous waste with binders or other materials and curing the resulting hazardous waste and binder mixture. Other synonymous terms used to refer to this process are “stabilization,” “waste fixation,” or “waste solidification.” (See 40 CFR §372.3.)
<i>Release</i>	<i>Release</i> is defined by EPCRA Section 329(8) to mean any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles) of any EPCRA Section 313 chemical. (See 40 CFR §372.3.)
<i>Disposal</i>	<i>Disposal</i> means any underground injection, placement in landfills/surface impoundments, land treatment, or other intentional land disposal. (See 40 CFR §372.3.)

(See EPA document, *Interpretations of Waste Management Activities: Recycling, Combustion for Energy Recovery, Waste Stabilization and Release* for further detail.)

Waste management activities conducted by a facility on EPCRA Section 313 chemicals in wastes generated on-site are not considered an otherwise use of that chemical. The otherwise use threshold applies to amounts disposed, stabilized (without subsequent distribution in commerce), or treated for destruction from wastes received from off-site or from chemicals generated from waste received from off-site. Simply receiving and storing a waste from off-site for waste management sometime in the future does not trigger an “otherwise use” of those chemicals in waste. However, subsequent activities involving the EPCRA Section 313 chemical in waste managed on-site may require you to consider those amounts toward other threshold activities. For example, recycling of an EPCRA Section 313 chemical for distribution into commerce would apply towards the processing threshold. Likewise, if an EPCRA Section 313 chemical taken from an on-site waste is burned for energy recovery, then amounts would be considered toward the otherwise use threshold.

Example - Otherwise Use

A facility captures leachate from a landfill, treats the leachate with an EPCRA Section 313 chemical, and then uses the treated leachate (which now contains the EPCRA Section 313 chemical) as on-site irrigation water. Is the facility “otherwise using” the EPCRA Section 313 chemical in the irrigation water, and should the facility report the EPCRA Section 313 chemical as a release to land in Section 5.5.4, Other Disposal?

Yes. Use of EPCRA Section 313 chemicals contained in the treated leachate for irrigation purposes is considered an “otherwise use” and amounts of these chemicals contained in the treated leachate must be counted toward the “otherwise use” threshold. Any EPCRA Section 313 chemicals manufactured during the treatment of the leachate would also need to be considered toward the “manufacturing” threshold. The treated leachate, and EPCRA Section 313 chemicals contained in the treated leachate, are also considered a waste and any “otherwise use” of EPCRA Section 313 chemicals contained in the treated leachate is not eligible for the *de minimis* exemption. The “otherwise use” of these chemicals for irrigation constitutes a release to land and would be reportable in Part II 5.5.4 Other Disposal.

3.2.1 Concentration Ranges for Threshold Determination

You are required to use your best “readily available data” for estimating EPCRA Section 313 threshold determinations and release and other waste managed calculations. In some cases, the exact concentration of an EPCRA Section 313 chemical in a mixture or other trade name product or in a waste may not be known. In these cases, the waste profile, customer, supplier, or MSDS may only provide ranges, or upper or lower bound concentrations. EPA has developed the following guidance on how to determine concentrations from this type of information for use in threshold determinations:

- If exact concentration is provided, use it.
- If the concentration is provided as a lower and upper bound or as a range, you should use the mid-point in your calculations for the threshold determination. For example, the waste profile states methanol is present in a concentration of not less than 20% and not more than 40%, or it may be stated as present at a concentration between 20 to 40%. You should use 30% methanol in your threshold calculations.
- If only the upper bound concentration is provided you must use this value in your threshold calculation.
- If only the lower bound concentration of the EPCRA Section 313 chemical is specified and the concentration of other components are given, subtract the other component values from 100%. The remainder should be considered the upper bound for the EPCRA Section 313 chemical and you should use the given lower bound to calculate the mid-point as discussed above. For example, the waste profile states that a solvent contains at least 50% MEK and 20% non-hazardous surfactants. Subtracting the non-hazardous contents from 100% leaves 80% as the upper bound for MEK. The mid-point between upper (80%) and lower (50%) bounds is 65%, the value you should use in your threshold calculation.

- If only the lower bound is specified and no information on other components is given assume the upper bound is 100% and calculate the mid-point as above.

Even if the concentration of a chemical is known through engineering knowledge only, the facility is still required to consider the chemical for threshold determinations. For example, facility engineers may have knowledge that nitric acid is manufactured in an on-site incinerator. If there are no waste profiles or permit information specifically listing nitric acid, the facility must still consider the chemical for threshold determinations. This determination should be made based on their best “readily available data”, be it process knowledge or other reasonable estimation techniques.

When determining concentration information for wastes, it is important to understand that the *de minimis* exemption does NOT apply to wastes. If your waste profiles (or other information) indicate that there are chemicals present that are below the detection limit, you may still need to include those chemicals in your threshold determinations and release and other waste management calculations. If you have no information to indicate that the chemical exists in the waste stream, you may assume that the concentration is zero. However, if the facility has reason to believe that the EPCRA Section 313 chemical is present in the waste, it may use half of the detection limit for that chemical when making threshold determinations and release and other waste management calculations.

Example - Average Concentration

Is it appropriate for a metal mining facility to develop an average concentration for an EPCRA Section 313 chemical contained in many different ores extracted by the facility, and then use that average as a basis of threshold determination? If so, does EPA have a recommended approach for developing such an average?

EPCRA allows facilities to use “readily available data” to provide information required under EPCRA Section 313. When data are not “readily available”, EPCRA allows facilities to use “reasonable estimates” of the amounts involved. A facility must use its best judgment to determine whether data are “readily available.” Thus, with regard to use of average concentration levels, a facility must use its best judgment to decide whether the raw data from which it might base any average concentration level are “readily available”. In any event, a facility should carefully document its decision making. For example, if a facility decides to use average concentration levels, it should document why the raw data from which the averages are based are not “readily available”, how it arrived at any average concentration level used, and why the average concentration level is a “reasonable estimate” of the amount of the EPCRA Section 313 chemical in the waste stream. EPA does not have a recommended approach for determining average concentration levels.

3.2.2 Evaluation of Exemptions

EPCRA Section 313 provides the following exemptions for metal mining facilities :

- Overburden exemption (metal mining facilities only);

- Laboratory activities exemption;
- *De minimis* exemption;
- Article exemption;
- Exemptions that apply to the otherwise use of chemicals: routine janitorial/facility grounds maintenance exemption; personal use exemption; structural component exemption; motor vehicle maintenance exemption; exemption for air or water drawn from the environment or municipal sources for certain uses.

Each of these exemptions is discussed in detail below.

3.2.2.1 Overburden Exemption

If an EPCRA Section 313 chemical that is a constituent of overburden is processed or otherwise used by metal mining facilities, the facility is not required to consider the quantity of the EPCRA Section 313 chemical processed, or otherwise used when calculating thresholds or when calculating release and other waste management quantities. EPCRA Section 313 chemicals used (e.g., as explosives) to remove overburden are not eligible for the overburden exemption. Overburden is the unconsolidated material that overlies a deposit of useful materials or ores. It does not include any portion of ore or waste rock (40 CFR 327.3). As previously discussed, waste rock is generally considered that portion of the ore body that is barren or submarginal rock or ore which has been mined but is not of sufficient value to warrant treatment and is therefore removed ahead of the milling process (May 1, 1997; 62 FR 23859).

3.2.2.2 Laboratory Activities Exemption

This exemption includes EPCRA Section 313 chemicals that are manufactured, processed, or otherwise used in a laboratory under the supervision of a technically qualified individual. This exemption may be applicable in such circumstances as laboratory sampling and analysis, research and development, and quality assurance and quality control activities. It does not include pilot plant scale or specialty chemical production. It also does not include laboratory support activities. For example, chemicals used to maintain laboratory equipment are not eligible for the laboratory activities exemption.

Example - Laboratory Activities Exemption

If a facility takes a sample from its process stream to be tested in a laboratory for quality control purposes, are releases of an EPCRA Section 313 chemical from the testing of the sample in the laboratory exempt under the laboratory activities exemption?

Yes, provided that the laboratory at the covered facility is under the direct supervision of a technically qualified individual as provided in 40 CFR 372.38(d). The laboratory exemption applies to the “manufacture,” “process,” or “otherwise use” of EPCRA Section 313 chemicals and any associated release and other waste management amounts that take place in a qualifying laboratory.

3.2.2.3 *De Minimis* Exemption

If the amount of EPCRA Section 313 chemical(s) present in a mixture or other trade name product processed or otherwise used is below its *de minimis* concentration level, that amount is considered to be exempt from threshold determinations and release and other waste management calculations. (Note that this exemption does not apply to manufacturing, except for importation or as an impurity as discussed below.) Because wastes are not considered mixtures or other trade name products, the *de minimis* exemption does not apply to wastes. The *de minimis* concentration for mixtures or other trade name products is 1%, except for OSHA-defined carcinogens, which have a 0.1% *de minimis* concentration. If a mixture or other trade name product contains more than one member of a compound category, the weight percent of all members must be summed. If the total meets or exceeds the category’s *de minimis* level, the *de minimis* exemption does not apply. Information may only be available that lists the concentration of chemicals in mixtures as a range. EPA has developed guidance on how to determine quantities that are applicable to threshold determinations, release, and other waste management calculations when this range straddles the *de minimis* value. EPA has published several detailed questions and answers and a directive in the *EPCRA Section 313 Q&A Document* that may be helpful if you have additional concerns about the *de minimis* exemption. The *TRI Forms and Instructions* list each EPCRA Section 313 chemical and compound category with the associated *de minimis* value.

The *de minimis* exemption also applies in limited circumstances to the manufacture of EPCRA Section 313 chemicals. In the specific case where EPCRA Section 313 chemicals are coincidentally manufactured in a product and remain in the product as an impurity which is then subsequently distributed in commerce, amounts of EPCRA Section 313 chemicals are eligible for the *de minimis* exemption. For example, in the beneficiation of gold ore, nickel compounds may

be formed and transferred with the gold ore as it is distributed in commerce. The nickel compounds are not desirable, but are of such a low concentration that the additional effort to remove them is not economically justifiable. In this case, the nickel compounds are considered an impurity and are eligible for the *de minimis* exemption. The *de minimis* exemption also applies to EPCRA Section 313 chemicals in an imported mixture or other trade name product.

The *de minimis* exemption, however, does not apply to EPCRA Section 313 chemicals that are coincidentally manufactured as byproducts that are separated from the product; nor does it apply to chemicals that are coincidentally manufactured as a result of waste treatment or other waste management activities, or to waste brought on site for waste management. Metal mining facilities may coincidentally manufacture EPCRA Section 313 chemicals as byproducts during beneficiation. For example, a cobalt mine extracts ore containing arsenic. During beneficiation, arsenic compounds in the ore convert to other arsenic compounds, which the facility removes and manages as a waste. The facility coincidentally manufactured arsenic compounds as a byproduct, and the *de minimis* exemption does not apply to threshold determinations and release and other waste management reporting for the manufactured arsenic compounds.

Waste Rock and the *De Minimis* Exemption

Because waste rock is not manufactured, processed, or otherwise used, amounts of EPCRA Section 313 chemicals in waste rock are not eligible for the *de minimis* exemption. Therefore, if you exceed a threshold for an EPCRA Section 313 chemical that is also present in waste rock, you must report the disposal or other waste management of the waste rock on the chemical's Form R, regardless of concentration. If you decide to beneficiate waste rock, the EPCRA Section 313 chemicals that are prepared for distribution into commerce are considered to be processed and, therefore, are eligible for the *de minimis* exemption.

***De Minimis* Exemption**

Chemicals in ore or concentrate that are below *de minimis* levels and remain below *de minimis* levels are eligible for the *de minimis* exemption. If an EPCRA Section 313 chemical is at a concentration in ore below the *de minimis* level, and is concentrated above the *de minimis* level during beneficiation, you must consider amounts of the concentrate above *de minimis* concentrations toward threshold determination and release and other waste management activities.

Once the *de minimis* level has been met or exceeded, the exemption no longer applies to that process stream, even if the concentration of the EPCRA Section 313 chemical in a mixture or other trade name product later drops below the *de minimis* level. All releases and other waste management activities are subject to reporting after the *de minimis* concentration has been equaled or exceeded, provided an activity threshold has been exceeded.

Example - De Minimis

A facility receives a mixture with an EPCRA Section 313 chemical in a concentration below the *de minimis* concentration. During processing, the concentration of the EPCRA Section 313 chemical exceeds its *de minimis* level. This facility must consider amounts toward threshold determination and releases and other waste management activities that take place after the point in the process where the *de minimis* level is met or exceeded. The facility does not have to consider toward threshold determinations or release and other waste management estimates, activities that took place before the *de minimis* level was met or exceeded.

3.2.2.4 Article Exemption

An article is defined as a manufactured item if each of the three criteria below applies:

- Is formed to a specific shape or design during manufacture;
- Has end-use functions dependent in whole or in part upon its shape or design; and
- Does not release an EPCRA Section 313 chemical under normal conditions of processing or otherwise use of the item at the facility.

If you receive a manufactured item from another facility and process or otherwise use the item without changing the shape or design, and your processing or otherwise use results in the release of 0.5 pound or less of the EPCRA Section 313 chemical in a reporting year from all like articles, then the EPCRA Section 313 chemical in that item is exempt from threshold determinations and release and other waste management reporting. The article exemption does not apply to the manufacturing of items at your facility.

The shape and design of a manufactured item can change somewhat during processing and otherwise use activities as long as part of the item retains the original dimensions. That is, as a result of processing or otherwise use, if an item retains its initial thickness or diameter, in whole or in part, then it still meets the definition of article. If the item's basic dimensional characteristics are totally altered during processing or otherwise use, the item would not meet the definition, even if there were no releases of an EPCRA 313 chemical from these manufactured items. As an example, items that do not meet the definition would be items that are cold extruded, such as bar stock that is formed into wire. However, stamping a manufactured item into pieces that are recognizable as the original articles would not change the exemption status as long as the diameter and the thickness of the item remain unchanged. For instance, metal wire may be bent and sheet metal may be cut, punched, stamped, or pressed without losing the article status as long as no change is made in the diameter of the wire or tubing or the thickness of the sheet and, more important, there are no releases of the EPCRA Section 313 chemical(s).

Any processing or otherwise use of an article that results in a release above 0.5 pound per year for each EPCRA Section 313 chemical for all like articles will negate the article exemption. Cutting, grinding, melting, or other processing of a manufactured item could result in a release of an EPCRA Section 313 chemical during normal conditions of use and, therefore, could negate the exemption as an article if the total release exceeds 0.5 pound in a year. However, if all of the resulting waste is recycled or reused, either on site or off site such that the release and other waste management of the EPCRA Section 313 chemical in all like articles does not exceed 0.5 pound, then the article exemption status is maintained. Also, if the processing or otherwise use of similar

manufactured items results in a total release and other waste management of less than or equal to 0.5 pound of any individual EPCRA Section 313 chemical in a calendar year, EPA will allow this quantity to be rounded to zero and the manufactured items to maintain their article exemption. The 0.5 pound limit does not apply to each individual article; instead, it applies to the sum of releases and other waste management activities (except recycling) from processing or otherwise use of all like articles for each EPCRA Section 313 chemical contained in these articles.

The *EPCRA Section 313 Q&A* document presents several specific questions and answers/discussion pertaining to the article exemption.

3.2.2.5 Exemptions that Apply to the Otherwise Use of EPCRA Section 313 Chemicals

Some exemptions are limited to the “otherwise use” of an EPCRA Section 313 chemical. EPCRA Section 313 chemicals used in these activities do not need to be included in a facility’s threshold determinations nor the associated release and other waste management calculations, provided thresholds are met elsewhere. The following otherwise use activities are considered exempt (see most current versions of *TRI Forms and Instructions* and *EPCRA Section 313 Questions and Answers* documents):

- **EPCRA Section 313 chemicals used in routine janitorial or facility grounds maintenance.** Examples are bathroom cleaners and fertilizers and garden pesticides in similar type or concentration distributed in consumer products. Materials used to clean process-related equipment do not qualify for this exemption.
- **EPCRA Section 313 chemicals for personal use.** Examples are foods, drugs, cosmetics, and other personal items including those items used in cafeterias and infirmaries.

Example - Personal Use Exemption

Ammonia used to clean a cafeteria grill is exempt from threshold determinations and release and other waste management calculations. Chlorine added to the water supply system to prepare potable water for consumption at the facility is also exempt under the personal use exemption.

- **EPCRA Section 313 chemicals in structural components of the facility.** This exemption applies to EPCRA Section 313 chemicals present in materials used to construct, repair, or maintain non-process related structural components of a facility. An example common to all facilities would be the solvents and pigments used to paint the administrative office buildings. Materials used to construct, repair, or maintain process-related equipment (e.g., storage tanks, reactors, and piping) are not exempt.

- **EPCRA Section 313 chemicals used to maintain facility motor vehicles.** This exemption includes the use of EPCRA Section 313 chemicals for the purpose of maintaining motor vehicles operated by the facility. Common examples include EPCRA Section 313 chemicals in gasoline, radiator coolant, windshield wiper fluid, brake and transmission fluid, oils and lubricants, batteries, cleaning solutions, and solvents in paint used to touch up the vehicle. Motor vehicles include cars, trucks, forklifts, and locomotives. Note that this exemption applies only to the OTHERWISE USE of the chemical only. The coincidental manufacture of EPCRA Section 313 chemicals resulting from combustion of gasoline is not considered part of the exemption, and any amounts of EPCRA Section 313 chemicals coincidentally manufactured should be considered as part of the manufacturing threshold.

Example - Motor Vehicle Exemption

Methanol is purchased for use as a processing aid and as a windshield washer anti-freeze in company vehicles. The amount used for the latter purpose can be subtracted from the facility total BEFORE the facility total is compared to the activity threshold. Even if the facility still exceeds the otherwise use threshold, the amount in the anti-freeze is eligible for the exemption from release and other waste management reporting.

This exemption does NOT apply to stationary equipment. The use of lubricants and fuels for stationary process equipment (e.g., pumps and compressors) and stationary energy sources (e.g., furnaces, boilers, heaters), are NOT exempt.

Example - Use of Lubricants

Lubricants containing EPCRA Section 313 chemicals used on facility vehicles or on-site structural maintenance activities that are not integral to the process are exempt activities. However, lubricants used to maintain pumps and compressors, which aid in facility process-related operations, are not exempt and the amount of the chemical in that lubricant should be applied to the otherwise use threshold.

- **EPCRA Section 313 chemicals in certain air and water drawn from the environment or municipal sources.** Included are EPCRA Section 313 chemicals present in process water and non-contact cooling water drawn from the environment or a municipal source, or chemicals present in compressed air or air used in combustion.

Example - Chemicals in Process Water

A facility uses river water in its cooling tower. The facility draws out of and ultimately returns to the river water that contains 100 pounds of an EPCRA Section 313 chemical. Any amount of the EPCRA Section 313 chemicals that may be contained in the river water does not have to be considered for threshold determinations or release and other waste management calculations because the EPCRA Section 313 chemicals were present in the water as it was drawn from the environment.

3.2.3 Additional Guidance on Threshold Calculations for Certain Activities

This section covers two specific situations in which the threshold determination may vary from normal facility operations: reuse and remediation activities of EPCRA Section 313 chemicals.

3.2.3.1 On-site Reuse Activities

Threshold determinations of EPCRA Section 313 chemicals that are reused at the facility are based only on the amount of the EPCRA Section 313 chemical that is added during the year, and not the total volume in the system or the amounts reused.

Example - Reuse Activities

A facility operates a heat transfer unit that contains 15,000 pounds of ethylene glycol at the beginning of the year that was in use in prior years. The system is charged with 2,000 pounds of ethylene glycol during the reporting year. The facility has therefore “otherwise used” only 2,000 pounds of the covered EPCRA Section 313 chemical within that particular reporting year. A facility reporting for the first time would consider only the amount of EPCRA Section 313 chemical that is added during its first reporting year towards its “otherwise use” threshold for that year. If, however, the entire heat transfer unit was recharged with 15,000 pounds of ethylene glycol during the year, the facility would consider the 15,000 pounds toward its otherwise use threshold and, exceeding the otherwise use threshold, be required to report.

3.2.3.2 Remediation Activities

EPCRA Section 313 chemicals that are being managed at a remediation site (e.g., Superfund) are not considered manufactured, processed, or otherwise used and therefore, they are not included in the threshold determinations. However, if during remediation activities, an EPCRA Section 313 chemical is manufactured, then these amounts would have to be considered toward the manufacturing threshold. Additionally, if you are conducting remediation for an EPCRA Section 313 chemical for which you have exceeded an activity threshold elsewhere at the facility, you must consider this activity in your release and other waste management calculations. In that case, you must report any release and other waste management of an EPCRA Section 313 chemical due to remediation in Part II, Sections 5 through 8, accordingly, of the Form R. Those quantities, however, would not be considered as part of the reportable amount for determining Form A eligibility because they are not considered part of normal production related activities.

3.3 Step 3. Determine which EPCRA Section 313 chemicals exceed a threshold

The final step is to determine which chemicals exceed a threshold. At this point you should have:

1. Determined each EPCRA Section 313 chemical at your facility;

2. Determined the threshold activity for each EPCRA Section 313 chemical (manufactured, processed, or otherwise used) and calculated the quantity for each activity.

Now, you must sum the usage for each chemical by threshold activity, subtract all exempt quantities, and compare the totals to the applicable thresholds. Each EPCRA Section 313 chemical exceeding any one of the activity thresholds requires the submission of a Form R. Provided you meet certain criteria you may be eligible to file a Form A rather than a Form R.

POSSIBLE ERROR - What if Your Facility Has No Releases and Other Waste Management Quantities of EPCRA Section 313 Chemicals?

If you meet all reporting criteria and exceed any threshold for an EPCRA Section 313 chemical, you must file a Form R or Form A for that chemical, even if you have zero releases and no other waste management activities. Exceeding the chemical activity threshold, not the quantity released and otherwise managed as waste, determines whether you must report. Note that if the total annual reportable amount is 500 pounds or less, and you do not exceed one million pounds manufactured, processed, or otherwise used for that chemical, then you are eligible to submit a Form A rather than a Form R for that chemical (see Chapter 2.9).

Calculating the Manufacturing Threshold for EPCRA Section 313 Chemicals in Wastes

Metal mining may coincidentally manufacture EPCRA Section 313 chemicals during heap leaching, wastewater treatment, and other waste management operations. You will also need to consider whether EPCRA Section 313 chemicals are produced coincidentally, even if the chemical exists for only a short period of time, and later is destroyed by air control equipment. Most commonly, incineration may result in the manufacture of metal compounds (usually as a result of oxidation), acid aerosols, and other organic compounds, or convert metal compounds to the parent metal (e.g., mercury compounds in coal convert to elemental mercury). The following discussion describes how to calculate the manufacturing threshold for these situations.

To calculate the amount of EPCRA Section 313 metal compounds manufactured during combustion of wastes, you will need to determine the concentration of each metal present in the waste being combusted. The best “readily available data” should be used to estimate the approximate concentration of the metal(s) in the waste. If you have data regarding chemical concentrations in the wastes (e.g., analytical data) and believe that it is the best “readily available data”, then you should use this information. If specific concentration data of the metals in the waste do not exist, you can assume that the metals will convert to the lowest weight metal oxide possible.

During combustion, other EPCRA Section 313 chemicals could be manufactured, particularly acid aerosols. For instance, sulfuric acid (acid aerosols) could be produced depending on a variety of factors such as sulfur content of the waste. If you have specific data on the manufacture of acid aerosols, then use it. If data are not available, EPA has published guidance on calculating the amount of sulfuric acid (acid aerosols) manufactured during combustion, which could be applied to the combustion of wastes; *Guidance for Reporting Sulfuric Acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)*, EPA, March 1998, available on EPA’s TRI website at <http://www.epa.gov/opptintr/tri>.

To estimate the amount of EPCRA Section 313 chemicals manufactured during wastewater treatment, the Clean Water Act typically requires facilities to monitor some EPCRA Section 313 chemicals. In particular, the facility's wastewater permit application may have more detailed, chemical-specific monitoring data. However, it is important to note how the chemical is monitored in relation to the EPCRA Section 313 chemical being evaluated. For example, wastewater permits may require monitoring for the nitrate ion, but the nitrate compound category is calculated by the total weight of the nitrate compound.

Calculating the Otherwise Use and Processing Thresholds for EPCRA Section 313 Chemicals in Wastes

To determine if a chemical exceeds the processing or otherwise use threshold, you must calculate the annual activity for that chemical. For EPCRA Section 313 chemicals in wastes, start with the amount of chemical in stored waste as of January 1, add the amount of the chemical in waste both received from off-site and generated on-site and any amounts that are manufactured during the treatment during the year, and subtract the amount remaining in storage on December 31. The waste manifests received from your customers will be an invaluable source for determining the quantities of different types of wastes managed by your facility, particularly in terms of classifying how various types and quantities undergo a treatment step, or are disposed by your facility, for example when determining if the otherwise use threshold has been exceeded.

Calculating Thresholds for EPCRA Section 313 Chemicals in Purchases

For purchased chemicals, start with the amount of chemical at the facility as of January 1, add any purchases during the year and the amount manufactured (including imported), and subtract the amount remaining in the inventory on December 31. If necessary, adjust the total to account for exempt activities (see Chapter 3.2.2 for a discussion of exemptions). You should then compare the result to the appropriate threshold to determine if you are required to submit an EPCRA Section 313 report for that chemical.

Keep in mind that the threshold calculations are independent for each threshold activity: manufactured, processed, and otherwise used. If more than one threshold activity applies, the amount associated with each activity is determined separately.

Table 3-9 presents a worksheet that may be helpful when conducting your threshold determinations and Table 3-10 illustrates an example of how the work sheet can be used for the following example:

Example - Threshold Worksheet

A lead (Pb) mine extracts 1,000,000 tons of ore at 6.0 % PbS (galena). The facility crushes and grinds the ore to prepare it for flotation. Flotation produces a concentrate of PbS. After flotation, the facility roasts the concentrate to produce 55,970 tons of lead oxide (PbO), which is then smelted to create the elemental lead. For purposes of the threshold determination, both lead sulfide (PbS) and lead oxide (PbO) are processed. The facility also manufactures lead oxide (PbO). The facility must total the lead oxide and lead sulfide processed, and compare the total to the 25,000 pound processing threshold, and compare the amount of lead oxide manufactured to the 25,000 pound manufacturing threshold. As shown on the threshold determination worksheet in Table 3-9, the facility exceeds both the manufacturing and processing thresholds, and must submit a Form R or Form A. The facility must conduct a separate threshold determination (not discussed here) for elemental lead.

Table 3-9 Section 313 Reporting Threshold Worksheet

Facility Name: _____
 Toxic Chemical or Chemical Category: _____
 CAS Number: _____
 Reporting Year: _____

Date Worksheet Prepared: _____
 Prepared By: _____

Amounts of the toxic chemical manufactured, processed, or otherwise used.

Mixture Name, Waste Name, or Other Identifier	Information Source	Total Weight (lb)	Percent TRI Chemical by Weight	TRI Chemical Weight (in lbs)	Amount of the Listed Toxic Chemical by Activity (in lbs.):		
					Manufactured	Processed	Otherwise Used
1.							
2.							
3.							
4.							
Subtotal:					(A) _____ lbs.	(B) _____ lbs.	(C) _____ lbs.

Exempt quantity of the toxic chemical that should be excluded.

Mixture Name or Waste Name as Listed Above	Applicable Exemption (<i>de minimis</i> , article, facility, activity)	Fraction or Percent Exempt (if Applicable)	Amount of the Toxic Chemical Exempt from Above (in lbs.):		
			Manufactured	Processed	Otherwise Used
1.					
2.					
3.					
4.					
Subtotal:			(A ₁) _____ lbs.	(B ₁) _____ lbs.	(C ₁) _____ lbs.

Amount subject to threshold:

(A-A₁) _____ lbs. (B-B₁) _____ lbs. (C-C₁) _____ lbs.

Compare to threshold for Section 313 reporting.

25,000 lbs. 25,000 lbs. 10,000 lbs.

If any threshold is exceeded, reporting is required for all activities. Do not submit this worksheet with Form R, retain it for your records.

Table 3-9. Sample Section 313 Reporting Threshold Worksheet

Facility Name: Galena Mine

Date Worksheet Prepared: May 1, 1999

Toxic Chemical or Chemical Category: Lead Compounds

Prepared By: _____

CAS Number: N420

Reporting Year: 1998

Amounts of the toxic chemical manufactured, processed, or otherwise used.

Mixture Name, Waste Name, or Other Identifier	Information Source	Total Weight (lb)	Percent TRI Chemical by Weight	TRI Chemical Weight (in lbs)	Amount of the Listed Toxic Chemical by Activity (in lbs.):		
					Manufactured	Processed	Otherwise Used
1. Galena in ore	Assay, Mine records	1,000,000 tons x 2,000 lb/ton	6.0%	120,000,000	---	120,000,000	---
2. Lead Oxide from roasting	Operating records	55,970 tons x 2,000lb/ton	NA	111,940,000	111,940,000	111,940,000	---
Subtotal:					(A) 111,940,000 lbs.	(B) 231,940,000 lbs.	(C) 0 lbs.

Exempt quantity of the toxic chemical that should be excluded.

Mixture Name or Waste Name as Listed Above	Applicable Exemption (<i>de minimis</i> , article, facility, activity)	Fraction or Percent Exempt (if Applicable)	Amount of the Toxic Chemical Exempt from Above (in lbs.):		
			Manufactured	Processed	Otherwise Used
1. None					
2.					
3.					
4.					
Subtotal:			(A₁) 0 lbs.	(B₁) 0 lbs.	(C₁) 0 lbs.

Amount subject to threshold:

(A-A₁) (B-B₁) (C-C₁)

111,940,000 231,940,000 0 lbs

Compare to threshold for Section 313 reporting.

25,000 lbs. 25,000 lbs. 10,000 lbs.

If any threshold is exceeded, reporting is required for all activities. Do not submit this worksheet with Form R, retain it for your records.

Chapter 4 - Estimating Releases and Other Waste Management Quantities

4.0 PURPOSE

Once you have determined which EPCRA Section 313 chemicals have exceeded thresholds at your facility, as described in Chapter 3, you must then estimate amounts of these chemicals in waste by particular waste management type (e.g., release to air, transfer off-site, etc.). To aid your facility in making these calculations, this chapter is intended to help you in developing a systematic approach for conducting release and other waste management calculations specific to metal mining facilities. This chapter has been divided into two parts. The first part provides a general approach to identifying sources of potential releases and other waste management activities, collecting data, and determining the most appropriate method(s) to develop estimates. Chapter 4.1 also provides insights into the requirements, recommended approaches, and other nuances associated with developing comprehensive and accurate estimates for EPCRA Section 313 chemicals. To illustrate this approach, a diagram of a recommended steps for estimating quantities of EPCRA Section 313 chemicals released or otherwise managed as wastes is provided in Figure 4-1.

Chapter 4.2 of this chapter provides a focused discussion with examples of methods and tools to use in calculating estimates of releases and other waste management activities specific to many metal mining operations. In particular, Chapter 4.2 provides specific examples and issues pertaining to extraction activities and common beneficiation methods.

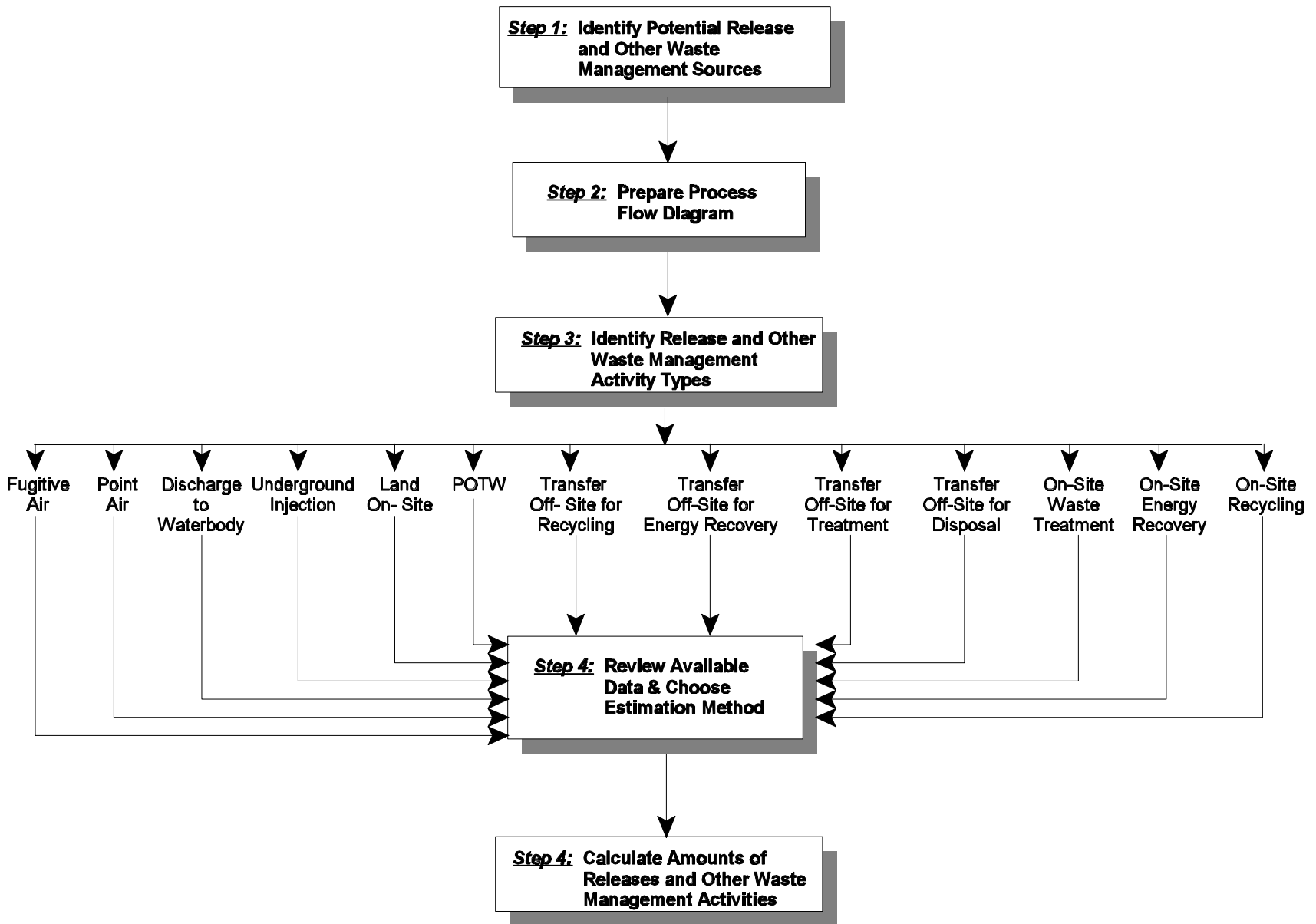


Figure 4-1 Release and Other Waste Management Calculation Approach

4.1 General Steps for Determining Releases and Other Waste Management Activities

You can develop release and other waste management estimates by completing these four basic steps. See Figure 4-1 for illustration of this four-step process.

- Step 1)* Identify potential sources of chemicals released or otherwise managed as waste.
- Step 2)* Prepare a process flow diagram.
- Step 3)* Identify on-site releases, off-site transfers, and other on-site waste management activity types.
- Step 4)* Determine the most appropriate method(s) to develop the estimates for releases and other waste management activity quantities and calculate the estimates.

These steps are described in detail in the following sections.

4.1.1 Step 1: Identify Potential Sources of Chemical Release and Other Waste Management Activities

The first step in release calculations is to identify all areas at your facility that could potentially release EPCRA Section 313 chemicals. Consider all potential sources at which EPCRA Section 313 chemicals may be released and otherwise managed from each unit operation and process. Remember to include upsets and routine maintenance activities. Potential sources include the following:

- Relief valves;
- Pumps;
- Stacks;
- Volatilization from process or treatment;
- Fittings;
- Transfer operations;
- Flanges;
- Storage tanks;
- Stock pile losses;
- Waste treatment discharges;
- Process discharge stream;
- Container residues;
- Recycling and energy recovery byproducts;
- Accidental spills and releases;
- Storm water runoff;
- Clean up and housekeeping practices;
- Treatment sludge; and
- Combustion byproducts.

Next, you must identify the EPCRA Section 313 chemicals that are released and otherwise managed from each source. A thorough knowledge of the facility's operations and processes will be required to make an accurate determination of which chemicals are involved, including those EPCRA Section 313 chemicals that are coincidentally manufactured during these processes.

4.1.2 Step 2: Prepare a Process Flow Diagram

Preparing a process flow diagram will help you calculate your releases by illustrating the life-cycle of the EPCRA Section 313 chemical(s), as well as help you identify any sources of chemicals that are released and otherwise managed as waste at your facility that you might have missed in step 1. Depending on the complexity of your facility, you may want to diagram individual processes or operations rather than the entire facility. The diagram should illustrate how materials flow through the processes and identify material input, generation, and output points. By reviewing each operation separately, you can determine where EPCRA Section 313 chemicals are manufactured, processed, or otherwise used and the medium to which they will be released on-site, transferred off-site for further waste management, or otherwise managed as wastes on-site.

4.1.3 Step 3: Identify On-Site Releases, Off-Site Transfers and On-Site Waste Management Activity Types

For each identified source of an EPCRA Section 313 chemical, you must examine all possible releases and other waste management activities. Figure 4-2 is a schematic of releases and other waste management activities as they correspond to individual data elements on the Form R. Remember to include both routine operations and accidents when identifying types of chemical management activities. This diagram, along with the following descriptions, can be used as a checklist to make sure all possible types of releases and other waste management activities have been considered.

- a. Fugitive or Non-Point Air Emissions (Part II, Section 5.1 of Form R) -** Emissions to the air that are not released through stacks, vents, ducts, pipes, or any confined air stream. Examples include:
 - Equipment leaks from valves, pump seals, flanges, compressors, sampling connections, open-ended lines, etc.;
 - Releases from building ventilation systems, such as a roof fan in an open room;
 - Evaporative losses from solvent cleaning tanks, surface impoundments, and spills; and
 - Emissions from any other fugitive or non-point sources.

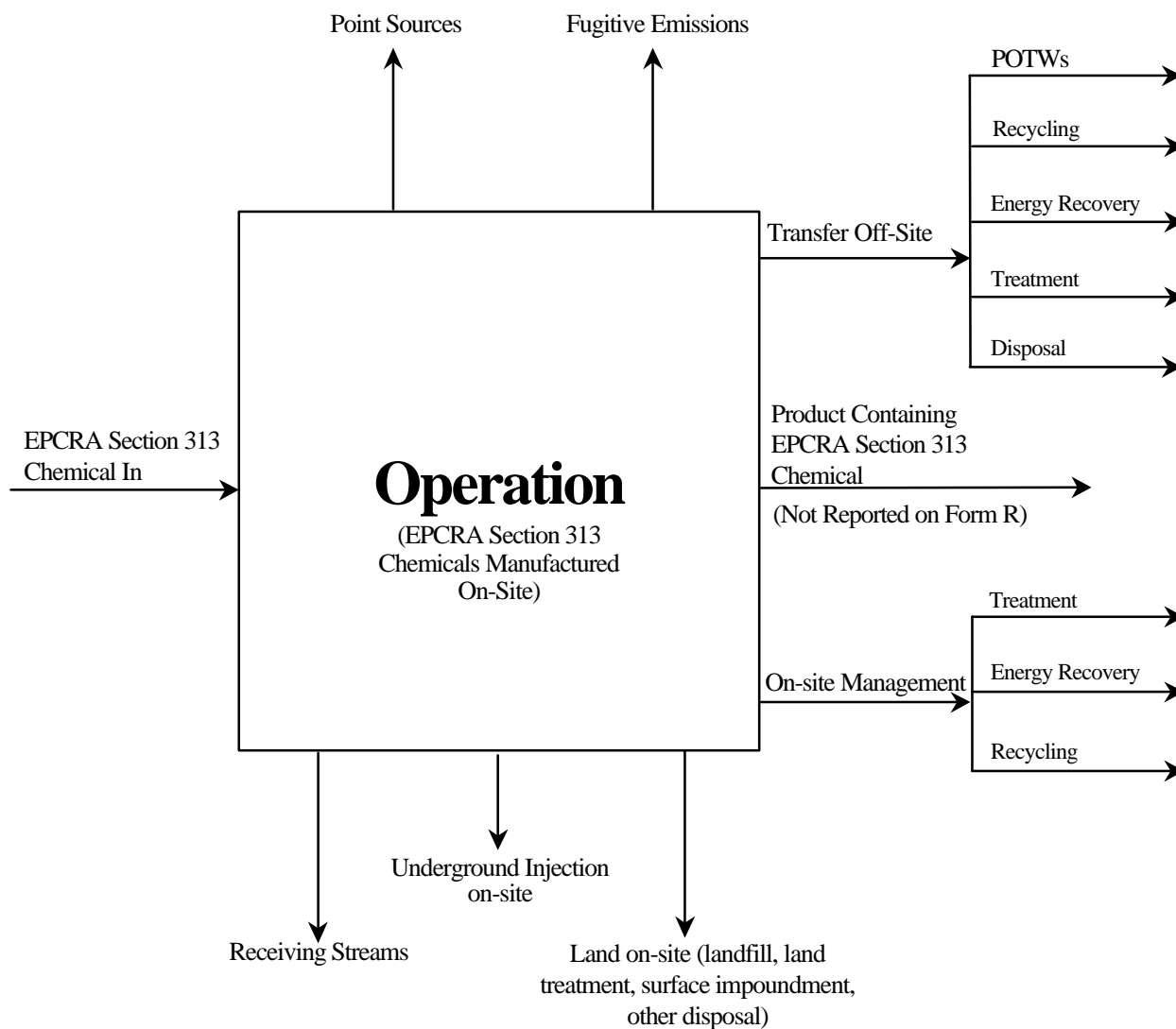


Figure 4-2. Possible Release and Other Waste Management Types for EPCRA Section 313 Chemicals

- b. Stack or Point Air Emissions (Part II, Section 5.2 of Form R)** - All emissions to the air which occur through stacks, vents, ducts, pipes, or any confined air stream, including storage tank emissions and emissions from air pollution control equipment. Emissions released from general room air through a ventilation system are not considered stack or point releases for the purpose of EPCRA Section 313 reporting unless they are channeled through an air pollution control device. Instead, they are considered fugitive releases. You should note that some state air quality agencies consider ventilation systems without an attached pollution control device to be a stack or point source, and other agencies consider releases from storage tanks to be fugitive emissions.
- c. Discharges to Receiving Streams or Water Bodies (Part II, Section 5.3 of Form R)** - Direct wastewater discharges to a receiving stream or surface water body. Discharges usually occur under a National Pollutant Discharge Elimination System (NPDES) permit.
- d. Underground Injection On site to Class I Wells (Part II, Section 5.4.1 of Form R) and to Class II through V Wells (Part II, Section 5.4.2 of Form R)** Disposal into an underground well at the facility. These wells may be monitored under an Underground Injection Control (UIC) Program permit. RCRA Hazardous Waste Generator Reports may be a good source of information for wastes injected into a Class I well. Injection rate meters combined with waste profiles may provide the necessary information for all classes of wells.
- e. Releases to Land On Site (Part II, Section 5.5 of Form R)** - All releases to land on site, both planned (i.e., disposal) and unplanned (i.e., accidental release or spill). The four predefined subcategories for reporting quantities released to land within the boundaries of the facility are:

 - e(1). Landfill** - The landfill may be either a RCRA permitted or a non-hazardous waste landfill. Both types are included if they are located on site.
 - e(2). Land treatment/application farming** - Land treatment is a disposal method in which a waste containing an EPCRA Section 313 chemical is applied to or incorporated into soil. Volatilization of an EPCRA Section 313 chemical due to the disposal operation must be included in the total fugitive air releases and/or should be excluded from land treatment/application farming to accurately represent the disposition of the EPCRA Section 313 chemical and to avoid double counting.

Sludge and/or aqueous solutions that contain biomass and other organic materials are often collected and applied to farm land. This procedure supplies a nitrogen source for plants and supplies metabolites for microorganisms. EPA considers this operation to be land treatment/farming if it occurs on site. If a facility sends this material off site for the same purpose, it is considered to be a “transfer to an off site

location, disposal” and should be reported under Part II, Sections 6.2 and 8.1 of the Form R.

The ultimate disposition of the chemical after application to the land does not change the required reporting. For example, even if the chemical is eventually biodegraded by microorganisms or plants, it is not considered recycled, reused, or treated.

- e(3). Surface impoundment** - A surface impoundment is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials that is designed to hold an accumulation of wastes containing free liquids. Examples include: holding, settling, storage, and elevation pits; ponds; and lagoons. Ash disposed in excavated areas would also be reported here.

You do not have to report quantities of an EPCRA Section 313 chemical that are released to a surface impoundment as part of a wastewater treatment operation in this section. However, if the sludge from the surface impoundment contains the EPCRA Section 313 chemical, then the EPCRA Section 313 chemical in the sludge must be estimated in this section unless the sludge is removed and subjected to another waste management activity. In that case, it should be reported for that activity, as appropriate.

- e(4). Other disposal** - Releases to land that do not fit the categories of landfills, land treatment, or surface impoundment are classified as other disposal. This category also includes any spills or leaks of the EPCRA Section 313 chemical to land.

- f. Transfers Off Site to a Publicly Owned Treatment Works (POTW) (Part II, Section 6.1 of Form R)** The amount of EPCRA Section 313 chemical in water transferred to an off site POTW.
- g. Transfers to Other Off-Site Locations (Part II, Section 6.2 of Form R)** All amounts of the EPCRA Section 313 chemical transferred off-site for the purposes of waste treatment, disposal, recycling, or energy recovery. Be sure to include quantities of the EPCRA Section 313 chemical in non-hazardous wastes (such as sanitary waste and facility trash) transferred off-site and metals in waste transferred off site for recycling.

Any residual chemicals in “empty” containers transferred off-site would also be reported in Section 6.2. EPA expects that all containers (bags, totes, drums, tank trucks, etc.) will have a small amount of residual solids and/or liquid. On-site cleaning of containers must be considered for EPCRA Section 313 reporting. If the cleaning occurs with a solvent (organic or aqueous), you must report the disposition of the waste solvent as appropriate. If the containers are sent off site

for disposal or reclamation, you should report the EPCRA Section 313 chemical in this section.

- h. On-Site Waste Treatment (Part II, Section 7A of Form R)** All on-site waste treatment of reported EPCRA Section 313 chemicals. The information reported in Section 7A focuses on the treatment of the waste stream. The information includes: type of waste stream (gaseous, aqueous or non-aqueous liquid, or solid); treatment methods or sequence; influent concentrations of the EPCRA Section 313 chemical; treatment efficiency of each method or sequence; and whether efficiency data are based on actual operating data. Metal compounds in waste subjected to a combustion process are not destroyed but should still be reported as going through the treatment process, with a treatment efficiency of zero.

Example - On-Site Waste Treatment

A process at the facility generates a wastewater stream containing an EPCRA Section 313 chemical (chemical A). A second process generates a wastewater stream containing two EPCRA Section 313 chemicals, a metal (chemical B) and a mineral acid (chemical C). Thresholds for all three EPCRA Section 313 chemicals have been exceeded and you are in the process of completing separate Form Rs for each chemical.

All wastewater streams are combined and sent to an on-site wastewater treatment system before being released to a POTW. This system consists of an oil/water separator which removes 99% of chemical A; a neutralization tank where the pH is adjusted to 7.5, thereby destroying 100% of the mineral acid (chemical C), and a settling tank where 95% of the metal (chemical B) is removed from the water (and eventually landfilled off site).

Section 7A should be completed slightly differently for each chemical for which a Form R must be filed. The table accompanying this example shows how Section 7A should be completed for each chemical. First, on each Form R you should identify the type of waste stream in Section 7A.1a as wastewater (aqueous waste, code W). Next, on each Form R you should list the code for each of the treatment steps that are applied to the entire waste stream, regardless of whether the operation affects the chemical for which you are completing the Form R (for instance, the first four blocks of Section 7A.1b of all three Form Rs should show: P19 (liquid phase separation), C11 (neutralization), P11 (settling/clarification), and NA (to signify the end of the treatment system). Note that Section 7A.1b is the only section of the Form R that is not chemical specific. It applies to the entire waste stream being treated. Section 7A.1c of each Form R should show the concentration of the specific chemical in the influent to the first step of the process (oil/water separation). For this example, assume chemicals A, B, and C are all present at concentrations greater than 1%. Therefore, code "1" should be entered. Section 7A.1d is also chemical specific. It applies to the efficiency of the entire system in destroying and/or removing the chemical for the Form R you are currently completing. 99% should be entered when filing for chemical A, 95% for chemical B, and 100% for chemical C. Finally, you should report whether the influent concentration and efficiency estimates are based on operating data for each chemical, as appropriate.

Chemical A						
7A.1a	7A.1b	1. <u>P19</u>	2. <u>C11</u>	7A.1c	7A.1d	7A.1e

<u>W</u>	3. <u>P11</u>	4. <u>NA</u>	5. _____	<u>1</u>	<u>99</u> %	Yes	No
	6. _____	7. _____	8. _____			<u>X</u>	___
							-
Chemical B							
7A.1a	7A.1b	1. <u>P19</u>	2. <u>C11</u>	7A.1c	7A.1d	7A.1e	
<u>W</u>	3. <u>P11</u>	4. <u>NA</u>	5. _____	<u>1</u>	<u>95</u> %	Yes	No
	6. _____	7. _____	8. _____			<u>X</u>	___
							-
Chemical C							
7A.1a	7A.1b	1. <u>P19</u>	2. <u>C11</u>	7A.1c	7A.1d	7A.1e	
<u>W</u>	3. <u>NA</u>	4. _____	5. _____	<u>1</u>	<u>100</u> %	Yes	No
	6. _____	7. _____	8. _____			<u>X</u>	___
							-
<p>Note that the <u>quantity</u> removed and/or destroyed is not reported in Section 7 and that the efficiency reported in Section 7A.1d refers to the amount of EPCRA Section 313 chemical destroyed <u>and/or removed</u> from the applicable waste stream. The amount actually destroyed should be reported in Section 8.6 (quantity treated on site). For example, when completing the Form R for chemical B you should report "0" pounds in Section 8.6 because the metal has been removed from the wastewater stream, but not actually destroyed. The quantity of chemical B that is ultimately land filled off site should be reported in Section 6.2 and 8.1. However, when completing the Form R for chemical C you should report the entire quantity in Section 8.6 because raising the pH to 7.5 will completely destroy the mineral acid.</p>							

- i. On-Site Energy Recovery (Part II, Section 7B of Form R)** All on-site energy recovery of reported EPCRA Section 313 chemicals must be reported. EPA's view is that chemicals that do not contribute significant heat energy during combustion processes should not be considered for energy recovery. Therefore, only chemicals with a significant heating value (e.g., heating value high enough to sustain combustion) that are combusted in an energy recovery unit, such as an industrial furnace, kiln, or boiler can be reported for energy recovery. If an EPCRA Section 313 chemical is incinerated on-site but does not significantly contribute energy to the process (e.g., chlorofluorocarbons), it must be considered on-site waste treatment (see Chapter 4.1.3, h. above). Metal and metal compounds in a waste that is combusted cannot be considered combusted for energy recovery because metals do not have any heat value.
- j. On-Site Recycling (Part II, Section 7C of Form R)** All on-site recycling methods used on EPCRA Section 313 chemicals must be reported.

k. Source Reduction and Recycling Activities (Part II, Section 8 of Form R)¹
Provide information about source reduction and recycling activities related to the EPCRA Section 313 chemical for which releases and other waste management activities are being reported. Section 8 uses some data collected to complete Part II, Sections 5 through 7. For this reason, Section 8 should be completed last. The relationship between Sections 5, 6, and 8.8 to Sections 8.1, 8.3, 8.5, and 8.7 are provided in equation forms below.

k(1). Quantity Released (Part II, Section 8.1 of Form R) - The quantity reported in Section 8.1 is the quantity reported in all of Section 5 plus the quantity of metals and metal compounds reported as discharged off site to POTWs in Section 6.1 plus the quantity reported as sent off site for disposal in Section 6.2 minus the quantity reported in Section 8.8 that was released on-site or transferred off-site for disposal:

Section 8.1 = Section 5 + Section 6.1 (metals and metal compounds) +
Section 6.2 (disposal only) - Section 8.8 (release or off-site disposal only)

k(2). Quantity Used for Energy Recovery On-Site (Part II, Section 8.2 of Form R) - Estimate a quantity of the EPCRA Section 313 chemical in wastes combusted for energy recovery on-site. This estimate should be the quantity of the chemical combusted in the process for which codes were reported in Section 7B (unless the 7B code is related to a Section 8.8 activity). Test data from trial burns or other monitoring data may be used to estimate the quantity of the EPCRA Section 313 chemical combusted for energy recovery purposes. If monitoring data are not available, vendor specifications regarding combustion efficiency may be used as they relate to the EPCRA Section 313 chemical. A quantity should be reported in Section 8.2 when a method is reported in Section 7B (unless the 7B code is related to a Section 8.8 activity). Combustion for energy recovery is interpreted by EPA to include the combustion of an EPCRA Section 313 chemical that is (1) (a) a RCRA hazardous waste or waste fuel, (b) a constituent of a RCRA hazardous waste or waste fuel, or (c) a spent or contaminated "otherwise used" material; and that (2) has a significant heating value and is combusted in an energy or materials recovery device. Energy or materials recovery devices are boilers and industrial furnaces as defined in 40 CFR 372.3 (see 62 FR 23891, May 1, 1997). If a reported EPCRA Section 313 chemical is incinerated but does not contribute energy to the process (e.g., metal, metal compounds, and chlorofluorocarbons), it must be considered treatment for destruction. In determining whether an EPCRA Section 313 listed chemical is combusted for energy recovery, the facility should consider the heating value of the EPCRA Section 313 chemical and not of the chemical stream. Note that "NA" should be

¹The subsection 8.1 through 8.8 designation are those for the 1997 Form R. Please refer to the current reporting year's *TRI Forms and Instructions* for any changes.

reported for EPCRA Section 313 chemicals which are halogens, CFCs, halons, and metals.

- k(3). Quantity Used for Energy Recovery Off-Site (Part II, Section 8.3 of Form R)** - The quantity reported in Section 8.3 is the quantity reported in Section 6.2 for which energy recovery codes are reported. If a quantity is reported in Section 8.8, subtract any associated off-site transfers for energy recovery:

Section 8.3 = Section 6.2 (energy recovery) - Section 8.8 (off-site energy recovery)

Combustion for energy recovery is interpreted by EPA to include the combustion of an EPCRA Section 313 chemical that is (1) (a) a RCRA hazardous waste or waste fuel, (b) a constituent of a RCRA hazardous waste or waste fuel, or (c) a spent or contaminated “otherwise used” material; and that (2) has a significant heating value and is combusted in an energy or materials recovery device. Energy or materials recovery devices are boilers and industrial furnaces as defined in 40 CFR 372.3 (see 62 FR 23891, May 1, 1997). If a reported EPCRA Section 313 chemical is incinerated but does not contribute energy to the process (e.g., metal, metal compounds, and chlorofluorocarbons), it must be considered treatment for destruction. In determining whether an EPCRA Section 313 listed chemical is combusted for energy recovery, the facility should consider the heating value of the EPCRA Section 313 chemical and not of the chemical stream. “NA” should be reported for EPCRA Section 313 chemicals which are halogens, CFCs, halons, and metals.

- k(4). Quantity Recycled On-Site (Part II, Section 8.4 of Form R)** - Estimate a quantity of the EPCRA Section 313 chemical recycled in wastes on-site. This estimate should be the quantity of the chemical recycled in the operation for which codes were reported in Section 7C (unless the 7C code is related to a Section 8.8 activity). A quantity should be reported in Section 8.4 when a method of on-site recycling is reported in Section 7C (unless the 7C code is related to a Section 8.8 activity). To estimate this quantity, you should determine if operating data exist which indicate a recovery efficiency and use that efficiency value combined with throughput data to calculate an estimate. If operating data are unavailable, use available vendor specifications.

- k(5). Quantity Recycled Off-Site (Part II, Section 8.5 of Form R)** - The quantity reported in Section 8.5 will generally be the same as the quantity reported in Section 6.2 for which recycling codes are reported. If a quantity is reported in Section 8.8, subtract any associated off-site transfers for recycling:

§8.5 = §6.2 (recycling) - §8.8 (off-site recycling)

k(6). Quantity Treated On-Site (Part II, Section 8.6 of Form R) - Waste treatment in Section 8 is limited to the destruction or chemical conversion of the EPCRA Section 313 chemical in wastes. The quantities reported in Section 8.6 will be those treated in a subset of the operations for which codes were reported in Section 7A, where treatment can include physical removal of the EPCRA Section 313 chemical(s) from a waste stream. To estimate the quantity, you should determine if operating data exist which indicate a treatment (e.g., destruction or chemical conversion of EPCRA Section 313 chemical) efficiency and use that efficiency value combined with throughput data to calculate an estimate. Because metals cannot be destroyed or chemically converted into something other than the metal or metal compound, metals cannot be reported as treated in Sections 8.6 or 8.7. Note that conversion of a metal from one oxidation state to another (e.g., Cr(VI) to Cr(III)) is not considered treatment in Section 8.6. If operating data are unavailable, use available vendor specifications. Section 7A must be completed if a quantity is entered into Section 8.6.

k(7). Quantity Treated Off-Site (Part II, Section 8.7 of Form R) - This quantity reported in Section 8.7 must be the same as the quantity reported in Section 6.2 for which treatment codes are reported and quantities sent to a POTW as reported in Section 6.1 except for metal and metal compounds. If a quantity is reported in Section 8.8, subtract any associated off-site transfers for treatment:

Section 8.7 = Section 6.1 (except metals and metal compounds) + Section 6.2 (treatment) - Section 8.8 (off-site treatment)

Because metals cannot be destroyed or chemically converted into something other than the metal or metal compound, metals cannot be reported as treated in Sections 8.6 or 8.7. Quantities of metals reported in Section 6.1 and 6.2 as being treated should be reported in Section 8.1 (Quantity Released) unless the facility has knowledge that the metal is being recovered.

k(8). Quantity Released to the Environment as a Result of Remedial Actions, Catastrophic Events, or One-Time Events Not Associated with Production Processes (Part II, Section 8.8 of Form R) - The purpose of this section is to separate quantities recycled, used for energy recovery, treated, or released (including disposal) that are associated with normal or routine production from those that are not. The quantity reported in Section 8.8 is the quantity of the EPCRA Section 313 chemical released directly into the environment or sent off-site for recycling, waste treatment, energy recovery, or disposal during the reporting year due to any of the following events:

- (1) Remedial actions;
- (2) Catastrophic events such as earthquakes, fires, or floods; or
- (3) One-time events not associated with normal or routine production processes.

The quantity reported in Section 8.8 should not be included with quantities reported in Part II, Sections 8.1 through 8.7 of Form R, but should be included in Part II, Sections 5 and 6 of Form R as appropriate. The on-site waste management activities should also be reported in Section 7.

Spills that occur as a routine part of production operations and could be reduced or eliminated by improved handling, loading, or unloading procedures are included in the quantities reported in Sections 8.1 through 8.7 as appropriate. On-site releases and off-site transfers for further waste management resulting from remediation of an EPCRA Section 313 chemical or an unpreventable accident unrelated to production (such as a hurricane) are reportable in Section 8.8.

On-site treatment, energy recovery, or recycling of EPCRA Section 313 chemicals in wastes generated as a result of remedial actions, catastrophic events, or one-time events not associated with production processes are not reported in Part II, Section 8.8 nor Sections 8.1 through 8.7 of Form R.

- k(9) Prior Year Estimates (for Part II, Sections 8.1 – 8.7 of Form R) -.** In several instances, the Form R prompts the facility for information from prior reporting years. In Section 8, Source Reduction and Recycling Activities, Column A of Sections 8.1-8.7 requests release and other waste management information from the prior reporting year. Because 1998 is the first year that metal mining facilities were required to collect data for EPCRA Section 313 reporting, you may enter “NA” in column A for Form Rs for RY 1998 only. In Section 8.9, you are required to provide a production ratio or activity index to reflect either the ratio of current year’s production to prior year’s production or an index of the current year’s activity to prior year’s activity with respect to the EPCRA Section 313 chemical. Because you were not required to collect data prior to 1998, recently added facilities as a result of the industry expansion rulemaking may also enter “NA” in Section 8.9 for Form Rs for RY 1998 only.

POSSIBLE ERROR - Double Counting

Releases and other waste management activities should not be inadvertently “double counted.” A single wastewater discharge should not be listed as both a release to water (on site) and a discharge to POTW (off site). Similarly, a release to land should not be listed as both a release to land (on site) and a transfer to an off-site landfill. Estimates of releases and other waste management activities should be prepared for Sections 5 through 7 of the Form R. For the most part, Section 8 relies on the data collected to complete these previous sections. Therefore, Section 8 should be completed last. However, the data elements of Section 8 (8.1 through 8.7) are mutually exclusive and care should be taken to avoid double counting.

4.1.4 Step 4: Determine the Most Appropriate Method(s) to Develop the Estimates for Releases and Other Waste Management Activity Quantities and Calculate the Estimates

After you have identified all of the potential sources for release and other waste management activity types, you must next estimate the quantities of each EPCRA Section 313 chemical released and otherwise managed as waste. EPA has identified four basic methods that may be used to develop estimates (each estimate has been assigned a code that must be identified when reporting). The methods and corresponding codes are:

- Monitoring Data or Direct Measurement (M);
- Mass Balance (C);
- Emission Factors (E); and,
- Engineering Calculations (O).

Descriptions of these techniques are provided in *Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form*. They are also briefly described below. EPA does not require you to conduct additional sampling or testing for Section 313 reporting; however, you are required to use the best “readily available data” or prepare “reasonable estimates”. For example, emission factors or engineering calculations may not be the best “readily available data” when other data, such as stack testing, are available. For each reported amount, you are required to identify only the primary method used for each estimate.

Based on site-specific knowledge and potential data sources available, you should be able to determine the best method for calculating quantities for each release and other waste management activity. Many potential sources of data exist for these (and other) methods of developing estimates. Table 4-2 presents potential data sources and the estimation methodology in which they are most likely to be used.

**Table 4-2
Potential Data Sources for Release and Other Waste Management Calculations**

DATA SOURCES	
<u>Monitoring Data (M)</u>	<u>Mass Balance (C)</u>

- Stack monitoring data
- Outfall monitoring data
- Air permits
- Industrial hygiene monitoring data
- NPDES permits
- POTW pretreatment standards
- Effluent limitations
- RCRA permit
- Hazardous waste analysis
- pH for acids
- Continuous emission monitoring

Emission Factors (E)

- AP-42 or other EPA emission factors
- Published facility or trade association chemical-specific emission factors

- Supply records
- Hazardous material inventory
- Air emissions inventory
- Pollution prevention reports
- Hazardous waste manifests
- Spill event records

Engineering Calculations (O)

- Volatilization rates
- Raoult's Law
- Henry's Law
- Solubilities
- Non-published emission factors
- Facility or trade association non chemical specific emission factors (e.g., SOCOMI factors)

Once estimation methods have been determined for all potential sources, releases and other waste management activities, an estimate for each EPCRA Section 313 chemical can be developed corresponding to the data elements on Form R.

4.1.4.1 Monitoring Data or Direct Measurement (code M)

Using monitoring data or direct measurements is usually the best method for developing estimates for chemical releases and other waste management activity quantities estimates. Your facility may be required to perform monitoring under provisions of the Clean Air Act (CAA), Clean Water Act (CWA), Resource Conservation and Recovery Act (RCRA), or other regulations. If so, these data should be available for developing estimates. Data may have also been collected for your facility through an occupational health and safety assessment. If only a small amount of direct measurement data are available or if you believe the monitoring data are not representative, you must determine if another estimation method would give a more accurate result.

Example - Monitoring Data

Data from the on-site wastewater treatment facility indicate that the annual average concentration of copper in the POTW discharge is 2 mg/L. The wastewater treatment facility processed 1.5 million gallons of water in 1998. The treated wastewater is discharged to an off-site POTW. The amount of copper transferred off site to the POTW (for Part II, Section 6.1 of the Form R) is estimated as follows:

Amount of copper transferred

$$= (2\text{mg} / \text{L}) * \left(\frac{1\text{g}}{1,000\text{mg}}\right) * \left(\frac{1\text{lb}}{453.59\text{g}}\right) * \left(\frac{1\text{L}}{0.2642\text{gal}}\right) * (1,500,000\text{gal} / \text{yr})$$
$$= 25\text{lbs} / \text{yr}$$

POSSIBLE ERROR - Treatment Efficiencies

Vendor data on treatment efficiencies often represent ideal operating conditions. Thus, you should adjust such data to account for downtime and process upsets during the actual reporting year that would result in lower efficiencies. Remember that efficiencies reported by vendors are often general and may not apply to specific chemicals or uses of the equipment. For example, an incinerator or flare may be 99.99% efficient in combusting organic chemicals, but will have a zero percent efficiency in combusting metals.

4.1.4.2 Mass Balance (code C)

A mass balance involves determining the amount of an EPCRA Section 313 chemical entering and leaving an operation. The mass balance is written as follows:

$$\text{Input} + \text{Generation} = \text{Output} + \text{Consumption}$$

where:

- Input refers to the materials (chemicals) entering an operation. For example, chlorine added to process water as a disinfectant would be considered an input to the water treatment operation.
- Generation identifies those chemicals that are created during an operation (manufactured, including coincidental manufacturing). For example, additional ammonia, sodium nitrite, or nitrate compounds may be coincidentally manufactured in biological wastewater treatment systems.
- Output means any avenue by which the EPCRA Section 313 chemical leaves the operation. Output may include on-site releases and other on-site waste management activities; transfers for treatment, disposal, energy recovery, or recycling; or the amount of chemical that leaves with the final product. In a

solvent recovery operation, for example, the recovered solvent product and wastes generated from the process are outputs.

- Consumption refers to the amount of chemical that is converted to another substance during the operation (i.e., reacted). For example, phosphoric acid would be consumed by neutralization during wastewater treatment.

The mass balance technique may be used for manufactured, processed, or otherwise used chemicals. It is typically useful for chemicals that are “otherwise used” and do not become part of the final product, such as catalysts, solvents, acids, and bases. For large inputs and outputs, a mass balance may not be the best estimation method, because slight uncertainties in mass calculations can yield significant errors in the release and other waste management estimates.

Example - Estimating Releases to Air Using Mass Balance

A facility uses an EPCRA Section 313 chemical as a refrigerant in condensers to control air emissions and adds 20,000 pounds to the refrigeration system in 1998 (to make up for system losses). The chemical is released to the air from relief vents, during system filling operations and from leaks in valves and fittings. During system maintenance, the lines are bled directly into water and the system is vented to the air. Monitoring data of the wastewater, including chemical concentrations and wastewater throughput, indicate that 1,200 pounds of the chemical were discharged to the wastewater in 1998. The remaining losses are assumed to be fugitive air releases and are estimated as follows:

Fugitive air releases of the EPCRA Section 313 chemical

$$= \text{Amount input (lbs/yr)} - \text{Amount released to wastewater (lbs/yr)}$$

$$= 20,000 \text{ lbs/yr} - 1,200 \text{ lbs/yr}$$

$$= 18,800 \text{ lbs/yr}$$

POSSIBLE ERROR - Mass Balances for Otherwise Used Chemicals

If you are performing mass balance to estimate the quantity for a particular data element, make sure you include all inputs and outputs as precisely as possible. If, for example, you identify all inputs properly, but you fail to include all outputs, your estimate could be inaccurately inflated. Furthermore, if all inputs and outputs are identified, but are not precise, the estimate of the release in question could also be inaccurate.

4.1.4.3 Emissions Factors (code E)

An emission factor is a representative value that attempts to relate the quantity of a chemical released with an associated activity. These factors are usually expressed as the weight of chemical released divided by a unit weight, volume, distance, or duration of the activity releasing the chemical (e.g., pounds of chemical released per pounds of product produced). Emission factors, commonly used to estimate air emissions, have been developed for many different industries and activities. You should carefully evaluate the source of the emission factor and the conditions for its use to determine if it is applicable to the situation at your facility.

Many emission factors are available in EPA's *Compilation of Air Pollutant Emission Factors* (AP-42). The use of AP-42 emission factors is appropriate in developing estimates for emissions from boilers and process heaters. Equations are presented in AP-42 to calculate chemical specific emission factors for liquid material loading/unloading of transportation vehicles and storage tanks. AP-42 can be accessed at EPA's Technology Transfer Network (TTN) website: <http://www.epa.gov/ttn/chief/ap42.html>.

It should be noted that, for purposes of EPCRA Section 313 reporting, the only estimates that can be reported as "emission factors (code E)" are published chemical-specific emission factors.

Example - Emission Factors

Emission factors have been developed for air releases of fuel constituents and combustion products from boiler operations. AP-42 lists a range of formaldehyde emission factors when No. 6 fuel oil is consumed:

0.024 to 0.061 lbs formaldehyde generated/10³ gallons No. 6 fuel oil fired.

A facility operating a boiler using No. 6 fuel oil could use the above emission factor to determine the amount of formaldehyde generated and subsequently released to the air. If 1,000,000 gallons of No. 6 fuel oil is used during a reporting year, the amount of formaldehyde generated would be between:

$(0.024 \text{ lbs}/10^3 \text{ gal}) \times (1,000,000 \text{ gallons})$ and $(0.061 \text{ lbs}/10^3 \text{ gal}) \times (1,000,000 \text{ gallons}) = 24$ and 61 lbs of formaldehyde

The mid-point of these two values, 42.5 pounds, should be use in developing release estimates assuming that a threshold has been exceeded for formaldehyde.

NOTE: In addition to combustion by-products, there are other EPCRA Section 313 chemicals in No. 6 fuel oil that should be considered for EPCRA Section 313 reporting.

4.1.4.4 Engineering Calculations (code O)

Engineering calculations are assumptions and/or judgements used to estimate quantities of EPCRA Section 313 chemicals released or otherwise managed. The quantities are estimated by using physical and chemical properties and relationships (e.g., ideal gas law, Raoult's law) or by modifying an emission factor to reflect the chemical properties of the EPCRA Section 313 chemical in question. Engineering calculations rely on the process parameters; you must have a thorough knowledge of the processes at your facility to complete these calculations.

Engineering calculations can also include computer models. Several computer models are available for estimating emissions from landfills, wastewater treatment, water treatment, and other processes.

Non-chemical-specific emission factors (e.g., SOCFI emission factors) and non-published emission factors also can be used as discussed in Section 4.1.4.3, but must be classified as "engineering calculations" for EPCRA Section 313 reporting.

Example - Engineering Calculations

A copper mine exceeds an activity threshold for copper compounds, and is filing a Form R for copper compounds. Secondary crushing of ore generates stack emissions of copper. Mining records show that the concentration of copper in the ore is 0.5% by weight, and that the mine crushes 5,200,000 tons of ore during the reporting year. The facility has emission factors for stack emissions of particulate generated from secondary crushing, but does not have copper-specific emission factors. The particulate emission factor for secondary crushing of ore is 60 pounds of particulate released per 1,000 tons of ore crushed. The facility can estimate the stack emissions of copper by assuming that the concentration of copper in the particulate is the same as the concentration of copper in the ore. The copper mine uses the following engineering calculation to estimate the amount of copper released as a stack emission from secondary crushing:

$$60 \text{ pounds}/1,000 \text{ tons ore} \times 5,200,000 \text{ tons/year} \times 0.5\% = 1,560 \text{ pounds/year}$$

4.1.4.5 Estimating Releases and Other Waste Management Quantities

Once all sources, types, and appropriate estimation methodologies have been identified, you can estimate the release and other waste management activity quantities for each data element of the Form R. The recommended approach is that you estimate the amounts released from all sources at your facility by the data element on the form R (i.e., first estimate all fugitive emissions for an EPCRA Section 313 chemical (Part II, Section 5.1), then estimate all stack air releases for an EPCRA Section 313 chemical (Part II, Section 5.2), etc.). Table 4-3 presents a work sheet that may be helpful in compiling this information.

If you submit a Form R, you must also enter on-site waste treatment information in Section 7A, including the code for each treatment method used, the treatment efficiency for the chemical in the treated waste stream, and the concentration of the chemical in the influent sent to treatment. You should report treatment methods that do not actually destroy or remove the chemical by entering “0” for removal efficiency. Similarly, on-site energy recovery methods and on-site recycling methods must be reported in Section 7B and 7C, respectively.

Table 4-3
Release and Other Waste Management
Quantity Estimation Worksheet

Facility Name: _____

Date Worksheet Prepared: _____

Toxic Chemical or Chemical Category: _____

Prepared by: _____

CAS Number: _____

Reporting Year: _____

ON-SITE			
Release or Other Waste Management Activity Type	Amount (lbs)	Basis of Estimate	Form R Element
FUGITIVE AIR			
Equipment Leaks			5.1, (8.1 or 8.8)
Process Areas			5.1, (8.1 or 8.8)
Evaporative Losses (spills, surface impoundments)			5.1, (8.1 or 8.8)
Total =			5.1, (8.1 or 8.8)
STACK AIR			
Process Vents			5.2, (8.1 or 8.8)
Storage Tanks			5.2, (8.1 or 8.8)
Control Device Stacks			5.2, (8.1 or 8.8)
Other			5.2, (8.1 or 8.8)
Total =			5.2, (8.1 or 8.8)
RECEIVING STREAM/WATER BODY DISCHARGE			
Stormwater Discharge			5.3, (8.1 or 8.8)
On-Site Treatment Plant Discharge			
Total =			
ON-SITE UNDERGROUND INJECTION			
Underground Injection to Class I Wells			5.4, (8.1 or 8.8)
Underground Injection to Class II -V Wells			5.4, (8.1 or 8.8)
ON-SITE LAND			
Landfill			5.5, (8.1 or 8.8)
Land Treatment/Application Farming			5.5,(8.1,8.6, or 8.8)
Surface Impoundment			5.5,(8.1 or 8.8)
Other			
Total =			5.5,(8.1 or 8.8)
ON-SITE ENERGY RECOVERY			8.2
ON-SITE RECYCLING			8.4
ON-SITE TREATMENT			8.6

OFF-SITE				
Release or Other Waste Management Activity Type	Amount (lbs)	Basis of Estimate	Form R Data Element	Off-Site Location (name)
OFF-SITE DISPOSAL				
Solidification/Stabilization (metals and metal compounds only)			6.2, (8.1 or 8.8)	
Amount of metal and metal compounds to POTW			6.1, (8.1 or 8.8)	
Wastewater Treatment (excluding POTWs) metals and metal compounds only			6.2, (8.1 or 8.8)	
Underground Injection			6.2, (8.1 or 8.8)	
Landfill/Surface Impoundment			6.2, (8.1 or 8.8)	
Land Treatment			6.2, (8.1 or 8.8)	
Other Land Disposal			6.2, (8.1 or 8.8)	
Other Off-site Management			6.2, (8.1 or 8.8)	
OTHER AMOUNTS SENT OFF-SITE				
Amounts sent for storage			6.2, (8.1 or 8.8)	
Amounts sent for unknown waste management practice			6.2, (8.1 or 8.8)	
OFF-SITE TREATMENT				
Solidification/Stabilization			6.2,(8.7 or 8.8)	
Incineration/Thermal Treatment			6.2, (8.7 or 8.8)	
Incineration/Insignificant Fuel Value			6.2, (8.7 or 8.8)	
Wastewater Treatment (to POTW excluding metals and metal compounds)			6.1, (8.7 or 8.8)	
Wastewater Treatment (Excluding POTW and metal and metal compounds)			6.2, (8.7 or 8.8)	
Transfer to Waste Treatment Broker			6.2, (8.7 or 8.8)	
OFF-SITE ENERGY RECOVERY				
Off-site Energy Recovery			6.2, (8.3 or 8.8)	
Transfer to Energy Recovery Broker			6.2, (8.3 or 8.8)	
OFF-SITE RECYCLING				
Solvents/Organics Recovery			6.2, (8.5 or 8.8)	
Metals Recovery			6.2, (8.5 or 8.8)	
Other Reuse or Recovery			6.2, (8.5 or 8.8)	
Acid Regeneration			6.2, (8.5 or 8.8)	
Transfer to Recycling Waste Broker			6.2, (8.5 or 8.8)	

4.1.5 Other Form R Elements

4.1.5.1 Maximum Amount On-Site (Part II, Section 4.1 of Form R)

In this section of the Form R, you are required to report the code that indicates the maximum quantity of the EPCRA Section 313 chemical present at your facility at any time during the reporting year. This estimate includes any amount of the chemical on-site in storage, in process vessels, in treatment units, and in shipping containers. This calculation includes quantities of the EPCRA Section 313 chemical present in purchased chemicals and in wastes. When performing the calculation, use only the total amount of the chemical present at your site at **any one time**. For example, assume you have a facility that incinerates waste and sends the remaining ash to an off-site landfill. In February, you receive waste with 500 pounds of benzene which you process completely within the month. In September, you receive waste with 600 pounds of benzene which you also process in a similar time frame. If you have no other sources of benzene on-site, your maximum amount estimation would be 600 pounds (range code 02). These codes are provided in the *TRI Forms and Instructions* document.

Example - Maximum Amount On-Site for Landfills

How do facilities that operate landfills report the maximum amount of an EPCRA Section 313 chemical on-site? Does this data element take into account amounts of a chemical that have been disposed of in prior years.

No. Facilities do not have to count amounts of the EPCRA Section 313 chemical that it disposed of on-site in previous years. Wastes that are released to such management units as surface impoundments and landfills should be counted for the purposes of data element 4.1, Part II, of the Form R during the reporting year that they are disposed.

4.1.5.2 Production Ratio or Activity Index (Part II, Section 8.9 of Form R)

For this data element, you are required to provide a ratio of reporting year production to prior year production or provide an “activity index” based on a variable other than production that is the primary influence on the quantity of the reported EPCRA Section 313 chemical recycled, used for energy recovery, treated, or disposed. The ratio or index must be reported to the nearest tenths or hundredth place (e.g., one or two digits to the right of the decimal point). Because the facilities added by the facility expansion rulemaking were not required to collect data until RY 1998, these facilities may enter “NA” in this data element regardless of whether the chemical existed at your facility in the previous year (i.e., RY 1997). In future years, however, Metal Mining facilities may only enter “NA” in the production ratio or activity index data element if the EPCRA Section 313 chemical was not manufactured, processed, or otherwise used in the year prior to the reporting year for which a Form R is being submitted.

You may choose either the production ratio or activity index depending on the chemical and how the chemical is used at your facility. The major factor in selecting whether to use a production ratio or activity index is typically a measure of which threshold activity applies. Typically, production ratio would apply to EPCRA Section 313 chemicals manufactured and processed by a facility, while otherwise use activities would be best measured using an activity

index. A key consideration in developing a methodology for determining a production ratio/activity index is that you should choose a methodology that will be least likely to be affected by potential source reduction activities. In most cases, the production ratio or activity index should be based on some variable of production or activity rather than on toxic chemical or material usage.

For example, suppose you use an EPCRA Section 313 chemical as a cleaning solvent to perform tank washouts. Using a production ratio based on the amount of the product produced in the tanks between the prior and current reporting years may seem logical but may not take into consideration potential source reduction activities. As a result, an activity index may be more appropriate. In this instance, an activity index based on the number of tank washouts conducted would be more accurate in reflecting the potential source reduction activities that could be implemented for that chemical and/or activity. For example, a source reduction activity might include the facility deciding to modify the production process such that they would need to clean the tanks less often and, therefore, use less cleaning solvent. The use of an activity index based on tank washouts would better reflect the factors that influence the amount of solvent managed as a waste than would a production ratio based on the amount of product produced in the tanks.

Example - Production Ratio

A zinc mine extracts 1,000,000 tons of ore during the reporting year, and exceeds the processing threshold for zinc compounds. The previous year, the facility extracted 900,000 tons of ore. As a result, the production ratio for the zinc compounds would be calculated by dividing the amount of ore extracted this year, by the amount extracted last year.

$$\frac{1,000,000 \text{ tons ore (current reporting year)}}{900,000 \text{ tons ore (previous reporting year)}} \\ \text{Production Ratio} = 1.11$$

4.1.5.3 Source Reduction (Part II, Sections 8.10 and 8.11 of Form R)

The final two sections of the Form R are used for reporting any source reduction activities conducted at the facility. Section 8.10 asks whether there has been any source reduction at the facility **during the current reporting year**. If so, *TRI Forms and Instructions* provides a list of three-digit codes that the facility must choose from to describe these source reduction activities. Source reduction activities do not include recycling, treating, using for energy recovery, or disposing of an EPCRA Section 313 chemical. Report in this section only the source reduction activities implemented to reduce or eliminate the quantities reported in Section 8.1 through 8.7.

Under Section 8.11, check “yes” if you would like to attach any optional information on source reduction, recycling, or pollution control activities for the EPCRA Section 313 chemical at your facility. This information can be reported for the current reporting year, or for prior year activities. The Agency asks that you limit this information to one page that summarizes the source reduction, recycling, or pollution control activities implemented by your facility.

4.2 Calculating Release and Other Waste Management Estimates at Metal Mining Facilities

This section discusses the most common releases and other waste management activities at metal mining facilities, and provides guidance for estimating quantities. The discussion is organized by release or other waste management type, as follows:

- Fugitive Air Emissions
- Stack or Point Source Air Emissions
- Water Discharges
- Releases to Land
- Transfers Off-Site
- Pollution Prevention Data

For each type of release or other waste management activity, there is a discussion about particular metal mining activities that commonly generate various types of waste, data sources available to estimate certain quantities, and example scenarios and calculations to clarify concepts and illustrate estimation methods.

Activities at metal mining facilities can vary greatly from mine to mine, depending on target mineral(s), extraction method, beneficiation techniques, and other factors. However, metal mining facilities will generally conduct one or more of the following types of activities: extraction, physical beneficiation (including comminution), and chemical beneficiation. Within each of these three threshold activities, releases and other waste management activities are similar. Throughout this chapter, each of the release types listed above is frequently discussed separately for extraction, physical beneficiation, and chemical beneficiation. A brief description of each of these activities is given below:

- Extraction of ore - The extraction of ore involves removing any overburden, drilling, blasting, and mucking the broken ore and waste rock.
- Physical beneficiation - Physical beneficiation includes comminution (the size reduction of ore), which is often the first step in most mineral processing operations. Facilities reduce the size of ore to liberate the valuable components for further recovery, and to make bulk materials easier to handle. Comminution can include crushing, grinding, sorting, sizing, and washing. Following comminution, facilities may use other physical beneficiation techniques, including gravity concentration, magnetic separation, electrostatic separation, and filtration. Metal mining facilities generally do not add EPCRA Section 313 chemicals to physical beneficiation operations; therefore, any potential reporting of releases and other waste management activities associated with physical beneficiation activities is generally limited to reporting of EPCRA Section 313 chemicals originating in ore. Therefore, in addition to the data sources mentioned throughout the remainder of this section, mineral assays of ore and operating records indicating changing concentrations during beneficiation will be extremely useful in estimating quantities

of releases and other waste management activities associated with physical beneficiation techniques.

- Chemical beneficiation techniques include leaching, flotation, solvent extraction, electrowinning precipitation, amalgamation, carbon adsorption, and ion exchange.

Metal mining facilities that are subject to EPCRA Section 313 and have operations not described in this document may find the release and other waste management reporting issues discussed here still relevant to their activities, however, they may need to also consider additional issues not discussed.

4.2.1 Air Emissions

Air emissions at metal mining facilities can occur from a number of sources. The primary fugitive emissions sources of EPCRA Section 313 chemicals for these facilities are likely to be:

- Extraction of ores and waste rock containing EPCRA Section 313 chemicals
- Physical beneficiation activities
- Chemical beneficiation activities
- Acid aerosols generated during leaching operations (e.g., heap leaching, etc.);
- Wastewater treatment and other sources, including cleaning operations and spills, containing EPCRA Section 313 chemicals

In particular extraction and beneficiation activities may result in large amounts of particulate air emissions. Air emissions from each of these activities and useful data sources and estimation techniques are discussed below. Also, it is important to recognize that similar information may have been estimated by your facility as a result of separate requirements under the Clean Air Act, particularly the Title V requirements.

Extraction. Metal mining facilities are likely to release particulate matter of ore and waste rock to the air during extraction activities. Most of these air emissions tend to be uncontrolled and may need to be reported in Section 5.1, Fugitive Air Emissions of Form R provided thresholds have been exceeded. Several factors may affect the amount of fugitive air emissions from extraction, including rock characteristics such as hardness, crystal and grain structure, friability and moisture level; the type of mine (e.g., underground or open pit); equipment used; and climate. Sources of data for calculating air emissions from extraction include monitoring data, data

Releases During Transportation

If you transport ore at your facility, for example from the mine to the comminution site which is not part of your facility, you must report releases and other waste management activities for any EPCRA Section 313 chemical in the ore (or other materials, except overburden) provided an activity threshold has been exceeded for that chemical. Releases and other waste management activities for EPCRA Section 313 chemicals used to maintain motor vehicles operated by the facility are currently exempt under the motor vehicle exemption. However, this exemption does not apply to EPCRA Section 313 chemicals in materials being transported, only to chemicals used to maintain motor vehicles.

collected for air permit applications, data collected for assurance of worker safety; facility-specific particulate emission factors, and published emission factors. If only particulate emission factors (i.e., you do not have chemical-specific emission factors) are available, these should be combined with data indicating the concentration of EPCRA Section 313 chemicals in the particulate. This may be actual measurements from samples of particulate, or estimates of the composition of waste rock or ore.

Physical Beneficiation Comminution activities such as crushing, grinding, sorting, sizing, drying, handling and storage of ore may create fugitive and/or point source (stack) air emissions of particulate matter dependent on control systems at your facility. Air emissions of metals and metal compounds in particulate emissions from ore must be reported on the Form R in Section 5.1, Fugitive Emissions, or 5.2, Stack Emissions, provided an activity threshold is exceeded for that chemical. Several factors may affect the amount of emissions from a particular comminution process. These include ore characteristics such as hardness, crystal and grain structure, and friability; equipment design characteristics (such as crusher type); and control equipment. Sources of data for calculating air emissions from comminution include monitoring data, data collected for air permits, industrial hygiene monitoring data, facility-specific particulate emission factors, and published emission factors. If you do not have better “readily available data,” you may use AP-42 particulate emission factors for crushing, grinding and handling, provided in Table 4-4. Most of these factors are for uncontrolled emissions. Some general information about using these factors is given below, followed by specific guidance on using emission factors for crushing, grinding, and storage and handling.

Test data collected in the mineral processing industries indicate that the moisture content of ore can have a significant effect on emissions from several process operations. High moisture generally reduces the uncontrolled emission rates, and separate emission rates are provided for primary crushers, secondary crushers, tertiary crushers, and material handling and transfer operations that process high-moisture ore. Dry grinding operations are assumed to produce or to involve only low-moisture material. For most metallic minerals addressed in Table 4-4, high-moisture ore is defined as ore whose moisture content, as measured at the primary crusher inlet or at the mine, is 4 weight percent or greater. Ore defined as high-moisture at the primary crusher is presumed to be high-moisture ore at any subsequent operation for which high-moisture factors are provided unless a drying operation precedes the operation under consideration. Ore is defined as low-moisture when a dryer precedes the operation under consideration or when the ore moisture at the mine or primary crusher is less than 4 weight percent.

**Air Emissions from Comminution:
Sources of Data**

Under section 111 of the Clean Air Act (CAA), New Source Performance Standards (NSPS) (40 CFR 60 Subpart LL) regulate emissions of particulate matter in metal mining operations in crushers, conveyor belt transfer points, thermal dryers, product packaging stations, storage bins, truck loading and unloading stations, and rail car loading and unloading. Information collected to meet these standards can be used to help estimate air emissions for EPCRA Section 313. Although all underground mining facilities are exempt from these provisions, fugitive dust emissions from underground mining activities may be regulated (usually by requiring dust suppression management activities) through State permit programs established to meet Federal National Ambient Air Quality Standards (NAAQSs).

Table 4-4. Emission Factors for Crushing and Grinding

Source	Filterable ^{b,c}			
	PM ^a lb/ton	Rating	PM-10 lb/ton	Rating
Low-moisture ore^c				
Primary crushing (SCC 3-03-024-01) ^d	0.5	C	0.05	C
Secondary crushing (SCC 3-03-024-02) ^d	1.2	D	ND	
Tertiary crushing (SCC 3-03-024-03) ^d	2.7	E	0.16	E
Wet grinding	Neg		Neg	
Dry grinding with air conveying and/or air classification (SCC 3-03-024-09) ^e	28.8	C	26	C
Dry grinding without air conveying and/or air classification (SCC 3-03-024-10) ^e	2.4	D	0.31	D
High-moisture ore^c				
Primary crushing (SCC 3-03-024-05) ^d	0.02	C	0.01	C
Secondary crushing (SCC 3-03-024-06) ^d	0.05	D	0.02	D
Tertiary crushing (SCC 3-03-024-07) ^d	0.06	E	0.02	E
Wet grinding	Neg		Neg	
Dry grinding with air conveying and/or air classification (SCC 3-03-024-09) ^e	28.8	C	26	C
Dry grinding without air conveying and/or air classification (SCC 3-03-024-10) ^e	2.4	D	0.31	D
Handling and Transfer				
Material handling and transfer--all minerals except bauxite (SCC 3-03-024-04) ^g	0.12	C	0.06	C
Material handling and transfer--bauxite/alumina (SCC 3-03-024-04) ^{g,h}	1.1	C	ND	
Material handling and transfer--bauxite/alumina (SCC 3-03-024-08) ^{g,h}	ND		ND	
Material handling and transfer--all minerals except bauxite (SCC 3-03-024-08) ^g	0.01	C	0	C
Drying				
Drying--all minerals except titanium/zirconium sands (SCC 3-03-024-11) ^f	19.7	C	12	C
Drying--all minerals except titanium/zirconium sands (SCC 3-03-024-11) ^f	19.7	C	12	C
Drying--titanium/zirconium with cyclones (SCC 3-03-024-11) ^f	0.5	C	ND	C
Drying--titanium/zirconium with cyclones (SCC 3-03-024-11) ^f	0.5	C	ND	

Notes for Table 4-4:

Factors represent uncontrolled emissions unless otherwise noted; controlled emission factors are also discussed in this section. All emission factors are in lb/ton of material processed unless noted. SCC = Source Classification Code. Neg = negligible. ND = no data.

- a PM emissions do not equate to quantity of listed chemical. Such determinations require knowledge of the percent concentration of the target chemical in the ore.
- b Filterable PM is that PM collected on or prior to the filter of an EPA Method 5 (or equivalent) sampling train.
- c Defined in Section 11.24.2.
- d Based on weight of material entering primary crusher.
- e Based on weight of material entering grinder; emission factors are the same for both low-moisture and high-moisture ore because material is usually dried before entering grinder.
- f Based on weight of material exiting dryer; emission factors are the same for both high-moisture and low-moisture ores; SO_x emissions are fuel dependent (see Chapter 1); NO_x emissions depend on burner design and combustion temperature (see Chapter 1).
- g Based on weight of material transferred; applies to each loading or unloading operation and conveyor belt transfer point.
- h Bauxite with moisture content as high as 15 to 18% can exhibit the emission characteristics of low-moisture ore; use low-moisture ore emission factor for bauxite unless material exhibits obvious sticky, nondusting characteristics.

Source: AP-42.

**Emission Factor Quality Ratings for Table 4-4 are as follows:

A Excellent. Factor is developed from A- and B-rated source test data taken from many randomly chosen facilities in the industry population. The source category population is sufficiently specific to minimize variability.

B Above average. Factor is developed from A- or B-rated test data from a "reasonable number" of facilities. Although no specific bias is evident, it is not clear if the facilities tested represent a random sample of the industry. As with an A rating, the source category population is sufficiently specific to minimize variability.

C Average. Factor is developed from A-, B-, and/or C-rated test data from a reasonable number of facilities. Although no specific bias is evident, it is not clear if the facilities tested represent a random sample of the industry. As with the A rating, the source category population is sufficiently specific to minimize variability.

D Below average. Factor is developed from A-, B- and/or C-rated test data from a small number of facilities, and there may be reason to suspect that these facilities do not represent a random sample of the industry. There also may be evidence of variability within the source population.

E Poor. Factor is developed from C- and D-rated test data, and there may be reason to suspect that the facilities tested do not represent a random sample of the industry. There also may be evidence of variability within the source category population.

The emission factors in Tables 4-4 are for the process operations as a whole. At most metallic mineral processing plants, each process operation requires several types of equipment. A single crushing operation is likely to include a hopper or ore dump, screen(s), crusher, surge bin, apron feeder, and conveyor belt transfer points. Emissions from these various pieces of equipment are often ducted to a single control device and, therefore, considered stack air emission sources. The emission factors provided in Table 4-4 are for primary, secondary, and tertiary crushing process units that are in this type of arrangement.

Emission factors provided in Table 4-4 are for two types of dry grinding operations: those that involve air conveying and/or air classification of material and those that involve screening of material without air conveying. Grinding operations that involve air conveying and air classification usually require dry cyclones for efficient product recovery. The factors in Tables 4-4 are for emissions after product recovery cyclones. Grinders in closed circuit with screens usually do not require cyclones. Emission factors are not provided for wet grinders because the high-moisture content in these operations can reduce emissions to negligible levels.

At some metallic mineral processing plants, material is stored in enclosed bins between process operations. The emission factors provided in Table 4-4 for the handling and transfer of material should be applied to the loading of material into storage bins and the transferring of material from the bin. The emission factor will usually be applied twice to a storage operation: once for the loading operation and once for the reclaiming operation. If material is stored at multiple points in the plant, the emission factor should be applied to each operation and should apply to the material being stored at each bin. The material handling and transfer factors do not

apply to small hoppers, surge bins, or transfer points that are integral with crushing, drying, or grinding operations.

At some large metallic mineral processing plants, extensive material transfer operations with numerous conveyor belt transfer points may be required. The emission factors for material handling and transfer should be applied to each transfer point that is not an integral part of another process unit. These emission factors should be applied to each such conveyor transfer point and should be based on the amount of material transferred through that point. The emission factors for material handling can also be applied to final product loading for shipment. Again, these factors should be applied to each transfer point, ore dump, or other point where material is allowed to fall freely.

The emission factors for dryers in Table 4-4 include transfer points integral to the drying operation. A separate emission factor is provided for dryers at titanium/zirconium plants that use dry cyclones for product recovery and for emission control. Titanium/zirconium sand-type ores do not require crushing or grinding, and the ore is normally washed to remove humic and clay material before concentration and drying operations. Drying and dry grinding operations are assumed to produce or to involve only low-moisture material.

Emissions from metallic mineral processing plants are usually controlled with wet scrubbers or baghouses. For moderate to heavy uncontrolled emission rates from typical dry ore operations, dryers, and dry grinders, a wet scrubber with pressure drops ranging from 1.5 to 2.5 kilopascals (kPa) (6 to 10 inches of water) will reduce emissions by approximately 95 percent. With very low uncontrolled emission rates typical of high-moisture conditions, the percentage reduction will be lower (approximately 70 percent). The amounts not captured by this type of equipment will need to be considered toward stack or fugitive emissions depending on how the equipment is designed, if thresholds for the chemicals have been exceeded elsewhere at the facility.

Over a wide range of inlet mass loadings, a well-designed and maintained baghouse will reduce emissions to a relatively constant outlet concentration. Such baghouses tested in the mineral processing industry consistently reduce emissions to less than 0.05 gram per dry standard cubic meter (g/dscm) (0.02 grains per dry standard cubic foot [gr/dscf]), with an average concentration of 0.015 g/dscm (0.006 gr/dscf). Under conditions of moderate to high uncontrolled emission rates at typical dry ore facilities, this level of controlled emissions represents greater than 99 percent removal of PM emissions. Because baghouses reduce emissions to a relatively constant outlet concentration, percentage emission reductions would be less for baghouses on facilities with a low level of uncontrolled emissions.

Many physical beneficiation processes are wet and fugitive air emissions are expected to be minimal. Industrial hygiene monitoring may be a useful source of information for estimating any fugitive emissions from wet physical beneficiation. Facilities using dry processes may have particulate emissions of ore or concentrate and can refer to emission factors, monitoring data, and permit information. Fugitive emissions may occur during transfer and handling of ore and concentrate. In the absence of better facility-specific data, the emission factors in Table 4-4 may be used to estimate amounts of fugitive emissions from storage and handling. Facilities that use

heat processes such as calcining and sintering may use monitoring data, facility-specific emission factors, and other sources of data to determine quantities of EPCRA Section 313 chemicals released to air during heat processes. In the absence of better facility specific data, facilities may use the emission factors for drying in Table 4-4.

Chemical Beneficiation Air emissions of EPCRA Section 313 chemicals can also occur during many chemical beneficiation techniques, including air emissions from the following sources:

- Tanks
- Waste management units
- Other Sources of Air Emissions

These air releases and methods for estimating their quantities are discussed below.

Air Releases From Tanks

Compilation of Air Pollutant Emission Factors (AP-42) provides detailed information on the calculation of stack air emissions during the storage and transfer of liquids. A number of equations used to calculate air emissions from storage tanks can be found in *AP-42*, Chapter 7. Total air emissions from storage tanks are equal to the sum of the standing storage loss and working loss. Variables such as tank design, liquid temperature, and wind velocity are taken into account when determining standing storage loss and working loss. The emission equations for fixed-roof tanks in *AP-42* were developed for vertical tanks; however, the equations can also be used for horizontal tanks by modifying the tank parameters as specified in *AP-42*. Many of these equations have been incorporated into computer models such as TANKS3 (See box on TANKS3 for more information).

Once the total volatile organic compound (VOC) loss is calculated, the emission rate of each constituent in the vapor can then be determined. In general, the emission rate for individual components can be estimated by multiplying the weight fraction of the constituent in the vapor by the amount of total VOC loss. The weight fraction of the constituent in the vapor can be calculated using the mole fraction and the vapor pressure of the constituent (equations found in *AP-42*). The weight percent can also be

Stack Emissions from Storage Tanks

The TANKS3 program is designed to estimate emissions of organic chemicals from several types of storage tanks. The calculations are performed according to EPA's *AP-42*, Chapter 7. After the user provides specific information concerning a storage tank and its liquid contents, the system produces a report which estimates the chemical emissions for the tank on an annual or partial year basis. The user can also determine individual component losses by using one of the specification options available in the program.

The TANKS3 program relies on a chemical database of over 100 organic liquids and a meteorological database which includes over 250 cities in the United States; users may add new chemicals and cities to these databases by providing specific information through system utilities. On-line help provides documentation and user assistance for each screen of the program. The TANKS3 program and manual can be downloaded from the world wide web at <http://www.epa.gov/ttn/chief/tanks.html>.

obtained from the SPECIATE database. The SPECIATE database contains organic compound and particulate matter speciation profiles for more than 300 source types. The profiles attempt to break down the total VOC or particulate emissions from a particular source into the individual compounds. The SPECIATE database can be downloaded from the Internet at <http://www.epa.gov/ttn/chief/software.html#speciate>.

Equipment Leaks

In general, equipment such as valves and flanges leak. These leaks tend to be so small and slow that they are unnoticeable to a casual observer. When considered on a facility-wide basis, however, these leaks can account for a significant quantity of fugitive air emissions. These fugitive air emissions occur whenever the equipment contains chemical product waste or other materials (e.g., even though materials may no longer be flowing through a pipe, the valves and flanges associated with the pipe will still produce emissions unless the pipe has been drained and cleaned).

Protocol For Equipment Leak Emission Estimates (EPA-453/R-95-017) presents a comprehensive discussion of how to estimate equipment leaks. This document is available at <http://www.epa.gov/ttn/chief/fyi.html>. Four approaches for estimating equipment leak emissions are presented below in order of increasing refinement.

- Average emission factor approach;
- Screening ranges approach;
- EPA correlation approach; and
- Unit-specific correlation approach.

In general, the more refined approaches require more data and provide more accurate emission estimates for a process unit.

Both the average emission factor and screening ranges approaches, emission factors are combined with equipment counts to estimate emissions.

The average emissions factor approach allows the use of average emission factors developed by EPA, as shown in Table 4-5, SOCFI Average Emission Factors. These average factors must be multiplied by the number of pieces of equipment being considered and the length of time each piece of equipment is in service. The average emission factors vary depending on the service category (e.g., gas, light liquid, or heavy liquid), and the total organic compound (TOC) concentration of the stream. To estimate emissions with the EPA correlation approach, measured concentrations (screening values) for all equipment are individually entered into general correlations developed by the EPA. In the unit-specific correlation approach, screening and leak rate data are measured for a select set of individual equipment components and then used to develop unit-specific correlations. Screening values for all components are then entered into these unit-specific correlations to estimate emissions.

Table 4-5
SOCFI AVERAGE EMISSION FACTORS*

Equipment type	Service	Emission factors ^a (lbs/hr/source)
Valves	Gas	0.0132
	Light liquid	0.00888
	Heavy liquid	0.00051
Pump seals ^b	Light liquid	0.0439
	Heavy liquid	0.0190
Compressor seals	Gas	0.503
Pressure relief valves	Gas	0.229
Connectors	All	0.00403
Open-ended lines	All	0.0037
Sampling connections	All	0.0331

*Protocol for Equipment Leak Emission Estimates (EPA, EPA-453/R-95-017)

a These factors are for total organic compound emissions

b The light liquid pump seal factor can be used to estimate the leak rate from agitator seals

The general equation for estimating TOC mass emissions from an equipment leak using average emission factors is:

$$E_{\text{TOC}} = F_A * WF_{\text{TOC}} * N$$

where:

E_{TOC}	=	emission range of TOC from all equipment in the stream of a given equipment type (lb/hr)
F_A	=	average emission factor for the equipment type (lb/hr/source)
WF_{TOC}	=	average weight fraction of TOC in the stream
N	=	number of pieces of equipment

And the equation for determining the emissions of a specific VOC in a mixture or other trade name product from equipment is:

$$E_x = E_{\text{TOC}} * (WP_x / WP_{\text{TOC}})$$

where:

E_x	=	The mass emissions of organic chemical "x" (lb/hr)
E_{TOC}	=	The TOC mass emissions from the equipment (lb/hr)
WP_x	=	The concentration of organic chemical "x" in the equipment in weight percent
WP_{TOC}	=	The TOC concentration in the equipment in weight percent.

This average emission factor approach is presented as an option for facilities with no data concerning equipment leaks. It is the facility's responsibility to choose the best method for estimating releases from equipment leaks.

Waste Management Units

Air emissions from wastewater treatment plants can be estimated using one of several programs. One program is WATER8 (described in the box). Other programs are available commercially. Some wastewater treatment may take place in covered tanks. If this is the case, the TANKS3 program may be appropriate to use.

Metal mining facilities should also consider air emissions from any on-site tailings piles. Facilities can use EPA's TSCREEN model to analyze air emissions from different types of sources, including tailings piles. The computer program TSCREEN, A Model for Screening Toxic Air Pollutant Concentrations, should be used in conjunction with the "Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants (Revised)" (EPA, 1992a).

WATER8

A computer program, WATER8, is available for estimating the fate of organic compounds in various wastewater treatment units, including collection systems, aerated basins, and other units. WATER8 is written to run under DOS without the need to purchase other programs. WATER8 contains useful features such as the ability to link treatment units to form a treatment system, the ability to recycle among units, and the ability to generate and save site-specific compound properties. The WATER8 program and users manual can be downloaded from the world wide web at <http://www.epa.gov/ttn/chief/software.html#water8>.

With the use of these tools one can determine the type of release and the steps to be followed to simulate the release. TSCREEN can be downloaded at <http://www.epa.gov/scram001>.

Volatile chemicals can evaporate from solid waste and non-volatile chemicals can be released to the air via particulate emissions. One tool that can be used to estimate air emissions is CHEMDAT8.

CHEMDAT8

Analytical models have been developed to estimate emissions of organic compounds via various pathways from wastewater and waste management units. Some of these models have been assembled into a spreadsheet called CHEMDAT8 for use on a PC. A user's guide for CHEMDAT8 is also available. Area emission sources for which models are included in the spreadsheet are as follows: nonaerated impoundments, which include surface impoundments and open top wastewater treatment tanks; aerated impoundments, which include aerated surface impoundments and aerated WWT tanks; disposal impoundments, which include nonaerated disposal impoundments; land treatment; and landfills. These models can be used to estimate the magnitude of site air emissions for regulatory purposes. The CHEMDAT8 program and manual can be downloaded from the world wide web at <http://www.epa.gov/ttn/chief/software.html#water8>.

Other Sources of Air Emissions

Metal mining facilities may have air emissions from a variety of other sources, depending on the chemical beneficiation technique used. Data sources and calculation methods for

estimating fugitive and stack emissions from chemical beneficiation methods include the following:

- Industrial hygiene monitoring data
- AP-42 emissions factors
- Facility-specific emission factors and models
- Mass balance (for volatile solvents)
- EPA and industry association models
- Data from a leak detection and repair (LDAR) program
- Engineering calculations
- Air emission inventories
- Air permit applications
- Process and production data
- Emission factors from EPA and commercial models
- Engineering calculations

Facilities that do not have such data may use other sources, including engineering judgement to estimate fugitive emissions.

4.2.2 Wastewater

Numerous activities at metal mines may create wastewaters containing EPCRA Section 313 chemicals. Facilities can estimate quantities of EPCRA Section 313 chemicals in wastewater from various mining activities using similar sources of data and estimation techniques. Therefore, this section begins with a general discussion about estimating quantities of EPCRA Section 313 chemicals in wastewater from many metal mining activities. This is followed by a discussion about issues specific to extraction, physical beneficiation, and chemical beneficiation.

A facility that discharges or has the potential to discharge water containing regulated wastes must operate under the terms of Federal, State, and/or local permits, such as a NPDES direct discharge permit, or a POTW indirect discharge agreement. The permit(s) or agreement usually require measurements of the water volume and monitoring of some generalized wastewater parameters including concentrations of various constituents. In some cases, the constituent analyses required for permit compliance includes EPCRA Section 313 chemicals. In other cases, facilities may have conducted more detailed analysis of specific constituents in its wastewaters as part of its NPDES or POTW discharge applications. In these instances, releases can be calculated by multiplying the volume of wastewater released by the concentration of the chemical released. See box for an example calculation.

Based on the concentration and wastewater flow data available, an estimate of discharges to water can be calculated. Facilities should calculate the daily average discharges of a reportable EPCRA Section 313 chemical in pounds and use those estimates to determine the annual

discharge in pounds per year. Using the daily concentration data available for the reportable chemical combined with the wastewater flow data for each of the sampling dates, calculate an estimate of pounds per day for each sampling date. After the calculations are made for each monitoring point (e.g., daily, monthly), the pounds discharged are averaged to determine an average daily discharge amount which would be multiplied by the number of days discharges were possible (e.g., 365 days a year).

If no chemical-specific monitoring data exist, process knowledge (or in some cases, mass balance) may be used to develop an estimate.

Example Calculation of Yearly Wastewater Discharge

A facility has monitoring data on discharges to water of xylene, an EPCRA Section 313 chemical, and a Form R report is required. In this example, monitoring data on this chemical are only available for two days in the year. The daily quantities of pounds of xylene released for those two dates would then be divided by the number of sample dates to determine the daily average for the whole reporting year, which would be used to estimate the annual discharge of xylene in wastewater:

Date	Concentration (mg/l)	Flow (MGD)	Daily Discharge
3/1	1.0	1.0	8.33 lbs.
9/8	0.2	0.2	0.332 lbs.

Annual Calculation:
 $(8.33 \text{ lbs.} + 0.332 \text{ lbs.}) / 2 \text{ days} \times 365 \text{ days/year} = 1580.82 \text{ lbs/yr}$

Discharges of listed acids may be reported as zero if all discharges have been neutralized to pH 6 or above. If wastewater containing a listed acid is discharged below pH 6, then releases of the acid must be calculated and reported, except for hydrochloric and sulfuric acid (acid aerosols), which are only reportable in aerosol form. For more information on calculating such discharges of acids, see EPA's *Estimating Releases of Mineral Acid Discharges Using pH Measurements* (EPA 745/F-97-003, June 1991).

Section 313 chemicals contained in discharges to surface water would be reported as a discharge to a receiving stream or water body in Part II, Section 5.3 of Form R. Even those facilities subject to "zero discharge" requirements of 40 CFR Part 440, Subpart J may have authorized discharges due to the storm water exemption, and these would be reportable as well. Section 313 chemicals contained in discharges to publicly owned treatment works (POTWs) would be reported in Part II, Section 6.1 of Form R. Section 313 chemicals contained in discharges to land on-site would be reported in Part II, Section 5.5 of Form R (and are discussed further in the next section).

Metal mining facilities can use the data sources and estimation techniques outlined above to calculate quantities of EPCRA Section 313 chemicals in waste water discharges from many activities at their facilities. Additional information on estimating waste water discharges from extraction is given below:

Extraction Metal mining facilities may release or transfer to a POTW EPCRA Section 313 chemicals in wastewater resulting from extraction activities. In particular, facilities may discharge mine water and acid mine drainage containing EPCRA Section 313 chemicals.

Mine Water

Facilities may continuously pump enormous quantities of water during extraction. EPCRA Section 313 chemicals in mine water that is discharged into surface waters, on-site water bodies, or POTWs must be reported on the Form R, provided thresholds have been exceeded. Operating data on flow rates of discharged mine water, combined with monitoring data on chemical concentrations can be used to calculate discharges of EPCRA Section 313 chemicals in mine water.

Acid Mine Drainage

Facilities may discharge EPCRA Section 313 chemicals in acid mine drainage to surface water or on-site water bodies. Acid mine drainage occurs when sulfides in waste rock, tailings, spent ore from heap leach operations, and mine structures such as pits and underground workings, are exposed to oxygen and water in the presence of bacteria². Acid mine drainage is primarily a function of the mineralogy of the rock material and the availability of water and oxygen. Acid mine drainage generation can be seasonal and is sometimes accelerated during periods of heavy rainfall. Because remediating acid mine drainage can be damaging and costly, predictive tools and models, design performance, financial assurance, and monitoring have become increasingly important. Data collected for these purposes can be used to calculate quantities of EPCRA Section 313 chemicals in acid mine drainage for EPCRA Section 313 reporting purposes, when this activity takes place at a covered facility and thresholds have been exceeded. Facilities may also have data on amounts and concentrations of EPCRA Section 313 chemicals in acid mine drainage to meet regulatory requirements

Physical Beneficiation. Many physical beneficiation methods require facilities to mix ore particles with water, creating a slurry. These processes may result in wastewater discharges, particularly if the facility dewater the slurry to further concentrate the product. Monitoring data, and operating records are potential sources of data for calculating quantities of EPCRA Section 313 chemicals released to water.

Chemical Beneficiation. Many chemical beneficiation techniques produce wastewater streams that may be discharged to on-site water bodies or POTWs. For

Water Releases from Leaching Dumps

Facilities that use heap and dump leaching techniques should consider releases of EPCRA Section 313 chemicals that may wash from the dumps into surface waters. The facility water balance and pregnant leachate solution (PLS) characterization can be used to estimate these releases. Releases to water from leach dumps can also occur during large storm events. Some of the PLS may also be lost to a nearby water body through drainage or storm water. Monitoring required by NPDES permits may provide useful data to estimate these releases. Report water discharges from leaching dumps in Section 5.3 of Form R, discharged to a receiving stream or water body.

² When this reaction occurs within a mine in rock and tailings piles it is often known as acid rock drainage (ARD). For purposes of this document, AMD is used to describe both ARD and acid mine drainage.

example, electrowinning processes can produce a small amount of wastewater that may be discharged as a bleed stream to surface water. In carbon adsorption processes that use nitric acid to regenerate carbon beds, a spent acid wash solution containing nitric acid and nitrate compounds may be discharged. In most cases, facilities can use the data sources and estimation techniques outlined earlier in this section to estimate quantities of EPCRA Section 313 chemicals in wastewaters from chemical beneficiation activities. Facilities that use heap and dump leaching techniques may have additional considerations, as outlined in the box.

4.2.3 Land

Metal mining facilities may dispose EPCRA Section 313 chemicals in wastes generated from numerous on-site activities. Sources of data, estimation techniques, and reporting issues related to the disposal of wastes generated from extraction, physical beneficiation and chemical beneficiation are discussed below.

Extraction Metal mining facilities may release large amounts of waste rock to land during extraction. Mine operating records should indicate the amounts of waste rock disposed to land during the year. Concentrations of EPCRA Section 313 chemicals in waste rock can be obtained from mineral assays, metal analyses, historical mine records, financial information, and other sources.

During extraction, many metal mining facilities remove overburden to access an ore body. Overburden is the unconsolidated material that overlies a deposit of useful materials or ores, and does not include any portion of ore or waste rock (40 CFR 327.3). Chemicals in overburden are exempt from EPCRA Section 313 reporting and you are not required to report on or consider toward thresholds any quantities of chemicals in overburden released as particulate, disposed to land, transferred off-site or otherwise managed as waste.

As discussed in Chapter 3 of this document, displacement of waste rock to gain access to ore is not considered an EPCRA Section 313 threshold activity (i.e., waste rock is not manufactured, processed, or otherwise used) and therefore amounts of EPCRA Section 313 chemicals in waste rock are not required to be applied towards activity thresholds. However, this does not mean that releases and other waste management activities associated with waste rock are exempt from EPCRA Section 313 reporting. If you exceed an activity threshold for an EPCRA Section 313 chemical elsewhere at the facility that is also contained in waste rock regardless of its concentration, you must report releases and other waste management activities of that chemical. Because waste rock has not undergone a threshold activity, amounts of EPCRA Section 313 chemicals in waste rock are not eligible for the *de minimis* exemption. Therefore, releases and other waste management activities of EPCRA Section 313 chemicals in waste rock must be reported, regardless of their concentration if thresholds for those chemicals have been exceeded.

If you decide to beneficiate waste rock disposed in a previous year, and you displace some of the waste rock, you are not required to report EPCRA Section 313 chemicals in the waste rock as a release to land in the year that you displaced it. For example, a facility reports the on-site disposal of an EPCRA Section 313 chemical in waste rock in reporting year A. In reporting year A+1, the facility decides to beneficiate a portion of the waste rock that was disposed the previous

year. To access this portion, the facility moves some of the waste rock disposed in reporting year A to a different location. In reporting year A+1, the facility is not required to report the waste rock moved as a release to land.

Example - Waste Rock Calculation

A nickel mine processed more than 25,000 pounds of nickel compounds during the reporting year, and must file a Form R for nickel compounds (the facility does not meet the criteria for filing a Form A). The facility has data indicating that the waste rock contains less than 0.05 percent by weight nickel. Operating records indicate that the mine disposed 2.5 million tons of waste rock during the reporting year.

$$\begin{aligned}\text{Amount of nickel disposed to land} &= \text{Amount of waste rock} \times \text{concentration of nickel in waste rock} \\ &= 2,500,000 \text{ tons} \times 2,000 \text{ lbs/ton} \times 0.05\% \\ &= 2,500,000 \text{ pounds of nickel}\end{aligned}$$

Therefore, the facility must report (assuming the facility has no other releases of nickel to land) 2,500,000 pounds in Section 5.5, Disposal to Land On-site, of the Form R.

Physical Beneficiation. Physical beneficiation techniques may produce solid wastes, which may be disposed of on-site. If this waste is disposed on-site, it must be reported in Section 5.5 of Form R. Air control devices (e.g., baghouses) used in comminution equipment may collect solid waste containing EPCRA Section 313 chemicals. Sources of data to estimate the quantity of an EPCRA Section 313 chemical in solid matter collected in air control equipment include waste analyses, operating records, treatment equipment specifications, and mass balance. For example, filtration typically produces filter cake, filtrate, and/or spent filter cloths. Other physical beneficiation processes may produce various types of sludges and tailings. Waste analyses for these wastes can be used to estimate quantities of EPCRA Section 313 chemicals in the solid wastes.

Example - Baghouse

Your facility uses a baghouse to reduce particulate air emissions from ore grinding activities, and disposes the material caught in the baghouse on-site. Using emission factors (previously discussed), you calculate that you released 100 tons of particulate to air from grinding conducted during the reporting year. Your treatment equipment has a capture efficiency of 85%. Waste analyses of the particulate caught in the baghouse indicate that there is 1.6% nickel in the material. By combining these data, you can calculate the amount of nickel disposed on-site during the year:

$$\begin{aligned}\text{Amount disposed on-site} &= \text{Amount of particulate caught in baghouse} \times \text{concentration of nickel} \\ &= (100 \text{ tons} \times 2,000 \text{ pounds/ton}) \times 85/100 \times 1.6\% \\ &= 1,813.3 \text{ pounds of nickel released to air from grinding activities.}\end{aligned}$$

Thus, you would add 1,813.3 pounds of nickel to any other amounts of nickel disposed on-site during the year, and report the total amount disposed in Section 5.5 of Form R.

Chemical Beneficiation. Metal mines must report the on-site disposal of EPCRA Section 313 chemicals in tailings, and spills to land. Facilities that use leaching processes may also dispose spent ore. Finally, metal mining facilities may dispose wastes from beneficiation activities that are not directly related to mineral processing, such as wastes from equipment maintenance. These four types of wastes are discussed below.

Tailings

Metal mining facilities may create tailings from a variety of beneficiation activities. Examples include the following:

- Solvent Extraction - Sludge can accumulate in solvent extraction/electrowinning systems and facilities may periodically dispose this waste.
- Ion Exchange - The ion exchange process may generate loaded resins containing EPCRA Section 313 chemicals. Facilities may dispose the loaded resin to land.
- Electrowinning - Spent electrolyte may be generated during electrowinning activities, sent through a stripping step and subsequently discharged to a tailings pond.

Report the Final Disposition of a Waste

Facilities must report the final disposition of chemicals released during the reporting year. For example, your facility sends 1,000 pounds of an EPCRA Section 313 chemical to a surface impoundment during the reporting year. During the same reporting year, five hundred pounds of the amount disposed to the surface impoundment is discharged to an on-site water body, 100 pounds volatilizes as a fugitive air emissions, and the remainder accumulates as a sludge at the bottom of the impoundment. Assuming your facility exceeds an activity threshold for that chemical, you would report releases as follows:

100 pounds in Section 5.1, Fugitive Emissions
500 pounds in Section 5.3, Discharges to Receiving Streams or Water Bodies
400 pounds in Section 5.5, Releases to Land.

The facility does not, however, report amounts that are emitted or migrate from one media to another in subsequent years. For example, if a facility disposes 1,000 pounds of a Section 313 chemical to land in 1998, and 500 pounds of this is discharged to water in 1999, the facility reports 1,000 pounds released to land in 1998, and does not report the 500 pounds discharged to water in 1999 on the Form R.

Also, you are not required to report migrations of an EPCRA Section 313 chemical within the same media. For example, a facility places 500 pounds of a chemical into a landfill during the reporting year, of which fifty pounds seep into the ground below the landfill. You would report all 500 pounds in Section 5.5.1B, Other Landfills.

These and other wastes resulting from chemical beneficiation techniques may contain a mixture of extracted metals and chemicals added to the beneficiation process. Metal mining facilities commonly dispose tailings in on-site surface impoundments and occasionally in landfills or underground mines as backfill to provide ground or wall support. Disposal to surface impoundments, landfills, and underground mines is reported in Section 5.5 of Form R. Facilities using certain beneficiation methods may closely monitor the quantity and composition of tailings monitored to ensure the efficiency of the beneficiation process. Facilities can use these data to estimate the quantity of Section 313 chemicals discharged to land on site. Facilities may also have waste analyses that they can use to estimate quantities disposed to land.

Spent Ore

Some metal mining facilities use leaching processes to remove valuable metals from ores. In particular, gold mines commonly use heap leaching and copper mines often use dump leaching. Other leaching methods include tank/vat leaching, *in situ* leaching, and bioleaching. Facilities that conduct heap and dump leaching activities should consider EPCRA Section 313 chemicals in spent ore that is left in place, or moved elsewhere for disposal, after leaching is complete. During leaching, the ore pile is considered part of the facility's process, and EPCRA Section 313 chemicals in the pile would not be considered releases to land while the leaching process is active. However, EPCRA Section 313 chemicals that may accidentally seep into the ground below the pile during active leaching, must be reported on the Form R as land and water releases. Once the leaching activity is complete, amounts of EPCRA Section 313 chemicals remaining must be considered as released provided thresholds have been exceeded.

Spills

Example - Estimating Releases for Accidental Losses

A metal mining facility uses a glycol ether in a beneficiation process. While unloading on a windless overcast day, a 55 gallon drum containing glycol ether is spilled. Most of the spill remains on the pad, however, an estimated ten percent flows off the pad and onto the soil. Absorbent material used to remove the glycol ether from the concrete pad is subsequently incinerated. How would these releases be reported on the Form R? The density of glycol ether is 8.6 pounds per gallon, and the vapor pressure is 0.10 mm Hg at 68° F.

$$Quantity\ spilled = 55\ gal \times 8.6\ lbs./gal = 473\ lbs.$$

$$Quantity\ spilled\ onto\ pad = 473 \times 90\% = 425.7\ lbs.$$

$$Quantity\ spilled\ onto\ soil = 473 \times 10\% = 47.3\ lbs.$$

Air emissions of glycol ether are expected to be negligible due to the low vapor pressure and environmental conditions, provided response and cleanup are immediate. Therefore, the quantity spilled onto the soil (50 pounds) should be reported in Section 5.5.4, other disposal. The quantity spilled onto the concrete pad (430 pounds) will need to be added to the quantity of glycol ether directly fed to the incinerator. After accounting for releases of glycol ether to the air from the incinerator (as well as other potential releases - some may be released to water if the facility operates a wet scrubber), the remainder would be reported as treated on site (Section 8.6).

Spills are another pathway for EPCRA Section 313 chemicals to result in reportable releases and other waste management quantities. The total amount of the listed EPCRA Section 313 chemical that leaks or spills should not automatically be reported as released to land. Amounts that may volatilize should be considered a release to air, as well as amounts cleaned up and disposed also need to be considered. However, amounts spilled into containment areas that are directly reused within the same reporting year without requiring treatment prior to reuse are not subject to release reporting. More guidance on calculating releases from spills can be found in EPA's *Estimating Releases and Waste Treatment*

In-Situ Leaching

Less commonly used, *in situ* leaching involves the injection of solutions of chemicals into wells to remove target metals directly from deep-lying deposits of undisturbed ore. Facilities are not required to report as releases to land any EPCRA Section 313 chemicals in the leaching solution that are injected as part of the leaching process. For example, a facility injects a leaching solution into a well. The facility pumps the injected solution back to the surface, and removes the target metals from the solution. The facility reinjects the remaining solution, which may contain remaining amounts of EPCRA Section 313 metals. The facility is not required to report the EPCRA Section 313 chemicals injected into the well as releases to land, provided that the recirculating leaching process continues. However, amounts that escape into surrounding rock are reported in Section 5.5 of Form R, Disposal to Land On-site. Once the process stops, the facility must report any remaining amounts of EPCRA Section 313 metals left in the leaching zone.

Efficiencies for the Toxic Chemical Release Inventory Form.

Other Wastes

Wastes resulting from mining machinery maintenance, and other facility activities are commonly disposed on-site or transferred off-site for disposal. These wastes may include used oil, polychlorinated biphenyls, discarded commercial chemicals, cleaning solvents, filters, empty drums, and general refuse. Although wastes from the extraction and beneficiation (as defined under RCRA, the Resource Conservation and Recovery Act) of ores and minerals, and 20 specific mineral processing wastes (identified in an EPA final ruling) are exempt from RCRA Subtitle C requirements, other wastes produced at metal mining facilities may be subject to RCRA Subtitle C (40 CFR §261.4(b)(7)). Data from waste manifests, waste profiles, and other data collected under RCRA can therefore be used to estimate quantities of EPCRA Section 313 chemicals in wastes subject to RCRA.

4.2.4 Transfers Off-site (Not Including Transfers to POTWs)

Metal mining facilities may also transfer wastes off-site for treatment, disposal, recycling, or energy recovery. Examples of wastes containing EPCRA Section 313 chemicals that metal mining facilities may transfer off-site include:

- Wastes such as solvents sent off-site for energy recovery;
- Wastes containing high concentrations of metals (e.g., wastes from electrowinning) sent off-site for recycling;
- Wastes generated from remediation activities or one-time events unrelated to production (such as a hurricane);
- Wastes subject to RCRA Subtitle C, sent off-site for disposal, incineration, or other management.

Many of the sources of data mentioned previously in this chapter for estimating quantities of EPCRA Section 313 chemicals in wastes can be used to estimate quantities sent off-site. Facilities that transfer RCRA Subtitle C wastes off-site can use waste profiles and waste manifests to estimate quantities of EPCRA Section 313 chemicals in the waste transferred off-site. Operating records, waste analysis, and data generated to meet specifications requested by the off-site location are other sources of data that the facility may use.

The final known disposition of the EPCRA Section 313 chemical in wastes sent off-site for further waste management must be reported. For example, an EPCRA Section 313 metal in a waste solvent is sent off-site for energy recovery. The waste stream as a whole has a sufficient heat value to warrant energy recovery, however the metals do not. Unless the facility has information indicating that the metal will be recycled, assume the metal will be disposed at the off-site location.

APPENDIX A

REPORTING GUIDANCE DOCUMENTS

General Guidance

Air/Superfund National Technology Guidance Study Series, no date.

Internet Availability: None

Hardcopy Availability: NTIS

Order Number: PB96-162-490

Chemicals in Your Community: A Guide to the Emergency Planning and Community Right-To-Know Act, 1993.

Internet Availability: <http://www.epa.gov/swercepp/gen-pubs.html>

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-550-K-93-003

Common Synonyms for Chemicals Listed Under Section 313 of the Emergency Planning and Community Right-To-Know Act, March 1995.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-95-008

Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act and Section 112(r) of the Clean Air Act, as amended (Title III List of Lists), November 1998.

Internet Availability: <http://www.epa.gov/swercepp/gen-pubs.html>

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-550-B-98-017

The Emergency Planning and Community Right-to-Know Act: Section 313 Release Reporting Requirements, December 1997 (brochure).

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-K-97-002

EPCRA Section 313 Questions & Answers, Revised 1998 Version, December 1998.

Internet Availability: <http://www.epa.gov/opptintr/tri>

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-B-99-004

Executive Order 12856 - Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements: Questions and Answers.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-95-011

Interpretations of Waste Management Activities: Recycling, Combustion for Energy Recovery, Treatment for Destruction, Waste Stabilization and Release, April 1997.

Internet Availability: None

Hardcopy Availability: EPCRA Hotline

Order Number: No order number

Standard Industrial Classification Manual, 1987.

Internet Availability: None (see http://www.epa.gov/tdbnrmrl/help/l_help7.htm for codes)

Hardcopy Availability: NTIS

Order Number: PB-87-100-012

Supplier Notification Requirements

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-560-4-91-006

Toxic Chemical Release Inventory Reporting Forms and Instructions (TRI Forms and Reporting Requirements), March 23, 1998

Internet Availability: <http://www.epa.gov/opptintr/tri>

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-K-98-001

Toxic Chemical Release Reporting; Community Right-to-Know; Final Rule, February 16, 1988 (53 FR 4500).

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: None

Trade Secrets Rule and Form, July 29, 1988 (53 FR 28772).

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: None

Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes; A Guidance Manual, April 26, 1994.

Internet Availability: <http://es.epa.gov/oeca/ore/red/wap330.pdf>

Hardcopy Availability: NTIS

Order Number: PB94-963-603

Chemical-Specific Guidance

Emergency Planning and Community Right-to-Know Section 313: Guidance for Reporting Aqueous Ammonia, July 1995.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-95-012

Emergency Planning and Community Right-to-Know Section 313: List of Toxic Chemicals Within the Chlorophenols Category, November 1994.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-B-95-004

Emergency Planning and Community Right-to-Know Section 313: List of Toxic Chemicals, September 1996.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-B-96-002

Guidance for Reporting Sulfuric Acid Aerosols (acid aerosols, including mists, vapors, gas, fog, and other airborne forms of any particle size), March 1998 Revision

Internet Availability: <http://www.epa.gov/opptintr/tri>

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-97-007

List of Toxic Chemicals within the Water Dissociable Nitrate Compounds Category and Guidance for Reporting, May 1996.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-96-004

Toxics Release Inventory: List of Toxic Chemicals Within the Glycol Ethers Category and Guidance for Reporting, May 1995.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-95-006

Toxics Release Inventory: List of Toxic Chemicals Within the Nicotine and Salts Category and Guidance for Reporting, February 1995.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-95-004

Toxics Release Inventory: List of Toxic Chemicals Within the Polychlorinated Alkanes Category and Guidance for Reporting, February 1995.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-95-001

Toxics Release Inventory: List of Toxic Chemicals Within the Polycyclic Aromatics Compounds Category, February 1995.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-95-003

Toxics Release Inventory: List of Toxic Chemicals Within the Strychnine and Salts Category and Guidance for Reporting, February 1995.

Internet Availability: None

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-95-005

Release Estimation Guidance

General

Data Quality Checks to Prevent Common Reporting Errors on Form R/Form A, August 1998.

Internet Availability: <http://www.epa.gov/opptintr/tri>

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-745-R-98-012

Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form, December 1987.

Internet Availability: <http://www.epa.gov/opptintr/tri>

Hardcopy Availability: NCEPI or EPCRA Hotline

Order Number: EPA-560-4-88-002

Releases During Cleaning of Equipment, June 30, 1986.

Internet Availability: None

Hardcopy Availability: Prepared by PEI Associates, Inc. for the U.S. Environmental Protection Agency, Office of Prevention, Pesticides & Toxic Substances, Washington, DC, Contract Bo.

Order Number: 68-02-4248

Air

Chemdat 8/Water 8: Air Emission Models for Waste and Wastewater (for Microcomputers), 1994

Internet Availability: <http://www.epa.gov/ttn/chief/software.html#water8>

Hardcopy Availability: NTIS

Order Number: PB95-503595

Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition (AP-42).

Internet Availability: <http://www.epa.gov/ttn/chief/ap42.html>

Hardcopy Availability: NCEPI

Order Number: EPA-450-AP-425ED

Protocol for Equipment Leak Emission Estimates, 1987.

Internet Availability: <http://www.epa.gov/ttnchief/fyi.html>

Hardcopy Availability: NCEPI

Order Number: EPA-423-R-95-017

Tanks 3: Tanks: Storage Tank Emission Estimation Software, Version 3.0 (for Microcomputers), March 1996

Internet Availability: <http://www.epa.gov/ttn/chief/tanks.html>

Hardcopy Availability: NTIS

Order Number: PB97-500-755

Water

Chemdat 8/Water 8: Air Emission Models for Waste and Wastewater (for Microcomputers), 1994

Internet Availability: <http://www.epa.gov/ttn/chief/software.html#water8>

Hardcopy Availability: NTIS

Order Number: PB95-503595

Information and Document Distribution Centers

Enviro\$en\$e Information Network

BBS modem: (703) 908-2092

User Support: (703) 908-2007

Internet Home Page: <http://es.epa.gov/index.html>

National Center for Environmental Publications and Information (NCEPI)

P.O. Box 42419

Cincinnati, OH 45242

(800) 490-9198

(513) 489-8695 (fax)

Internet Home Page: <http://www.epa.gov/ncepihom/index.html>

National Technical Information Service (NTIS)

5285 Port Royal Road

Springfield, VA 22151

(800) 553-6847

(703) 605-6900 (fax)

Internet Home Page: <http://www.ntis.gov>

OPPT Pollution Prevention (P2)

Internet Home Page: <http://www.epa.gov/opptintr/p2home/index.html>

Pollution Prevention Information Clearinghouse (PPIC)

Mail Code 3404

401 M Street, SW

Washington, DC

(202) 260-1023

(202) 260-0178 (fax)

RCRA, Superfund & EPCRA Hotline

(800) 424-9346 (outside the Washington, DC Area)

(703) 412-9810 (inside the Washington, DC Area)

TDD: (800) 553-7672 (outside the Washington, DC Area)

(703) 412-3323 (inside the Washington, DC Area)

RTK-Net

1742 Connecticut Avenue, NW

Washington, DC 20009-1146

(202) 797-7200

Internet Home Page: <http://www.rtknet.org>

Technology Transfer Network (TTN)

(919) 541-5384 (Help Desk)

Internet Home Page: <http://www.epa.gov/ttn>

EPA Toxic Release Inventory General Information and Guidance

Internet Home Page: <http://www.epa.gov/opptintr/tri>

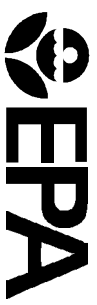
U.S. Government Printing Office (GPO)

(202) 512-1800

(202) 512-2250 (fax)

Internet Availability: <http://www.gpo.gov>

*For the latest list of industry-specific and other technical guidance documents, please refer to the latest version of the *Toxic Chemical Release Inventory Reporting Forms and Instructions, Appendix H*.



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