SECTION 313 REPORTING: ISSUE PAPER

Clarification and Guidance for the Metal Fabrication Industry

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I. INTRODUCTION

This Issue Paper has been prepared to assist establishments in the metal fabricating industry to comply with the reporting requirements of section 313 of the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499). Under section 313, facilities that meet all three of the following criteria are required to report releases to the air, water, and land as well as transfers of wastes containing any listed toxic chemical to off-site locations:

- The facility has 10 or more full-time employees;
- The facility is included in Standard Industrial Classification (SIC) codes 20 through 39 (thus including all metal fabricating establishments grouped under SIC code 34); and
- The facility manufactured (defined to include imported), processed, or otherwise used in the course of a calendar year any listed chemical in quantities greater than the set threshold. The thresholds for manufacturing or processing a listed toxic chemical or chemical category are 25,000 pounds. The otherwise use threshold is 10,000 pounds.

This document includes a clarification of threshold determinations and reporting requirements for metal fabricators which describes, in detail, the more complex issues involved in section 313 reporting. Questions and answers have been selected from the EPA document, Toxic Chemical Release Inventory Questions and Answers (EPA 560/4-90-003), to address reporting issues and problems typically encountered by metal fabricators. Finally, this document contains a list of reference materials and documents that may be of use in obtaining emission factors and other information to develop release estimates.

The following statements represent clarifications of threshold determinations and reporting requirements associated with processing and use of covered toxic chemicals by metal fabricators (for a more thorough explanation of these clarifications, see Section III of this document):

- **Metal alloys are solid mixtures.** Any alloy containing a listed toxic chemical above the de minimis concentration must be evaluated for threshold determinations and release calculations.
- **Metal "articles"** are exempt from threshold determinations if, during normal processing or otherwise use activities, no toxic chemical is released. Neither the disposal of solid wastes that are recognizable as the processed article nor the recycle of wastes constitute releases that would negate the article status of the metal item.

- **Welding metal parts** (e.g., welding of steel plates) requires the facility to determine whether releases occur from the metal items being joined, as well as the toxic chemical components of the welding rods. If no releases occur from the joined metal parts themselves, then only the toxic chemical(s) contained in the welding rods are subject to threshold and release determinations.

- **Fume or dust** is the qualifier for three listed toxic chemicals (aluminum, vanadium, and zinc). Threshold determinations are based on the amount of the chemical manufactured, processed, or otherwise used only as a fume or dust. Zinc compounds, distinct from zinc (fume or dust), are reportable as members of the zinc compound category. Zinc compounds released in particulate form are not considered zinc (fume or dust).

While the information contained in this document is the most up-to-date guidance available from EPA, no new policy information is contained here that is not represented in other EPA documents.

If you have specific circumstances or situations for which you need additional EPA guidance, contact your Regional section 313 coordinator or call the Emergency Planning and Community Right-to-Know Information Hotline at 1-800-535-0202, or in Washington, D.C. and Alaska 202-479-2449.

II. STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODES OF METAL FABRICATION

In general, metal fabricators are classified in the Standard Industrial Classification (SIC) codes of Major Group 34, which includes "Fabricated Metal Products, Except Machinery and Transportation Equipment." The complete listing of SIC codes within this group is provided on the next few pages.

Multiple SIC codes may apply to facilities which perform several types of manufacturing operations. For further information about the classification of establishments, consult the Standard Industrial Classification Manual, (PB 87-100012) published by the Executive Office of Management and Budget. The manual is available for purchase from: National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (703-487-4650).

Major Group 34. Fabricated Metal Products, Except Machinery and Transportation Equipment

This major group includes establishments engaged in fabricating ferrous and nonferrous metal products, such as metal cans, tinware, handtools, cutlery, general hardware, nonelectric heating apparatus, fabricated structural metal products, metal forgings, metal stampings, ordnance (except vehicles and guided missiles), and a variety of metal and wire products, not elsewhere classified.

[Note that: Certain important segments of the metal fabricating industries are classified in other major groups of the SIC code system. These include: machinery in Major Groups 35 and 36; transportation equipment, including tanks, in Major Group 37; professional scientific and controlling instruments, watches, and clocks in Major Group 38; and jewelry and silverware in Major Group 39. Establishments primarily engaged in producing ferrous and nonferrous metals and their alloys are classified in Major Group 33.]

341 METAL CANS AND SHIPPING CONTAINERS

- 3411 Metal Cans
- 3412 Metal Shipping Barrels, Drums, Kegs, and Pails

342 CUTLERY, HANDTOOLS, AND GENERAL HARDWARE

- 3421 Cutlery
- 3423 Hand and Edge Tools, Except Machine Tools and Hardware
- 3425 Saw Blades and Handsaws
- 3429 Hardware, Not Elsewhere Classified

343 HEATING EQUIPMENT, EXCEPT ELECTRIC AND WARM AIR; AND PLUMBING FIXTURES

- 3431 Enameled Iron and Metal Sanitary Ware
- 3432 Plumbing Fixture Fittings and Trim
- 3433 Heating Equipment, Except Electric and Warm Air Furnaces

344 FABRICATED STRUCTURAL METAL PRODUCTS

3441 Fabricated Structural Metal
3442 Metal Doors, Sash, Frames, Molding, and Trim
3443 Fabricated Plate Work (Boiler Shops)
3444 Sheet Metal Work
3446 Architectural and Ornamental Metal Work
3448 Prefabricated Metal Buildings and Components
3449 Miscellaneous Structural Metal Work

345 SCREW MACHINE PRODUCTS, AND BOLTS, NUTS, SCREWS, RIVETS, AND WASHERS

3451 Screw Machine Products
3452 Bolts, Nuts, Screws, Rivets, and Washers

346 METAL FORGINGS AND STAMPINGS

3462 Iron and Steel Forgings
3463 Nonferrous Forgings
3465 Automotive Stampings
3466 Crowns and Closures
3469 Metal Stampings, Not Elsewhere Classified

347 COATING, ENGRAVING, AND ALLIED SERVICES

3471 Electroplating, Plating, Polishing, Anodizing, and Coloring
3479 Coating, Engraving, and Allied Services, Not Elsewhere Classified

348 ORDNANCE AND ACCESSORIES, EXCEPT VEHICLES AND GUIDED MISSILES

3482 Small Arms Ammunition
3483 Ammunition, Except for Small Arms
3484 Small Arms
3489 Ordnance and Accessories, Not Elsewhere Classified

349 MISCELLANEOUS FABRICATED METAL PRODUCTS

3491 Industrial Valves
3492 Fluid Power Valves and Hose Fittings
3493 Steel Springs, Except Wire
3494 Valves and Pipe Fittings, Not Elsewhere Classified
3495 Wire Springs
3496 Miscellaneous Fabricated Wire Products
3497 Metal Foil and Leaf
3498 Fabricated Pipe and Pipe Fittings
3499 Fabricated Metal Products, Not Elsewhere Classified

III. CLARIFICATION OF SECTION 313 POLICY ISSUES OF INTEREST TO THE METAL FABRICATION INDUSTRY

This section of the issue paper provides in-depth descriptions of some of the more complex issues involved in section 313 reporting for the metal fabrication industry.

For some issues, such as de minimis and article exemptions, multiple factors become involved in determining threshold and release information. These issues have generated many inquiries and requests for clarification from facilities, particularly metal fabricators. To help facilities better understand these complex issues, comprehensive written interpretations are provided.

COMPOUNDS AND MIXTURES

1. Definition of Compounds

A "compound" is any combination of two or more chemicals that is the result (in whole or in part) of a chemical reaction. In the formation of a compound, the reactant chemicals loose their individual chemical identities.

2. Definition of Mixtures

A "mixture" is any combination of two or more chemicals, if the combination is not, in whole or in part, the result of a chemical reaction. In a mixture, the individual components retain their identities. Mixtures include any combination of a chemical and associated impurities.

Metal alloys are solid mixtures because the individual metals in the alloy retain their chemical identity. Any such mixture containing a listed toxic chemical at or above the de minimis concentration is subject to threshold determinations. Release of the mixture is considered a release of the toxic chemical(s) contained in the mixture. The quantity of metal released can be estimated based on the percent by weight of each toxic chemical in the mixture.

3. Mixtures Must be Considered for Section 313 Reporting

Threshold and release determinations for section 313 reporting must include the amount of the listed toxic chemical present above the de minimis concentration in all mixtures processed or otherwise used by the facility unless otherwise exempted. If a listed toxic chemical is present in a mixture at or above the de minimis concentration, only the amount of the toxic chemical, and not the mixture itself, is subject to threshold and release determinations.

The distinction between a compound and mixture is important because it affects the amount of the metal which is considered in making threshold determinations and release calculations. If a listed metal is present in an alloy (i.e., solid mixture), only the weight of the listed metal is subject to threshold determinations and release calculations. If a listed metal is present in the form of a listed metal compound (e.g., zinc oxide), the entire weight of the metal compound is subject to threshold determinations for the applicable metal compound category (e.g., zinc compounds), however, release determinations would be calculated for the parent metal only (e.g., pounds of zinc).

4. Supplier Notification and Concentration Ranges Provide Information for Reporting

The section 313 supplier notification requirements are designed to provide chemical users with information on the identities and concentrations of listed toxic chemicals present in the mixtures that they use. There can still be situations, however, when a facility may not have this information for a mixture. If a facility knows that a mixture contains a toxic chemical, but no concentration information is provided by the supplier, then the facility does not have to consider the chemical present in the mixture for purposes of threshold and release determinations. However, if a facility owner/operator only knows the lower bound concentration of a toxic chemical present in a mixture, the owner/operator should base the threshold determination on that lower bound concentration number. If only a range of concentrations is available for a toxic chemical present in a mixture, the owner/operator should use an average of the low and high concentrations numbers for threshold determinations.

SPECIAL QUALIFIER: "FUME OR DUST"

Three listed toxic chemicals (aluminum, vanadium, and zinc) have the qualifier, "fume or dust". When these chemicals are manufactured, processed, or otherwise used, including as part of an alloy, a different approach is used to make threshold determinations. Only the amount of these chemicals that are manufactured, processed, or otherwise used as a fume or dust is subject to threshold determinations. Manufacturing, processing, or otherwise using these chemicals in any other form is not reportable under section 313. Zinc compounds, distinct from zinc (fume or dust), are reportable as members of the zinc compound category. In most cases, only the generation of a fume or dust (i.e., manufacturing) would be a reportable activity, because there are few processing or otherwise use activities that utilize these chemicals in a fume or dust form.

To make threshold determinations for these chemicals, the amount of fume or dust generated for each chemical, including chemicals contained in an alloy mixture, are totalled. Because the chemical is being manufactured into a dust or fume, the manufacturing threshold of 25,000 pounds is applied and the de minimis exemption does not apply.

For example, a facility manufactures metal posts and uses over 150,000 pounds of solid aluminum slabs over the reporting year. During the processing of the aluminum slabs into posts, 11,000 pounds of fumes and dust are generated from the cutting, grinding, and polishing of the aluminum which is either released as fugitive emissions or is disposed in an off-site landfill. For threshold determinations, only the 11,000 pounds of aluminum generated in the form of fume and dust would be applied to the 25,000 pound manufacturing threshold. Therefore, the threshold for aluminum in a fume or dust form is not exceeded and a Form R is not required for this toxic chemical.

CHEMICAL CATEGORIES

1. All Compounds in a Listed Chemical Category are Aggregated for Threshold Determinations

Toxic chemical categories listed under section 313 require a different approach when making threshold and release determinations. For a chemical that is included in a listed metal compound category, the total weight of that chemical compound, not just the parent metal, is used in making threshold determinations. A facility will need to calculate the total weight of all compounds that are in the category, sum the amounts involved throughout the facility in each threshold activity, and compare the totals to the applicable thresholds.

For example, 30,000 pounds of nickel chloride are used in a plating bath during the reporting year. The nickel, which is 40 percent of the compound, is incorporated on steel plates, while the chloride remains in the plating bath. Even though only the nickel is incorporated on the steel plates, the facility is processing nickel chloride, which is a metal compound within the nickel compound category. The total weight of the nickel chloride processed during the reporting year is considered for threshold determinations. Therefore, the facility must submit a Form R for the nickel compound category and must report all releases from nickel compounds in terms of the parent metal, nickel.

A compound in a listed chemical category which is present in a mixture below the de minimis concentration, based on the total weight of the compound in the mixture, is exempt from threshold and release calculations under section 313. Again, all individual members of a chemical category must be totalled to determine if the chemical category has met or exceeded the de minimis concentration in a mixture.

2. Make Threshold Determinations for Listed Toxic Chemicals Separately from the Listed Chemical Category

The section 313 list contains some listed substances that are also members of a listed chemical category. Threshold determinations for a specifically listed toxic chemical are calculated separately from the threshold determinations for the chemical category. For example, C.I. Direct Brown 95 (CAS number 16071-86-6), a copper-based pigment, which is specifically listed on the section 313 list, is also a member of the copper compound category. Because it is specifically listed, a facility must make a threshold determination for C.I. Direct Brown 95 and a separate threshold determination for all other copper compounds that meet the criteria for that metal compound category which are not specifically listed under section 313.

Threshold determinations are calculated separately for a specifically listed metal and compounds that are members of the associated metal compound category. For example, a facility converts 12,000 pounds of lead (processing the listed metal) to form 15,000 pounds of lead oxide (manufacturing the listed compound category). Separate threshold determinations are made for these chemicals and these activities, and, therefore, the 25,000 pound thresholds for processing or manufacturing would not be exceeded for either the lead or the lead compounds.

3. Calculate Releases Based on Parent Metal For Metal Compound Categories

Once a reporting threshold is met for a metal compound category, releases of compounds are calculated based on the pounds of the parent metal released, rather than the total weight of the compound. EPA adopted this approach because it is difficult to calculate releases of potentially numerous compounds within a metal compound category, and because there are often methods and data for monitoring the parent metal but not the compound(s).

4. Optional Form R Submission for Parent Metal and Associated Metal Compound Category

If both the parent metal and the associated metal compound category exceed their respective thresholds, one section 313 reporting Form R may be filed, which covers all releases of the parent metal from activities involving both the parent metal and the metal compound category. This approach of reporting releases on a single Form R may be easier for facilities whose operations involve conversions between the listed metal and members of a listed metal compound category. For example, if a facility processes 30,000 pounds of lead and otherwise uses 13,000 pounds of lead oxide, the facility could submit one Form R for lead and lead compounds. On this Form R, the facility would report on all activities involving lead and lead compounds and all releases of the parent metal, lead. This option, preferred by EPA, is available to facilities, although separate reports may be filed if desired.

DE MINIMIS EXEMPTION

The de minimis exemption allows facilities to discount certain minimum concentrations of listed toxic chemicals in mixtures they process or otherwise use in threshold and release determinations for section 313 reporting. This de minimis level is 0.1 percent by weight for OSHA defined carcinogens and 1 percent by weight for all other section 313 listed toxic chemicals. De minimis levels for chemical categories apply to the total concentration of all chemicals in the category within a mixture, not the concentration of each individual category member within the mixture.

1. Processing or Use of a Mixture

If a listed toxic chemical is present in a mixture at a concentration below the de minimis level, this amount of the toxic chemical is not subject to threshold determination, release reporting, or supplier notification requirements.

For processes where the chemical concentration fluctuates above and below the de minimis level, the de minimis exemption applies to the process stages where the de minimis level is not exceeded. This application is further described in the general section of the Toxic Chemical Release Inventory Reporting Form R and Instructions document (EPA 560/4-90-007).

2. Manufacture of the Listed Chemical in a Mixture

The de minimis exemption **does not apply** to manufacture of a toxic chemical. One exception applies to the toxic chemical which is created (manufactured) as an impurity and remains in the product distributed in commerce at below the de minimis levels; the amount remaining in the product is exempt from threshold determinations. However, any amount that is separated from the product (e.g., ends up in a wastestream) is subject to threshold and release determinations regardless of the concentration in the wastestream.

Example of Coincidental Manufacture as a Waste Byproduct:

> A small amount of aluminum fumes is manufactured as a reaction byproduct during an arc welding process. The aluminum fumes are collected as a waste and disposed on site. Aluminum (fume or dust) is a listed toxic chemical under section 313. The amount of aluminum fumes generated and removed as waste must be included in threshold and release determinations, even if the aluminum fumes were present below the de minimis level in the process stream where it was manufactured or in the wastestream to which it was separated.

The de minimis exemption also does not apply to situations where the manufactured chemical is released or transferred to waste streams and thereby diluted to below the de minimis level.

3. De Minimis Levels Impact Supplier Notification Requirements

If the toxic chemical in a product (mixture or trade name product) is present below the de minimis level for that toxic chemical, supplier notification is not required for that chemical in the mixture.

ARTICLE EXEMPTION

Listed toxic chemicals contained in articles that are processed or otherwise used are exempt from threshold determinations. Manufacturing an article is not exempt. For a material to be exempt as an article, an item must meet all of the following three criteria in the section 313 article definition; that is, the item must be one:

i) Which is formed to a specific shape or design during manufacture;

ii) Which has end use functions dependent in whole or in part upon its shape or design during end use; and

iii) Which does not release a toxic chemical under the normal conditions of processing or otherwise use of the item at the facility.

If, as a result of processing or otherwise use, an item retains its initial thickness or diameter, in whole or in part, then it meets the first part of the definition. If the item's basic dimensional characteristics are totally altered during processing or otherwise use, the item would not meet the first part of the definition. An example of items that do not meet the definition would be items which are cold extruded, such as lead ingots formed into wire or rods.

However, cutting a manufactured item into pieces which are recognizable as the article does not change the original exemption as long as the diameter and the thickness of the item remain the same and no release of the toxic chemical occurs. For example, metal wire may be bent or cut into smaller pieces and sheet metal may be cut, punched, stamped, or pressed without losing the article status as long as there is no change in the diameter of the wire or the thickness of the sheet metal.

An important aspect of the article exemption is the criteria for what constitutes a release of a toxic chemical. Any processing or use of an article that results in generation of a waste containing the chemical is considered a release which negates the exemption. Cutting, grinding, melting, or other processing of a manufactured item could result in a release of a toxic chemical during normal conditions of use and, therefore, negate the item's exemption as an article.

A facility which receives an article for further processing that incorporates a toxic chemical into the article may retain the exemption for the article. However, the toxic chemical incorporated into the article will not be exempt. For example, a facility that receives steel bolts (articles)

and plates them with chromium (processing). The bolts retain the exemption as an article, however, the use of chromium does not meet the definition of an article and, therefore, is subject to threshold and release determinations.

However, there are two circumstances for which releases may not negate the exemption of the item as an article:

- If the resulting waste containing a listed toxic chemical is 100 percent recycled or reused, on-site or off-site, then the article exempt status is maintained. For section 313 purposes, wastes containing toxic chemicals are not reportable on Form R if the toxic chemical(s) in the waste is reused or recycled, on-site or off-site.

- If the processing or otherwise use of all similar manufactured items results in a total release of less than 0.5 pound of a toxic chemical to any environmental media in a calendar year, EPA will allow this release quantity to be rounded to zero and the manufactured items remain exempt as articles. Facilities should round off and report all estimates to the nearest whole number. The 0.5 pound limit does not apply to each individual article, but applies to the sum of all releases of a toxic chemical from the processing or otherwise use of all like articles.

REUSE AND RECYCLE EXCEPTIONS

Reuse or recycling of a listed toxic chemical can impact threshold determinations, article exemption status, reporting of off-site transfers, and supplier notification.

1. Processing or Otherwise Use of Toxic Chemicals in an On-Site Recycle/Reuse Operation May Be Exempt From Threshold Determinations

Quantities of a toxic chemical that are present in an on-site recycle/reuse operation at the beginning of the reporting year are not counted toward a threshold determination for that reporting year. This exemption prevents the facility from counting the same amount of a toxic chemical every time it cycles through the on-site operation. However, the amount of a toxic chemical that is newly added to a process system during the reporting year is counted in the threshold determination.

For example, a facility purchases 24,600 pounds of copper sheets for its decorative mail box manufacturing operation. As part of this operation, all the copper sheets are cut, grinded and polished, negating the copper sheets' exemption as an article. In addition, the facility processes 500 pounds of copper ingots into wire which the facility sells to an electronics firm. However, this 500 pounds of copper ingots was obtained by on-site reuse of scrap copper generated in the form of shavings and dust from the decorative mail box manufacturing operation. The scrap copper was melted and reformed

into ingots and the facility cold extruded the ingots into the copper wire. Despite the reuse of the copper, only 24,600 pounds of copper would be applied to the processing threshold determination. Therefore, the facility does not exceed the processing threshold for copper.

2. Article Status Is Maintained If All Releases Are Reused or Recycled

An important aspect of the article exemption is the criteria for what constitutes a release of a toxic chemical. Any processing or otherwise use of an article that results in generation of a waste containing the toxic chemical can be considered a release which negates the article exemption. Cutting, grinding, melting, or other processing or use of a manufactured item could result in a release of a toxic chemical during normal conditions of use, and therefore, could negate the exemption as an article. However, if the resulting waste containing a listed toxic chemical is 100 percent recycled or reused, on-site or off-site, then the article status is maintained and no section 313 reporting would be required for that toxic chemical. Wastes containing toxic chemicals are not reportable under section 313 if the toxic chemical contained in the waste is reused or recycled, on-site or off-site.

3. Do Not Report Amounts Sent Off-Site for Reuse or Recycling As Off-Site Transfers

If a toxic chemical is sent off-site for purposes of reuse or recycling, the location and amount of the chemical do not have to be reported on Form R as an off-site transfer. EPA requires the identification of all other toxic chemicals in wastes which are transferred off-site for final disposal. Off-site reuse or recycling activities, however, are more closely related to facility products distributed in commerce.

4. Supplier Notification Applies to Chemicals Sent Off-Site for Reuse or Recycling

While the off-site location to which a toxic chemical is sent for reuse or recycling does not have to be reported on Form R, supplier notification is still required to be provided to the off-site location, if the location is a manufacturing facility in SIC codes 20-39 or a facility that distributes to facilities in SIC codes 20-39.

ESTIMATING EMISSIONS FROM METAL WELDING AND OXYGEN CUTTING OPERATIONS

Metal fabrication facilities that conduct welding operations will need to estimate emissions that occur from these operations. When making a threshold determination, the facility uses the total weight of the metal being processed not just the immediate area being cut. First, the facility will need to determine if emissions are occurring from the metals being welded, in addition to emissions from the welding rods used in the welding process. Releases of listed toxic chemicals and chemical categories must be estimated for welding operations both to develop fugitive air release data and to identify whether the releases from the base material exceed 0.5 pounds per year and therefore negate the article status of the material welded.

The materials contained in the welding rod or electrode will make up much of the release from welding activities. However, oxyacetylene and oxymethane cutting of metals will produce emissions primarily from the base material (i.e., the material being welded). The method for developing emission estimates is, therefore, strongly dependent on the type of operation performed.

Metal Welding Releases

The amount of each section 313 listed metals released from welding rods may be estimated as follows:

$$\begin{array}{l}\text{release of listed metal (lbs/year)} \\ \text{number of rods used during year (rods/year)} \\ \text{weight of the rod that is consumed or deposited } \left(\frac{\text{lbs of material deposited}}{\text{rod used}}\right) \\ \text{emission factor } \left(\frac{\text{lbs of chemical}}{\text{tons material deposited}}\right) \\ \text{conversion factor } \left(\frac{1 \text{ ton}}{2000 \text{ lbs}}\right)\end{array} = \text{number of rods used} \times \text{weight of the rod that is consumed or deposited} \times \text{emission factor} \times \text{conversion factor}$$

Emission factors for section 313 listed metals applicable to several types and classes of electrodes are provided in the tables that follow. These data represent average fume generation rates and percent metal in the fume taken from Tables 2.2 and 2.18 from Fumes and Gases in the Welding Environment (see bibliography).

If the electrodes your facility uses are not listed, you may use emission factors for a similar electrode and adjust the calculated release values based on the composition of the electrodes you use.

Electrode composition information for development of welding release estimates can often be obtained from Material Safety Data Sheets, manufacturer's specifications, and American Welding Society (AWS) Electrode Specifications. Flux composition is often considered proprietary so only the composition of the weld deposit is provided for many covered or flux cored electrodes.

Shielded Metal Arc Covered Electrodes (5/32")
Carbon and Low Alloy Steel

Electrode class	Average fume generation rate, g/kg*	% 313 metal in fumes				lbs 313 metal released per tn total metal deposited			
		Mn	Ni	Cu	Cr	Mn	Ni	Cu	Cr
E6010	35.9	3.2				2.3			
E6013	20.	4.9				2.0			
E7018	21.1	4.1				1.8			
E7024	10.0	6.2				1.2			
E8018 C3	16.9	7.2				1.2			

Shielded Metal Arc Covered Electrodes (5/32")
Stainless Steel and High Alloy

Electrode class	Average fume generation rate, g/kg*	% 313 metal in fumes				lbs 313 metal released per tn total metal deposited			
		Mn	Ni	Cu	Cr	Mn	Ni	Cu	Cr
E316-15	9.6	7.7	1.1		5.8	1.5	0.2		1.1
E316-16	9.2	8.8	1.5		6.5	1.6	0.3		1.2
E410-16	12.9	5.2	<0.1			1.3	<0.02		
ENi-CI	12.9	0.3	6.9	<0.1		0.1	1.8	<0.02	
ENi-Cu2	10.1	2.1	4.2	6.2		0.4	0.8	1.2	
Inconel 625	9.2	4.6	0.7	5.9		0.8	0.1	1.1	
Haynes C-276	14.2	0.3	1.1		2.5	0.1	0.3		0.7
Haynes 25	8.9	4.6	1.8		6.9	0.8	0.3		1.2

Flux Cored Electrodes (3/32")
Carbon and Low Alloy Steel

Electrode class	Average fume generation rate, g/kg*	% 313 metal in fumes				lbs 313 metal released per tn total metal deposited			
		Mn	Ni	Cu	Cr	Mn	Ni	Cu	Cr
E70T-1	12.1	9.2				2.2			
E70T-4	13.3	3.9	<0.01			0.8			
E70T-5	21.0	11.1				4.7			

Flux Cored Electrodes (3/32")
Stainless Steel

Electrode class	Average fume generation rate, g/kg*	% 313 metal in fumes				lbs 313 metal released per tn total metal deposited			
		Mn	Ni	Cu	Cr	Mn	Ni	Cu	Cr
E316LT-3	9.6	7.3	1.1		12.5	1.4	0.2		2.4

* g/kg = grams of fume per kilogram of total deposited metal.

Gas Metal Arc Solid Electrodes (0.045")
Carbon Steel

Electrode class	Average fume generation rate, g/kg*	% 313 metal in fumes				lbs 313 metal released per tn total metal deposited			
		Mn	Ni	Cu	Cr	Mn	Ni	Cu	Cr
E70S-3	5.1	5.3		0.7		0.5		0.1	
E70S-5	4.0	5.8		1.8		0.5		0.1	

Gas Metal Arc Solid Electrodes (0.045") (0.035" for Haynes C-276)
Stainless Steel and High Alloy

Electrode class	Average fume generation rate, g/kg*	% 313 metal in fumes				lbs 313 metal released per tn total metal deposited			
		Mn	Ni	Cu	Cr	Mn	Ni	Cu	Cr
ERNiCu-7	2.0	1.1	22.1	44.4	<0.01	0.04	0.9	1.8	
Inconel 625	0.9		27.2	0.7	15.4		0.5	0.01	0.3
Haynes 25	1.4	15.4	7.1		14.9	0.4	0.2		0.4
Haynes C-276	7.0	1.0	32.5		8.2	0.1	4.6		1.2

Gas Metal Arc Solid Electrodes (3/64")
Aluminum.

Electrode class	Average fume generation rate, g/kg*	% aluminum in fumes	lbs aluminum released per ton total metal deposited
ER4043	10.7	46.2	9.9
ER5356	72.3	38.0	54.9

Gas Metal Arc Solid Electrodes (0.045")
Copper

Electrode class	Average fume generation rate, g/kg*	% copper in fumes	lbs copper released per ton total metal deposited
ERCu	4.9	66.0	6.5
ERCuAl-A2	8.1	70.5	11.4

* g/kg = grams of fume per kilogram of total deposited metal.

Oxygen Cutting Releases

The following release rates are based on information contained in Fumes and Gases in the Welding Environment (see bibliography). The values shown are calculated based on the percent metal in the fume and a fume generation rate of 2.1 grams per meter for oxyacetylene cutting and 0.037 grams per inch for oxymethane cutting. Releases are affected by the percent of the listed section 313 chemical present in the metal. The values for carbon steel are presented below.

Release rates for oxyacetylene cutting were found to increase and decrease proportionally with changing plate thickness (e.g., cutting a 2 inch plate would result in twice the release rate shown in the table below). Rates of release for oxymethane cutting are independent and not affected by plate thickness.

		Oxyacetylene Cutting of Carbon Steel	Oxymethane Cutting of Carbon Steel
Listed Section 313 Metal	Percent Metal in Fume	lbs 313 metal emitted per million feet of cut plate (1" thick)	lbs 313 metal emitted per million feet of cut plate (1" thick)
Ba	0.01	0.14	0.1
Mn	0.3	4.2	2.9
Cr	0.2	2.8	2.0
Ni	0.05	0.7	0.5
Al	0.02	0.3	0.2
V	<0.01	<0.14	<0.1
Cu	0.1	1.4	1.0
Zn	<0.1	<1.4	<1.0
Co	0.02	0.3	0.2

Total annual releases of each of the listed section 313 chemicals in the plate would be found by multiplying the emission factor by the total amount of cut plate (in million feet/year).

ESTIMATING EMISSIONS FOR SOLVENT DEGREASING OPERATIONS

Many facilities use organic solvents to remove grease, oil, loose metal chips, and dirt from metal products, equipment, and tools. In the process of degreasing, organic solvents may be intermixed with air, heated to boiling, or agitated which will cause the solvent to volatilize. Many organic solvents used in degreasing are listed under section 313 (e.g., methyl chloride, perchloroethylene, trichloroethylene, methyl chloroform, trichlorotrifluoroethane). Facilities that use an organic solvent degreaser containing a toxic chemical must estimate emissions if the reporting threshold for otherwise use (10,000 pounds per calendar year) has been exceeded for that chemical.

Emission estimates may be calculated from the following information:

- Emission factors to translate activity information into fugitive emission estimates;
- Facility activity rate or volume information (e.g., amount of product produced, fuel used); and
- Efficiency information on emission control devices to allow estimation of net releases to the air after emissions pass through control devices.

The basic fugitive emission estimation formula is:

$E = R \times EF \times (1 - C/100)$,
where E is the emission estimate for the source, R is the facility activity rate or volume, EF is the emission factor, and C is the control devices efficiency.

The table on the following pages has been excerpted from Toxic Air Pollutant Emissions Factors - A Compilation For Selected Air Toxic Compounds And Sources (EPA-450/2-88-006a), and contains information on the following section 313 substances: trichlorotrifluoroethane, trichloroethylene, methyl chloride, perchloroethylene, and methyl chloroform. For each type of degreasing operation, the table provides a brief description of the specific solvent degreasing process and the relevant Standard Industrial Code (SIC Code) if available, the emission source and appropriate Source Category Code (SCC), the chemical name and CAS number of the emitted pollutant, the estimated emission factor, and relevant notes. These emission factors should only be used if no site-specific or otherwise more accurate data is available to the facility.

Pollutant emission factors are provided in terms of mass of pollutant per mass of product produced, generally kilogram per kilogram (kg/kg), and were derived from a variety of methods, such as source tests, theoretical calculations, or a combination of the two; so that there is considerable variation in the quality of the emission factors presented. These estimates are further clarified by the identification of emission reduction techniques or controls in place within the degreasing operation used to develop these emission factors. The notes column provides details on methodology and assumed pollution reduction techniques.

INDUSTRIAL PROCESS	SIC CODE	EMISSION SOURCE	SCC	POLLUTANT	CAS NUMBER	EMISSION FACTOR	NOTES
Degreasing operations using MC		Open top vapor degreasers	40100204	Methylene chloride	75092	0.93 kg emit./kg fresh (virgin) MC used	Uncontrolled, considers recycle, material balance
Degreasing operations using MC		Open top vapor degreasers	40100204	Methylene chloride	75092	0.89 kg emit./kg fresh (virgin) MC used	Controlled by refrigerated freeboard chiller, considers recycle, material balance
Degreasing operations using MC		Conveyorized vapor degreaser	40100224	Methylene chloride	75092	0.96 kg emit./kg fresh (virgin) MC used	Uncontrolled, considers recycle, material balance
Degreasing operations using MC		Conveyorized vapor degreaser	40100224	Methylene chloride	75092	0.91 kg emit./kg fresh (virgin) MC used	Controlled by carbon adsorber or refrigerated freeboard chiller, considers recycle, material balance
Degreasing operations using MC		Cold cleaners	40100302	Methylene chloride	75092	0.89 kg emit./kg fresh (virgin) MC used)	Uncontrolled, considers recycle, based on material balance
Degreasing operations using MC		Cold cleaners	40100302	Methylene chloride	75092	0 87 kg emit./kg fresh (virgin) MC used	Controlled = 0.7 freeboard ratio + drainage rack with 15 second drain time, considers recycle, material balance
Degreasing operations using MC	7530	Carburator cleaners	40100302	Methylene chloride	75092	0.89 kg emit./kg fresh (virgin) MC used	Uncontrolled, considers recycle, material balance
Degreasing operations using MC	7530	Carburator cleaners	40100302	Methylene chloride	75092	0.76 kg emit./kg fresh (virgin) MC used	Controlled by water cover, considers recycle, material balance
Degreasing operations using PCE		Open top vapor degreasers	40100203	Perchloro-ethylene	127184	0.93 kg/kg of fresh (virgin) PCE used	Uncontrolled, based on material balance
Degreasing operations using PCE		Open top vapor decreasers	40100203	Perchloro-ethylene	127184	0.89 kg/kg of fresh (virgin) PCE used	Controlled by refrigerated freeboard chiller, based on material balance
Degreasing operations using PCE		Conveyorized vapor degreaser	40100223	Perchloro-ethylene	127184	0.96 kg/kg of fresh (virgin) PCE used	Uncontrolled, based on material balance
Degreasing operations using PCE		Conveyorized vapor degreaser	40100223	Perchloro-ethylene	127184	0.91 kg/kg of fresh (virgin) PCE used	Controlled by carbon adsorber or refrigerated freeboard chiller, based on material balance
Degreasing operations using PCE		Cold cleaners	40100304	Perchloro-ethylene	127184	0.78 kg/kg of fresh (virgin) PCE used	Uncontrolled, based on material balance
Degreasing operations using PCE		Cold cleaners	40100304	Perchloro-ethylene	127184	0.76 kg/kg of fresh (virgin) PCE used	Controlled by 0.7 freeboard ration and drainage rack with 15 second drain time, based on material balance

INDUSTRIAL PROCESS	SIC CODE	EMISSION SOURCE	SCC	POLLUTANT	CAS NUMBER	EMISSION FACTOR	NOTES
Degreasing operations using TCE		Open top vapor degreasers	40100205	Trichloro-ethylene	79016	0.93 kg/kg fresh (virgin) TCE used	Uncontrolled, based on material balance
Degreasing operations using TCE		Open top vapor degreasers	40100205	Trichloro-ethylene	79016	0.89 kg/kg fresh (virgin) TCE used	Controlled by above or below freezing refrigerated freeboard chiller, based on material balance
Degreasing operations using TCE		Conveyorized vapor degreaser	40100225	Trichloro-ethylene	79016	0.96 kg/kg fresh (virgin) TCE used	Uncontrolled, based on material balance
Degreasing operations using TCE		Conveyorized vapor degreaser	40100225	Trichloro-ethylene	79016	0.91 kg/kg fresh (virgin) TCE used	Controlled by carbon absorber or refrigerated freeboard chiller, based on material balance
Degreasing operations using TCE		Cold cleaners	40100306	Trichloro-ethylene	79016	0.84 kg/kg fresh (virgin) TCE used	Uncontrolled, based on material balance
Degreasing operations using TCE		Cold cleaners	40100306	Trichloro-ethylene	79016	0.82 kg/kg fresh (virgin) TCE used	Controlled by 0 7 freeboard ratio and drainage rack with 15 second drain time, based on material balance
Degreasing operations using methyl chloroform		Entire process		Dioxane, 1,4-	123911	0.03 lb/ton methyl chloroform	Based on 3 percent weight in methyl chloroform
Degreasing operations using methyl chloroform		Cold cleaner		Methyl chloroform	71556	0.86 kg/kg (fresh) virgin solvent used	Uncontrolled, considers recycle, based on material balance
Degreasing operations using methyl chloroform		Cold cleaner		Methyl chloroform	71556	0.84 kg/kg (fresh) virgin solvent used	Controlled by 0.7 freeboard ratio + drainage rack with 15 second drain time, considers recycle, based on material balance
Degreasing operations using methyl chloroform		Open top vapor degreasers	40100202	Methyl chloroform	71556	0.93 kg/kg (fresh) virgin solvent used	Uncontrolled, considers recycle, based on material balance
Degreasing operations using methyl chloroform		Open top vapor degreasers	40100202	Methyl chloroform	71556	0.89 kg/kg (fresh) virgin solvent used	Controlled by refrigerated freeboard chiller, considers recycle, based on material balance
Degreasing operations using methyl chloroform		Conveyorized vapor degreaser	40100222	Methyl chloroform	71556	0.96 kg/kg (fresh) virgin solvent used	Uncontrolled, considers recycle, based on material balance
Degreasing operations using methyl chloroform		Conveyorized vapor degreaser	40100222	Methyl chloroform	71556	0.91 kg/kg (fresh) virgin solvent used	Controlled by carbon adsorber or refrigerated freeboard chiller, considers recycle, material balance

INDUSTRIAL PROCESS	SIC CODE	EMISSION SOURCE	SCC	POLLUTANT	CAS NUMBER	EMISSION FACTOR	NOTES
Degreasing operations using trichloro-trifluoroethane		Cold cleaner		Trichlorotri-fluoroethane	761131	0.88 kg/kg fresh (virgin) solvent used	Uncontrolled, considers recycle, based on material balance
Degreasing operations using trichlorotri-fluoroethane		Cold cleaner		Trichlorotri-fluoroethane	761131	0.86 kg/kg fresh (virgin) solve used	Controlled = 0.7 freeboard ratio + drainage rack with 15 second drain time, considers recycle, material balance
Degreasing operations using trichlorotri-fluoroethane		Open top vapor degreasers	40100207	Trichlorotri-fluoroethane	761131	0.93 kg/kg fresh (virgin) solvent used	Uncontrolled, considers recycle, based on material balance
Degreasing operations using trichlorotri-fluoroethane		Open top vapor degreasers	40100207	Trichlorotri-fluoroethane	761131	0.89 kg/kg fresh (virgin) solvent used	Controlled by refrigerated freeboard chiller, considers recycle, based on material balance
Degreasing operations using trichlorotri-fluoroethane		Conveyorized vapor degreasers	40100298	Trichlorotri-fluoroethane	761131	0.96 kg/kg fresh (virgin) solvent used	Uncontrolled, considers recycle, based on material balance
Degreasing operations using trichlorotri-fluoroethane		Conveyorized vapor degreaser	40100298	Trichlorotri-fluoroethane	761131	0.91 kg/kg fresh (virgin) solvent used	Controlled by carbon adsorber or refrigerated freeboard chiller, considers recycle, material balance

Source: Toxic Air Pollutant Emission Factors -- A Compilation for Selected Air Toxic Compounds and Sources, EPA 450/2-88-006a. Office of Air Quality Planning and Standards. October 1988. NTIS PB 89-135644.

ESTIMATING EMISSIONS FROM CHROMIUM ELECTROPLATING OPERATIONS

Chromium electroplating and anodizing operations range in size from small shops, with one or two tanks that are operated only a few hours per week, to large shops with several tanks that are operated 24 hours a day, 7 days a week. These operations can also be separated into captive shops that are part of a larger manufacturing operation, or job shops that perform these services for many different clients.

Electroplating consists of the immersion of the base item into a plating solution, and the passing of a direct current through the solution, causing a metal to deposit out of the solution and onto the item. There are two types of electroplating: hard, in which a relatively thick layer of chromium is deposited directly on the base metal (usually steel) for use in engine components, marine hardware, plastic molds, zinc die castings, industrial rolls, and hydraulic cylinders and rods; and decorative, in which the base material is plated with a layer of nickel prior to the addition of a relatively thin layer of chromium, for use in automotive trim, metal furniture, bicycles, hand tools, and plumbing fixtures.

Chromic acid anodizing consists of the immersion of the base metal, usually aluminum, in a chromic acid solution and the application of electricity to produce a film of chromium deposit on the base metal, for use in aircraft parts and architectural structures that are subject to high stress and corrosion.

Emissions of chromic acid mist occur due to the inefficiency of the hexavalent chromium plating process. Only about ten to twenty percent of the electric current applied to the solution is actually used in the deposition of the chromium on the item. The vast majority of the electric current is consumed in the evolution of hydrogen gas, with the resultant liberation of gas bubbles, which burst at the surface of the plating solution, forming a fine mist of chromic acid droplets.

The table on the following pages has been excerpted from Locating and Estimating Air Emissions from Sources of Chromium (Supplement) (EPA-450/2-89-002), and presents uncontrolled emission data for twelve chromium plating operations -- ten hard (Plants A - J) and two decorative (Plants K and L). Process parameters (chromic acid concentration and temperature of the plating baths) were monitored, and appeared to be representative of typical operation values for conventional chromium plating operations. These emission factors should only be used if no site specific or otherwise more accurate data is available to the facility.

Based on this test data, an uncontrolled emission factor of 10 milligrams of hexavalent chromium per ampere-hour (mg/Ah) (0.15 grain per ampere-hour [gr/Ah]) is considered to be representative of uncontrolled emissions from a hard chromium electroplating operation. An uncontrolled hexavalent emission factor of 2 mg/Ah (0.03 gr/Ah) is considered to be representative of uncontrolled emissions from a decorative chromium electroplating operation. (A more conservative estimate was selected for this emission factor due to the limited data available).

UNCONTROLLED EMISSION DATA FOR TOTAL AND HEXAVALENT CHROMIUM FROM CHROMIUM PLATING OPERATIONS[a]

Plant	Process Conditions: No. of Tanks	Process Conditions: Total Tank Surface Area, m^2 (ft^2)	Process Conditions: Ampere-Hours	Actual Gas Flow Rate, m^3/min (ft^3/min)	Mass Emission Rate, kg/h (lb/h): Total Cr	Mass Emission Rate, kg/h (lb/h): Cr^{+6}[b]	Process Cr^{+6} Emission Rate, mg/A•h (gr/A•h)
Hard chromium plating							
Plant A[b,32]	1	5.8 (63)	14,000	226 (7,970)	0.029 (0.064)	0.026 (0.057)	4.0 (0.06)
Plant B[c,33]	2	2.5 (27)	14,400	152 (5,390)	0.008 (0.018)	0.015 (0.033)	3.2 (0.05)
Plant C[d,34]	4	8.4 (90)	20,000	339 (12,000)	[e]	0.039 (0.085)	4.6 (0.07)
Plant D[c,35]	1	5.2 (56)	19,800	177 (6,260)	0.076 (0.167)	0.076 (0.168)	9.1 (0.14)
Plant E[c,36]	1	3.4 (37)	11.700	190 (6,670)	[e]	0.031 (0.069)	6.3 (0.10)
Plant F[f,37]	1	1.8 (20)	12,200	128 (4,540)	[e]	0.083 (0.183)	16.3 (0.25)
Plant G[c,38]	1	1.4 (1.5)	8,900	95 (3,360)	[e]	0.024 (0.053)	6.5 (0.10)
Plant H[c,39]	1	5.5 (60)	3,440	242 (8,540)	0.009 (0.019)	[g] [g]	3.6 (0.06)[h]
Plant I[i,40]	2	9.0 (99)	8,530	290 (10,300)	0.100 (0.221)	0.090 (0.199)	22.5 (0.35)

(continued)

Plant	Process Conditions: No. of Tanks	Process Conditions: Total Tank Surface Area, m^2 (ft^2)	Process Conditions: Ampere-Hours	Actual Gas Flow Rate, m^3/min (ft^3/min)	Mass Emission Rate, kg/h (lb/h): Total Cr	Mass Emission Rate, kg/h (lb/h): Cr^{+b}	Process Cr^{+6} Emission Rate, mg/A•h (gr/A•h)
Plant J[c,41]	3	6.6 (71)	8,790	512 (18,100)	0.044 (0.097)	0.046 (0.102)	15.5 (0.24)
Average							9.8 (0.15)
Decorative chromium plating							
Plant K[c,42]	1	22.6 (240)	97,000	683 (24,100)	[e]	0.066 (0.145)	2.0 (0.03)
Plant L[c,43]	1	2.9 (30.8)	6,500	70 (2,470)	[e]	0.004 (0.008)	1.3 (0.02)
Average							1.6 (0.02)

[a] All tests were performed by EPA except for the Plant H test which was performed b the Naval Energy and Environmental Support Activity, Port Hueneme, California.
[b] Ampere-hour and mass emission rate values are based on an average of four test runs.
[c] Ampere-hour and mass emission rate values are based on an average of three test runs.
[d] Ampere-hour and mass emission rate values are based on an average of six test runs.
[e] Total chromium emissions were not determined.
[f] Ampere-hour and mass emission rate values are based on an average of five test runs.
[g] Hexavalent chromium emissions were not reported.
[h] Not included in average value because data are based on total chromium.
[i] Ampere-hour and mass emission rate values are based on an average of 11 test runs.

Chromic Acid Anodizing Operations

An uncontrolled emission factor of 0.0006 kilogram of hexavalent chromium per hour per square foot of tank surface (0.00012 pound per hour per square foot of tank surface area) is appropriate to characterize emissions from chromic acid anodizing.

Source: Locating and Estimating Air Emissions from Sources of Chromium (Supplement). EPA 450/2-89-002. August 1989.

IV. SELECT QUESTIONS AND ANSWERS ON PROBLEMS FACED BY THE METAL FABRICATION INDUSTRY

[Note: The numbers next to the questions refer to their location in the EPA document Toxic Chemical Release Inventory Questions and Answers: 1990 Update (EPA 560/4-90-003).]

DETERMINING WHETHER OR NOT TO REPORT: FACILITY

45. Must a facility include welding rods, solders, and the metals being joined during a welding or soldering job in threshold determination?

Yes, however, if no releases occur from the joined metal parts themselves they may be considered articles and only the welding rods or solder must be assessed for threshold purposes.

49. If a facility manufactures 19,000 pounds, processes 18,000 pounds, and imports 7,000 pounds of chemical X during 1989, is it required to report for chemical X?

For 1989, the facility would have to report chemical X because it would have exceeded the manufacture threshold of 25,000 pounds (19,000 (manufacturing) + 7,000 (importing) = 26,000). Note that importing is the equivalent of manufacturing and therefore the amounts must be added together for threshold determinations.

53. An airplane engine repair shop (generally SIC 7699) owns an "auxiliary" facility at a separate location that does metal plating (generally SIC 3471 -- Plating of Metals and Formed Products). Would the plating facility be exempt?

According to the SIC code manual, this plating facility would not be "auxiliary" but would be considered a separate operating establishment conducting a manufacturing activity. It would, therefore, need to make the employee and activity threshold determinations and report, if appropriate, because it falls between SIC codes 20-39.

DETERMINING WHETHER OR NOT TO REPORT: LISTED CHEMICALS

57. We use a chemical with a CAS number not on the list of section 313 toxic chemicals. There are similar chemicals on the list, but none with the same CAS number. How can I be sure I don't have to report?

As a general rule, the facility should focus on the available CAS number of chemicals present at the facility and compare them to the CAS number listing of reportable sections 313 chemicals. Be aware, however, that a complex mixture, such as naphtha, has a specific CAS numbers itself, but may also be composed of listed section 313 chemicals. Therefore, the facility should use all available information at the facility, not just the CAS number, when attempting to identify reportable chemicals in materials. Also, certain specific chemicals (e.g., copper chloride) may not appear in the CAS number list but are reportable under a compound category listing (e.g., copper compounds).

59. A facility processes aluminum, vanadium, and zinc. These three chemicals are listed under section 313 with the qualifier "fume or dust." Is this processing operation subject to reporting?

If the processing of these substances generated (i.e., manufactured) any fume or dust during its operation or if the three substances were processed or otherwise used, at any time, as a fume or dust in the operation, the processing would constitute a reportable use of a listed section 313 toxic chemical. The manufacturing, processing, or otherwise use of these substances in fume or dust form would be subject to threshold determinations.

60. If an item on the section 313 list incorporates chemicals with multiple CAS numbers (e.g., nickel compounds), how is the CAS number of the item described?

Do not enter a CAS number in such cases. Instead, enter NA in the space for the CAS number in Part III, Section 1.2 of Form R. The individual chemical members of a listed category are not required to be, and should not be, identified in the report.

61. Do the chemical categories such as nickel compounds include all compounds, even those which have not been associated with adverse health effects? What is the authority for this decision?

The section 313 list established by Congressional legislation included categories. EPA interprets these listings to mean all compounds of nickel for example, regardless of whether specific toxicological problems have been identified for a specific compound in the category.

77. I use copper wire in one of my products. I cut it and bend it and then heat seal it into a glass bulb. How do I consider the copper wire for section 313 reporting?

First, the wire would remain an article if no releases of copper (e.g., dusts) occur during manufacture of the glass bulbs. If the wire is not an article, then for an element such as copper, both copper metal and copper compounds are subject to section 313 reporting. First determine the form of copper in the wire. If it is pure copper wire, the entire weight of the wire must be used. If it is an alloy, the weight percent times the wire weight must be used. If there are copper compounds, the entire weight of each copper compound must be used for threshold determination.

81. For section 313 reporting, a catalyst contains 61 percent total nickel, which includes 26 percent free nickel and nickel contained in compounds. Should the threshold determination be based on the 61 percent total nickel?

The 61 percent total nickel cannot be used in the threshold determinations. Nickel compounds are a listed category, therefore the full weight of nickel compounds must be used in the threshold determination for nickel compounds. A separate threshold determination is required for the free nickel since nickel is a separately listed chemical under section 313.

85. A product is immersed into a plating bath containing nickel chloride (NiCl). This is done to bond nickel to the product prior to distribution in commerce. Nickel is incorporated into the final product (processed) whereas the chloride remains in the plating bath (otherwise used). Since nickel chloride is reportable under the nickel compound category of section 313, which threshold applies for this situation?

The threshold determination is made based on the total amount of nickel chloride processed and the report will be filed for nickel compounds.

MIXTURES

91. If a facility only knows the range of concentration of a section 313 chemical in a mixture, are they required to use the upper bound concentration to determine threshold as stated in the February 16, 1988 Federal Register? Use of the average or midpoint of the range will avoid overestimating emissions. If a metal mixture contains a range of 1 to 10 percent of three metals together, how can this information be used to determine thresholds?

The final rule does not discuss ranges, it only says that the upper bound should be used "if the person knows only the upper bound concentration". If a range is available, using the midpoint or average value is reasonable. For the combination of three chemicals, the facility should split the range among the three chemicals based on the knowledge that they have, so the total equals 10 percent. They do not have to assume 10 percent maximum for each chemical.

SUPPLIER NOTIFICATION

94. Is a facility subject to supplier notification requirements if it distributes products containing more than the de minimis level of a listed metal compound?

Yes, if you distribute these products to other manufacturers or processors, and you are in SIC Codes 20-39, you are subject to the supplier notification requirements. Articles and consumer products are exempt from supplier notification.

95. Do supplier notification requirements apply only to a situation where the customer is in SIC code 20 through 39 and has more than 10 employees?

A company is responsible for providing supplier notification to a covered facility within SIC codes 20-39 and with 10 or more employees, and to customers who in turn may sell or distribute to a "covered facility." Such a customer may be a wholesale distributor who is not in SIC codes 20 - 39 but sells to other manufacturing facilities.

110. If a mixture contains a chemical compound that is a member of a reportable section 313 chemical category, how should that be addressed on the supplier notification? Is it acceptable to provide the percent of the parent metal?

If a mixture contains a chemical compound (i.e., 12% zinc oxide) that is a member of a reportable chemical category (i.e., zinc compounds), the supplier is required to notify his customers that the mixture contains a zinc compound at 12% by weight. Supplying only the weight percent of the parent metal (zinc) does not fulfill the requirement, but may be done to aid receiving facilities in estimating releases. The customer must be told the weight percent of the entire compound for threshold determinations.

ACTIVITIES AND USES OF THE CHEMICAL AT THE FACILITY

125. A process at a facility draws steel rods into a smaller diameter. Is this manufacture, process, or otherwise use? How do I report?

This activity is considered processing because the toxic chemical remains incorporated in the final product distributed in commerce. Only apply the amount of each chemical in the rods processed toward the applicable activity threshold if the toxic chemical is present above the de minimis level.

128. We have purchased in excess of 100,000 pounds of aluminum material in block form to make a mold which stays on site. When making the mold, fumes and dust are a byproduct. Do we report aluminum as the chemical?

Aluminum appears on the list of chemicals as "aluminum (fume or dust)". You must determine if you manufacture, process, or use aluminum fume or dust. In this case, you are not processing or using, but do "manufacture" aluminum fume or dust coincidentally as a byproduct of making molds. Therefore, you must report for aluminum (fume or dust) if you exceed the 25,000 pound manufacturing threshold for the reporting year.

129. A facility melts aluminum ingots, reshapes them, and injects them into a die to form parts. Does the 25,000 pounds processing threshold apply to the amount of molten aluminum processed?

For calendar year 1989, the 25,000 pounds threshold applies to the amount of aluminum fume or dust generated at the facility, not the aluminum in molten (liquid) or solid form. Therefore, the facility must determine whether they produce more than 25,000 pounds of aluminum fume or dust air emissions in their processing operation.

130. A remanufacturer of auto engines cleans the engine parts and thereby produces a lead-containing waste (from gasoline lead deposits). Are they a manufacturer, processor, or otherwise user of lead compounds?

The facility neither manufactures, processes, nor otherwise uses lead. Lead is not incorporated into products for distribution nor is it a manufacturing aid or a processing aid as those terms are defined. Lead in the waste would not be included for threshold determination.

132. If a solvent is used in a process and 85 percent evaporates but 15 percent stays with product, is this processing or use? The 15 percent was not necessarily intended to stay with the product.

In this case, the entire quantity of the solvent should be considered "otherwise used" and subject to the 10,000 pound threshold. If the solvent was intended to remain in the product, this would be processing.

133. **Is soldering light bulbs using lead solder considered processing of the solder?**

Yes, it incorporates the solder into a product for distribution in commerce.

134. **An electroplating facility uses metal cyanide compounds in their electroplating operations. Are they processing or using those cyanide compounds, and how do they determine whether they meet the threshold and which threshold applies?**

The parent metal from the metal cyanide compound is plated onto a substrate electrochemically, leaving the cyanide as waste product. The parent metal is "processed", while the cyanide is "otherwise used". Metal cyanides are reportable under section 313 as both cyanide compounds and metal cyanides. Select the threshold based on the action that involves the portion of the compound that identifies the category (i.e., cyanide for cyanide compounds). The total weight of the compound counts for both the metal cyanides threshold and the cyanide compound threshold.

138. **A facility uses a chrome anode in an electroplating bath of sulfuric acid to plate chrome onto fabricated metal. Chromium compounds are generated in the bath and some chrome is deposited onto the fabricated metal part. The unutilized compounds are sent to the facility's waste treatment process, where hexavalent chromium is reduced to trivalent chromium. How are these reduced compounds counted for section 313 threshold determination?**

The threshold determination for chromium compounds is based upon the amount of chromium compounds generated in the plating bath. Any subsequent transformations of hexavalent to trivalent chromium compounds as a result of waste treatment does not affect the threshold determination. To do so would involve double counting.

139. **A company processes a galvanized sheet metal containing elemental zinc, not a zinc compound. When the sheet metal is processed it generates zinc dust, all of which is captured and sent off-site for recycle. Can the company claim an exemption because the sheet metal remains an article, or must it do a threshold determination because it has coincidentally manufactured zinc (fume or dust)?**

Though the sheet metal remains an article during the processing of the sheet metal, zinc (fume or dust), a listed chemical, is manufactured. This release negates the article exemption. The recycle/reuse exemption does not apply to cases of manufacture. The company would have to make a threshold determination based upon the quantity of zinc dust generated. The amount sent off-site for recycle is not reportable, being the equivalent of a product sold in commerce. Any amount not recycled would also be a reportable release.

141. **Paint containing listed chemicals is applied to a product and becomes part of an article. Does the 25,000 pound threshold apply? What about the volatile chemicals from the painting operation -- are they "otherwise used," thus subject to the 10,000 pound threshold?**

Yes to both questions. This is a case in which listed chemicals in the same mixture may have different uses and, therefore, different thresholds. The listed chemicals that are incorporated as part of the coating are "processed," whereas the volatile solvents in the paint are "otherwise used" because they are not intended to be incorporated into the article.

152. **How is routine maintenance defined in the exemption list? Is equipment maintenance included?**

Equipment maintenance such as the use of oil or grease is not exempt. The routine maintenance exemption is intended to cover janitorial or other custodial or plant grounds maintenance activities using such substances as bathroom cleaners, or fertilizers and pesticides used to maintain lawns, in the same form and concentration commonly distributed to consumers. Painting of equipment is exempt because the paint becomes part of the structure of the facility.

EXEMPTIONS

154. **The "structural component" exemption from section 313 reporting covers the small amounts of abraded/corroded metals from pipes and other facility equipment. Would the structural component exemption apply to equipment which regularly suffers abrasion, such as grinding wheels and metal working tools? What criteria can a facility use to decide which pieces of equipment are structural components and which are not?**

The section 313 structural components exemption would not apply to grinding wheels and metal working tools. These items are intended to wear down and to be replaced because of the nature of their use. The structural component exemption applies to passive structures and equipment such as pipes. The abrasion/corrosion includes normal or natural degradation, such as occurs in pipes, but not active degradation, such as occurs in a grinding wheel.

155. **A facility uses welding rods to maintain its equipment. The painting of equipment is exempt because the paint is intended to become part of the structure. Are welding rods used to maintain equipment exempt because the materials are intended to become part of the facility?**

Welding rods used to repair and maintain equipment would be exempt from reporting under section 313 because they are becoming a fixed part of the structure of the facility. In this way, they are similar to paint, and unlike some replaceable maintenance materials like oil or grease. The term "facility" includes all buildings, equipment, structures and other stationary items located on a single site, or on contiguous or adjacent sites.

174. A facility uses a chemical mixture that contains a toxic chemical. If the maximum and minimum concentrations listed on the MSDS range above and below the de minimis concentration levels, how can the facility determine quantities for section 313 compliance?

The amount of the chemical in the mixture that is present above the de minimis level and therefore counts toward the threshold, can be assumed to be proportional to the ratio of the above-de minimis concentration range to the overall concentration range. The concentration of the chemical in the mixture that is not exempt is the average of the de minimis level and the maximum concentration.

178. A facility cuts metal sheets containing nickel, releasing fumes. It then further grinds the metal to its final shape, producing grindings. For the sheets to retain their article status, releases must be less than 0.5 pound/year to any media. Does this cut-off value apply to aggregate releases of the same type of item being processed or used in the same way or to releases from all manners of processing or use of the same type of item?

The 0.5 pound/year release cut-off value applies to aggregate releases from the same type of item being processed or used in all manners at the facility. This value applies to the total aggregate releases of the toxic chemical from both steps of the process. The various shapes resulting from the cutting are "the same type of item" as the initial sheet. Thus any releases from grinding should be added to those from cutting.

180. We take copper wire, cut it, and wind it around smaller spools. Is the wire still an article?

If there is no release of a toxic chemical during normal processing of the copper wire, then the wire remains an article.

181. I run a metal fabrication facility, SIC code 34. If I cut the metal sheets and send the shavings off-site for reuse, can I consider the metal sheets articles?

If the shavings that are formed during the cutting are the sole releases, and if all the shavings are sent off-site for reuse, and the thickness of the metal sheet does not change during processing, then the metal sheets are still considered articles and are exempt.

182. Is bar stock that is used to make precision tuned parts an article and thus exempt from section 313 reporting? The bar stock is processed to produce parts that in whole or in part retain the basic dimensional characteristic of the bar stock. The production of the part itself is dependent upon the specific shape and dimension of the bar stock.

Bar stock is an article if its basic dimensional characteristics are maintained in whole or in part in the finished product and zero releases occurring during processing. If the end product is totally different in diameter or thickness, then the bar stock would not be an article.

183. Can facilities which extrude copper bars or rods into wire treat the bar or rod as an article?

No, an article has end use functions dependent in whole or in part upon its shape or design during end use. The end use function is dependent upon the copper being in the shape of the wire, so the copper bar cannot be considered an article. If you are changing the shape or form of an item substantially, you are processing the chemicals; the article exemption no longer applies.

RELEASES OF THE CHEMICAL

192. Is the disposal of wastes such as dusts, shavings, or turnings that result from grinding or drilling of metal items considered "releases of toxic chemicals"?

Yes, such releases of "non-recognizable" solid wastes such as dusts, shavings, or turnings are considered releases of toxic chemicals.

197. A facility discharges waste containing listed section 313 metals to an on-site cooling pond. The metals accumulate and settle over time, and the water is then drained from the cooling pond, leaving the heavy metal sludge. The sludge is then dredged and sent off-site to a recycler. How should this be reported?

The ultimate disposal of listed chemicals from the facility during the reporting year must be reported. Chemicals remaining in the sediments are "released to land." Chemicals sent to a receiving stream when the waste water is drained are "released to water." Materials dredged and sent off-site for recycle of the chemical are not reported as a release or transfer; others sent off-site not for recycle are reported as a "transfer off-site."

201. Our facility paints metal cabinets and the paint solvents contain a listed toxic chemical. The system consists of a closed vacuum vented painting room and a closed oven room vented by an oven stack. Is the vent to the outside of the building over the painting room a "releases from building ventilation systems" fugitive emission?

No, fugitive releases are emissions that are not in a confined directional air flow. Since your building vent system over the painting room is a confined air stream, it can be combined with the oven stack as a stack or point emission in Part III, Section 5.2 of Form R.

V. BIBLIOGRAPHY OF REFERENCE SOURCES

Fumes and Gases in the Welding Environment, 1979, American Welding Society, P.O. Box 351040, Miami, FL 33135, phone (305) 443-9353 ($48 for members; $64 for non-members).

NIOSH Criteria For a Recommended Standard: Welding, Brazing, and Thermal Cutting, April 1988, National Institute for Occupational Safety and Health, 1-800-356-4674, no charge.

Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form (EPA 560/4-88-002). Suggested methods on the development of release estimates and waste treatment efficiency calculations required on Form R. Available from: Superintendent of Documents, Government Printing Office, Washington, DC 20402-9325, (202) 783-3238, Stock Number: 055-000-00270-3, $11.00.

Compilation of Air Pollution Emission Factors, Volume 1, Stationary Point and Area Sources, Fourth Edition (AP-42). Available from: Superintendent of Documents, Government Printing Office, Washington, DC 20402-9325, (202) 783-3238, Stock Number: 055-000-00251-7, $20.00.

Locating and Estimating Air Emissions from Sources of Chromium (Supplement), August 1989, (EPA 450/2-89-002). Available from: National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161, (703) 487-4650, Stock Number: PB 90-103243, $15.95.

EPA Development Documents for Effluent Limitation Guidelines are available from NTIS or the Government Printing Office. These documents contain industry-specific information concerning chemicals in wastewater.

		NTIS #
Coil Coating, Phase I.	(EPA 440/1-82-071)	PB83-205542
Coil Coating, Phase II - Can Making.	(EPA 440/1-83-071)	PB84-198647
Electroplating -- Pretreatment.	(EPA 440/1-79-003)	PB80-196488
Electroplating -- Copper, Nickel, Chrome, and Zinc.	(EPA 440/1-74-003A)	PB-238834/F
Metal Finishing.	(EPA 440/1-83-091)	PB84-115989
Copper Forming.	(EPA 440/1-84-074)	PB84-192459

A complete list of the industries is available from: Superintendent of Documents Government Printing Office, Washington, D.C. 20402, (202) 783-3238. All Development Documents for Effluent Limitation Guidelines are available for review and inspection at the EPA Regional Office Libraries.

Toxic Air Pollutant Emission Factors -- A Compilation for Selected Air Toxic Compounds and Sources. (EPA 450/2-88-006a) October 1988. Available from: National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161, (703) 487-4650, Stock Number: PB 89-135644.

EPA has published a group individual guidance documents that target activities industries who primarily process or otherwise use listed toxic chemicals. The following are relevant to the metal fabrication industry and are available for no charge from: Section 313 Document Distribution Center, P.O. Box 12505, Cincinnati, OH 45212.

Estimating Chemical Releases from Roller, Knife, and Gravure Coating. (EPA 560/4-88-004j) February 1988.

Estimating Chemical Releases from Electrodeposition of Organic Coatings. (EPA 560/4-88-004c) January 1988.

Estimating Chemical Releases from Electroplating Operations. (EPA 560/4-88-004g) January 1988.

Estimating Chemical Releases from Spray Applications of Organic Coatings. (EPA 560/4-88-004d) January 1988.