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DEVELOPMENT DOCUMENT

for

EFFLUENT LIMITATIONS GUIDELINES AND STANDARDS

for the

NONFERROUS METALS FORMING AND METAL POWDERS

POINT SOURCE CATEGORY

VOLUME I

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U.S. Environmental Protection Agency Office of Water Office of Water Regulations and Standards Industrial Technology Division Washington, D.C. 20460 This document is divided into three volumes. Volume I contains Sections I through IV. Volume II contains Sections V and VI. Volume III contains Sections VII through XVI.

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SECTION I

SUMMARY AND CONCLUSIONS

The United States Environmental Protection Agency has promulgated effluent limitations guidelines and standards for the nonferrous metals forming and metal powders category pursuant to Sections 301, 304, 306, 307, and 501 of the Clean Water Act. For convenience, this category is referred to as the nonferrous metals forming category in this document. The promulgated regulation contains effluent limitations for best practicable control technology currently available (BPT), and best available technology economically achievable (BAT), as well as pretreatment standards for new and existing sources (PSNS and PSES), and new source performance standards (NSPS).

This development document highlights the technical aspects of EPA's study of the nonferrous metals forming category. This document and the Administrative Record provide the technical basis for promulgating the effluent limitations guidelines and pretreatment standards.

The Agency's economic analysis of the regulation is set forth in a separate document entitled Economic Analysis of Effluent Limitations and Standards for the Nonferrous Metals Forming and Metal Powders Point Source Category. That document is available from the Office of Analysis and Evaluation, Economic Analysis Staff, WH-586, USEPA, Washington, D.C., 20460.

METHODOLOGY

To develop the effluent limitations guidelines and standards presented in this document, the Agency characterized the category by subdividing it, collecting raw and treated wastewater samples, and examining water usage and discharge rates, and production processes. To gather data about the category, EPA developed a data collection portfolio (dcp) or questionnaire to collect information regarding plant size, age and production, the production processes used, the quantity of process wastewater used and discharged, wastewater treatment in place, and disposal practices. The dcps were sent to 377 firms known or believed to perform nonferrous metals forming. The responses were reviewed, and it was determined that 334 plants performed nonferrous metals forming.

As a next step, EPA conducted a sampling and analytical program to characterize the raw (untreated) and treated process wastewater. This program was carried out in two stages. Screen sampling was performed at 16 facilities, each representing the forming of a particular nonferrous metal or group of metals. Samples were collected from wastewater sources associated with the major manufacturing processes in this category, i.e., forming by rolling, drawing, extruding, forging, and cladding operations, as well as associated processes, including cleaning,

etching, solution heat treatment, and annealing, among others. Each of the samples was analyzed to determine the presence or and if present, the concentration, of 128 of the 129 absence, toxic priority pollutants, plus conventional and selected nonconventional pollutants. The toxic pollutant TCDD was not analyzed for because an analytical standard for TCDD was judged to be too hazardous to be made generally available. After proposal, wastewater sampling was conducted at nine facilities. A discussion of the sampling and analysis methods, and procedures is presented in Section V.

The Agency examined the metals formed and the manufacturing processes reported in the dcps for each nonferrous metals forming operation. This information, combined with the wastewater characterization data obtained from sampling visits and reported by the nonferrous metals forming plants, became the principle bases for subcategorizing this category. Based on this information, EPA determined that the most appropriate approach to subcategorizing this category is by the metals formed. A discussion of the subcategorization scheme is presented in Section IV. For this rulemaking, the nonferrous metals forming point source category has been divided into 10 subcategories based on the differences in wastewater quantity and quality related to metal type formed. The 10 subcategories are:

- 1. Lead-Tin-Bismuth Forming,
- 2. Magnesium Forming,
- 3. Nickel-Cobalt Forming,
- 4. Precious Metals Forming,
- 5. Refractory Metals Forming,
- 6. Titanium Forming,
- 7. Uranium Forming,
- 8. Zinc Forming,
- 9. Zirconium-Hafnium Forming, and
- 10. Metal Powders.

Each subcategory is further subdivided into major sources of wastewater for specific limitation within the regulation. Other sources of wastewater not directly related to metal forming, such as stormwater runoff or sanitary water, generally were not considered for specific limitation by the regulation. The Agency believes wastewater sources of this type are site-specific, and they are best handled on a case-by-case basis. Each wastewater source identified for this rulemaking, with the exception of uranium laundry wash water, was production-normalized. That is, each waste stream was characterized by the volume of wastewater discharged per unit of production. Uranium laundry wash water was characterized by the volume of wastewater discharged per employee per day. The limitations at BPT, BAT, NSPS, PSES, and PSNS are based on the effluent flow and the treatment effectiveness.

There are 158 plants identified in the nonferrous metals forming point source category discharging an estimated 5.14 billion liters per year (1.36 billion gallons per year) of process wastewater. Untreated, this process wastewater contains approximately 393,000 kilograms (866,000 pounds) of priority pollutants, and 1.53 million kilograms (3.37 million pounds) of conventional and nonconventional pollutants. The pollutants present in the highest concentrations and selected for consideration for each subcategory are presented in Section VI.

EPA studied the characteristics of the untreated wastewater in each subcategory for the purpose of selecting in-plant control and end-of-pipe treatment options. The Agency also studied various end-of-pipe technologies to treat the pollutants present in the identified process wastewaters, including:

- Chemical precipitation and sedimentation (lime and settle),
- Chemical emulsion breaking,
- Oil skimming,
- Ammonia steam stripping,
- Cyanide oxidation or precipitation,
- Chromium reduction,
- Multimedia filtration, and
- Ion exchange.

EPA also studied various types of in-plant controls reported in the dcps and observed during sampling. The in-plant controls studied included:

- Reuse of process wastewater
- Recycle of contact cooling water and air pollution control scrubber liquor, and
- Countercurrent cascade rinsing.

Engineering model costs were estimated for each of the treatment options considered for the category on a plant-by-plant basis. These costs were then used by the Agency to estimate the impact of implementing the various options on the industry. For each subcategory for each control and treatment option, the number of potential closures, number of employees affected, and impact on price were estimated. These results are reported in the Economic Impact Assessment.

The Agency then reviewed each of the treatment options for each subcategory to determine the estimated mass of pollutant removed by the application of each treatment technology. The amount of pollutant removal after the application of the treatment technology is referred to as the benefit. The methodology used to calculate the pollutant removal estimates is presented in Section X.

TECHNOLOGY BASIS FOR LIMITATIONS AND STANDARDS

\mathbf{BPT}

In general, the BPT level represents the average of the best existing performances of plants of various ages, sizes, processes or other common characteristics. Where existing performance is uniformly inadequate BPT may be transferred from a different subcategory or category. In balancing costs in relation to effluent reduction benefits, EPA considers the volume and nature of discharges expected after application of BPT the general environmental effects of the pollutants, cost and economic impact of the required pollution control level.

After examining the various treatment technologies, the Agency has identified BPT to represent the average of the best existing technology. EPA is promulgating mass limitations based on model end-of-pipe treatment which consists of oil skimming, lime precipitation and sedimentation technology. Chemical emulsion breaking, chromium reduction, cyanide removal, iron coprecipitation, and ammonia steam stripping are included in the model technology as preliminary treatments when necessary.

BAT

The BAT technology level represents the best economically achievable performance of plants of various ages, sizes, processes or other shared characteristics. As with BPT, where existing performance is uniformly inadequate, BAT may be transferred from a different subcategory or category. BAT may include feasible process changes or internal controls, even when not common industry practice.

In developing BAT, EPA has given substantial weight to the reasonableness of costs. The Agency considered the volume and nature of discharges, the volume and nature of discharges expected after application of BAT, the general environmental effects of the pollutants and the costs and economic impacts of the required pollution control levels. Despite this consideration of costs, the primary determinant of BAT is still effluent reduction capability.

The direct dischargers are expected to move directly to compliance with BAT limitations from existing treatment because the flow reduction used to meet BAT limitations would allow the use of smaller -- and less expensive -- lime and settle equipment than would be used to meet BPT limitations without flow reduction.

To meet the BAT effluent limitations based on this technology, the nonferrous metals forming point source category is estimated to incur a capital cost of \$603,000 (1982 dollars) and a total annual cost of \$202,000 (1982 dollars) above the costs required for BPT. The Agency predicts no additional plant or line closures as a result of these costs. If the average compliance cost incurred by the plants in the industry were passed on to consumers, price increases would range from 0.1 to 1.9 percent; about the same as the BPT increases. Thus the Agency has determined that BAT is economically achievable.

NSPS

Best demonstrated technology, which is the technical basis of NSPS, is lime, settle, and filter with in-process controls to reduce wastewater flows for all subcategories except lead-tinbismuth forming, titanium forming, zirconium-hafnium forming, and metal powders. EPA is promulgating NSPS for the lead-tinbismuth forming, titanium forming, zirconium--hafnium forming, and metal powders subcategories on the basis of lime and settle with in-process controls to reduce wastewater flows. subcategories which have more stringent requirements for The new sources than for existing sources are magnesium forming, and metal powders. In selecting best demonstrated technology, EPA recognizes that new plants have the opportunity to implement the best and most efficient manufacturing processes and control and treatment technology.

Since NSPS is based on the same model technology as BAT for all but two subcategories, the Agency does not believe that NSPS will constitute a barrier to entry for new sources, prevent major modifications to existing sources or produce other adverse The NSPS promulgated for the metal powder economic effects. subcategory incorporates in-process control dtechnologies that will reduce the overall cost of treatment from the cost existing sources will incure. NSPS promulgated for the magnesium forming category included the addition of a polishing filter to the endof-pipe treatment. The Agency does not believe this will cause a barrier to entry for new sources because a new source has the opportunity to design the plant with flow reduction technologies included in the design and thus will not have costs associated with retrofitting in-process or treatment equipment into the new facility. معمر : چې د براو د

PSES

PSES (pretreatment standards for existing sources) are designed to prevent the discharge of pollutants which pass through, interfere with or are otherwise incompatible with the operation of POTW. Pretreatment standards are technology-based and analogous to the best available technology for removal of toxic pollutants. EPA is promulgating PSES based on the application of technology equivalent to BAT with the exception of the refractory metals forming, uranium forming, and zinc forming subcategories. For the refractory metals forming subcategory, the Agency selected PSES based on lime precipitation and sedimentation technology, in conjunction with the in-process control technologies. The uranium forming and zinc forming subcategories are excluded from PSES.

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To meet the pretreatment standards for existing sources, the nonferrous metals forming point source category is estimated to incur a capital cost of \$7.5 million (1982 dollars) and an annual cost of \$4 million (1982 dollars). The Agency has excluded the zinc forming subcategory on the basis of economic impact, the Agency estimates that PSES could cause the closure of the larger of the two indirect dischargers in this subcategory. Aside from the zinc forming subcategory the Agency estimates there may be two titanium forming plant closures affecting 56 employees. Total production loss would be less than one percent. Thus, the Agency has determined that PSES is economically achievable.

PSNS

Like PSES, PSNS (pretreatment standards for new sources) are established to prevent the discharge of pollutants which passthrough, interfere with, or are otherwise incompatible with the operation of the POTW. New indirect dischargers, like new direct dischargers, have the opportunity to incorporate the best available demonstrated technologies including process changes, in-plant controls and end-of-pipe treatment technologies, and to use plant site selection to ensure adequate treatment system installation.

This regulation establishes mass-based PSNS for the nonferrous forming category. The treatment technology basis for the PSNS being promulgated is identical to the treatment technology set forth as the basis for the NSPS being promulgated. The Agency is promulgating PSNS for the uranium forming and zinc subcategories.

SECTION II

RECOMMENDATIONS

1. EPA has divided the nonferrous metals forming category into ten subcategories for the purpose of effluent limitations and standards. These subcategories are:

- Lead-Tin-Bismuth Forming
- Magnesium Forming
- Nickel-Cobalt Forming
- Precious Metals Forming
- Refractory Metals Forming
- Titanium Forming
- Uranium Forming
- Zinc Forming
- Zirconium-Hafnium Forming

Metal Powders

2. BPT is being promulgated based on the model treatment technology of flow equalization, oil skimming, and chemical precipitation and sedimentation (lime and settle) technology, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide precipitation. Iron coprecipitation is included in this model treatment technology for removal of the pollutant molybdenum from wastewaters in the refractory metals and uranium forming subcategories. The following BPT effluent limitations are being promulgated for existing sources:

BAT is being promulgated based on the model treatment 3. technology of flow equalization, oil skimming, chemical precipitation, sedimentation, and filtration (lime, settle, and filter) technology, and in-process flow reduction control methods, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide precipitation for the nickel-cobalt, refractory metals, uranium, and zinc forming subcategories. Iron coprecipitation is included in this treatment technology for removal of model the pollutant molybdenum from wastewaters in the refractory metals and uranium forming subcategories. BAT is being promulgated based on the model treatment technology of flow equalization, oil skimming, chemical precipitation and sedimentation (lime and settle) technology, and in-process flow reduction control methods, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide precipitation for the lead-tin-bismuth, magnesium, precious metals, titanium, and zirconium-hafnium forming subcategories. BAT is being promulgated based on the model treatment technology of flow equalization, oil skimming, and chemical precipitation and sedimentation (lime and settle) technology, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide precipitation for the metal powders subcategory. The following BAT effluent limitations are being promulgated for existing sources:

SUBPART A: BPT AND BAT MASS LIMITATIONS FOR THE LEAD-TIN-BISMUTH FORMING SUBCATEGORY

Rolling Spent Emulsions - BPT (a) Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of lead-tin-bismuth rolled with emulsions 0.068 Antimony 0.030 Lead 0.010 0.005 Oil & Grease 0.468 0.281 TSS 0.960 0.457 Within the range of 7.5 to 10.0 at all times pН (b) Rolling Spent Soap Solutions - BPT Pollutant or Maximum for Maximum for any one day pollutant property monthly average mg/off-kg (lb/million off-lbs) of lead-tin-bismuth rolled with soap solutions Antimony 0.125 0.055 Lead 0.019 0.009 0.860 Oil & Grease 0.520 TSS 1.80 0.840 Within the range of 7.5 to 10.0 at all times pН (c) Drawing Spent Neat Oils - BPT

There shall be no discharge of process wastewater pollutants.

(d) Drawing Spent Emulsions - BPT

Pollutant or	Maximum for	Maximum for	e .
pollutant property	any one day	monthly average	
mg/off-kg (lb/millic drawn with emulsions		tin-bismuth	• •
Antimony	0.076	0.034	
Lead	0.011	0.005	
Oil & Grease	0.526	0.316	
TSS	1.08	0.513	
pH Within the	range of 7.5 to 10	0.0 at all times	

(e) Drawing Spent Soap Solutions - BPT

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Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/mill	ion off-lbs) of lead-	tin-bismuth
drawn with soap so	lutions	
Antimony	0.022	0.010
Lead	0.003	0.002
Oil & Grease	0.149	0.090
TSS	0.306	0.146
pH Within t	he range of 7.5 to 10	0.0 at all times

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Pollutant pollutant	or property	Maximum for any one day	Maximum for monthly averag	e
mg/off-kg heat trea		off-lbs) of lea	d-tin-bismuth	
Antimony Lead Oil & Gre TSS pH		4.14 0.605 28.80 59.10 range of 7.5 to	1.850 0.288 17.30 28.10 10.0 at all times	•

(f) Extrusion Press and Solution Heat Treatment Contact Cooling Water - BPT

(g) Extrusion Press Hydraulic Fluid Leakage - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	<u></u>
mg/off-kg extruded	(lb/million	off-lbs) of lea	d-tin-bismuth	
Antimony Lead Oil & Gre TSS pH	· .	0.158 0.023 1.10 2.26 ange of 7.5 to	0.071 0.011 0.660 1.07 10.0 at all times	

Pollutant		Maximum for	Maximum for	
pollutant	property	any one day	monthly average	
			·······	••••
	(lb/million of the continuous	off-lbs) of lead strip method	l-tin-bismuth	
Antimony		0.003	0.001	
Lead		0.0004	0.0002	
Oil & Grea	ase	0.020	0.012	
TSS		0.041	0.020	
	Within the ra	ange of 7.5 to 1	.0.0 at all times	
				· · · · · · · · · · · · · · · · · · ·
Water	- BPT	got Casting Cont	-	-
Pollutant		Maximum for	Maximum for	
pollutant	property	any one day	monthly average	
		off-lbs) of lead -continuous meth		
Antimony		0.085	0.038	
Lead		0.013	0.006	
Oil & Grea	ase (0.588	0.353	
TSS		1.21	0.574	
pH	Within the ra	ange of 7.5 to 1	0.0 at all times	
	1013 Lun.			

(h) Continuous Strip Casting Contact Cooling Water - BPT

(j) Shot Casting Contact Cooling Water - BPT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg shot cast	(lb/million o	off-lbs) of lead-	tin-bismuth
Antimony		0.107	0.048
Lead		0.016	0.008
Oil & Grea		0.746	0.448
TSS		1.53	0.728
pH		ange of 7.5 to 10	.0 at all times

(k) Shot-Forming Wet Air Pollution Control Scrubber Blowdown - BPT

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Pollutant or	Maximum for	Maximum for
pollutant proper	ty any one day	monthly average
<u></u>		инстанта стана стана У 10 ма
	llion off-lbs) of lead	-tin-bismuth
shot formed		
Antimony	1.69	0.753
Lead	0.247	0.118
Oil & Grease	11.8	7.06
TSS	24.1	11.5
pH Withir	the range of 7.5 to 1	0.0 at all times

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(1) Alkaline Cleaning Spent Baths - BPT

Pollutant or	Maximum for	Maximum for
pollutant prope	erty any one day	monthly average
mg/off-kg (lb/m alkaline cleane	illion off-lbs) of lead- d	-tin-bismuth
Antimony	0.345	0.154
Lead	0.051	0.024
Oil & Grease	2.40	1.44
TSS	4.92	2.34
pH Withi	n the range of 7.5 to 10).0 at all times

(m) Alkaline Cleaning Rinse -BPT

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average	- 1 4
mg/off-kg (lb/million alkaline cleaned	off-lbs) of lead	d-tin-bismuth	2
Antimony Lead Oil & Grease TSS pH Within the r	6.78 0.991 47.2 96.8 range of 7.5 to 1	3.02 0.472 28.4 46.0 10.0 at all times	-

(n) Swaging Spent Emulsions - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million swaged with emulsion	n off-lbs) of lea	d-tin-bismuth
Antimony	0.005	0.002
Lead	0.0008	0.0004
Oil & Grease	0.036	0.022
TSS	0.073	0.035
pH Within the	range of 7.5 to	10.0 at all times

(o) Degreasing Spent Solvents - BPT

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There shall be no discharge of process wastewater pollutants.

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(a) Rolling Spent Emulsions - BAT

Pollutant or	Maximum for	Maximum for	-
pollutant property	any one day	monthly average	
mg/off-kg (lb/million rolled with emulsions	off-lbs) of lead-	-tin-bismuth	_
Antimony	0.067	0.030	
Lead	0.010	0.005	

(b) Rolling Spent Soap Solutions - BAT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millio rolled with soap sol	n off-lbs) of lead- utions	-tin-bismuth
Antimony	0.124	0.055
Lead	0.018	0.009

(c) Drawing Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

(d) Drawing Spent Emulsions - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million emulsions	off-lbs) of lead	-tin-bismuth
Antimony		0.080	0.034
Lead		0.011	0.005

(e) Drawing Spent Soap Solutions - BAT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million drawn with soap solut		-tin-bismuth
Antimony	0.022	0.010
Lead	0.003	0.002
		,

Pollutant pollutant	Maximum for any one day	Maximum monthly		20
mg/off-kg heat treat	off-lbs) of lead	-tin-bismuth	:	e.
Antimony Lead	0.414 0.061	0.185 0.030		

(f) Extrusion Press and Solution Heat Treatment Contact Cooling Water - BAT

(g) Extrusion Press Hydraulic Fluid Leakage - BAT

Pollutant pollutant		Maximum for any one day	Maximum monthly		
mg/off-kg extruded	(lb/million	off-lbs) of lea	ad-tin-bismuth	- - -	
Antimony Lead		0.158 0.023	0.071 0.011	n An An An An	

(h) Continuous Strip Casting Contact Cooling Water - BAT

Pollutant or	Maximum for	Maximum for
ollutant property	any one day	monthly average
g/off-kg (lb/million	off-lbs) of lead-	tin-bismuth
ast by the continuou		
Antimony	0.003	0.001
Lead	0.0004	0.0002
······		<u></u>
	مر _	
(i) Semi-Continuous I Water - BAT	ngot Casting Conta	ct Cooling
	Maximum for	Maximum for
pollutant property mg/off-kg (lb/million	any one day off-lbs) of lead-	monthly average
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method	monthly average tin-bismuth
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004
pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004
Pollutant or pollutant property mg/off-kg (lb/million cast by the semi-cont Antimony Lead	any one day off-lbs) of lead- inuous method 0.009	monthly average tin-bismuth 0.004

Pollutant pollutant		Maximum fo any one da		for average
mg/off-kg shot cast	(1b/million	off-lbs) of	lead-tin-bismuth	:
Antimony Lead		0.107 0.016	0.048 0.008	

(j) Shot Casting Contact Cooling Water - BAT

(k) Shot-Forming Wet Air Pollution Control Scrubber Blowdown - BAT

Pollutant pollutant	Maximum for any one day		
mg/off-kg shot forme	off-lbs) of 1	.ead-tin-bismuth	
Antimony Lead	0.169 0.025	0.076 0.012	

(1) Alkaline Cleaning Spent Baths - BAT

Pollutant pollutant		Maximum any one		Maximum monthly	
mg/off-kg alkaline d	(lb/million cleaned	off-lbs) o	of lead-	tin-bismuth	
Antimony Lead	•	0.345 0.051		0.154 0.024	

(m) Alkaline Cleaning Rinse - BAT

Pollutant o pollutant p		Maximum any one		Maximum monthly	for average
mg/off-kg (alkaline cl	lb/million eaned	off-lbs)	of lead	l-tin-bismuth	· ·
Antimony Lead		0.678 0.099	۰ ۰	0.302 0.047	
	nen an	,			
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		4 			
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(n) Swaging Spent Emulsions - BAT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million swaged with emulsion	off-lbs) of lead-	-tin-bismuth
Antimony	0.005	0.002
Lead	0.0008	0.0004
(o) Degreasing Spent S	Solvents - BAT	
There shall be	no discharge of	process wastewater
pollutants.		
		l l l l l l l l l l l l l l l l l l l
	AT MASS LIMITATION JBCATEGORY	IS FOR THE MAGNESIUM
		IS FOR THE MAGNESIUM
	JBCATEGORY	IS FOR THE MAGNESIUM
FORMING ST (a) Rolling Spent Emu Pollutant or	JBCATEGORY lsions - BPT Maximum for	IS FOR THE MAGNESIUM Maximum for
FORMING ST (a) Rolling Spent Emu Pollutant or	JBCATEGORY lsions - BPT Maximum for	
FORMING ST (a) Rolling Spent Emu Pollutant or pollutant property mg/off-kg (lb/million	JBCATEGORY lsions - BPT Maximum for any one day	Maximum for
FORMING ST (a) Rolling Spent Emu Pollutant or pollutant property mg/off-kg (lb/million	JBCATEGORY lsions - BPT Maximum for any one day	Maximum for monthly average
FORMING SU (a) Rolling Spent Emu Pollutant or pollutant property mg/off-kg (lb/million emulsions Chromium	JBCATEGORY lsions - BPT Maximum for any one day n off-1bs) of ma 0.033	Maximum for monthly average ignesium rolled with 0.014
FORMING SU (a) Rolling Spent Emu Pollutant or pollutant property mg/off-kg (lb/million emulsions Chromium Zinc	JBCATEGORY lsions - BPT Maximum for any one day n off-lbs) of ma 0.033 0.109	Maximum for monthly average gnesium rolled with 0.014 0.046
FORMING SU (a) Rolling Spent Emu Pollutant or pollutant property mg/off-kg (lb/million emulsions Chromium Zinc Ammonia	JBCATEGORY lsions - BPT Maximum for any one day n off-lbs) of ma 0.033 0.109 9.95	Maximum for monthly average ignesium rolled with 0.014 0.046 4.37
FORMING SU (a) Rolling Spent Emu Pollutant or pollutant property mg/off-kg (lb/million emulsions Chromium Zinc Ammonia Fluoride	JBCATEGORY lsions - BPT Maximum for any one day n off-lbs) of ma 0.033 0.109 9.95 4.440	Maximum for monthly average ignesium rolled with 0.014 0.046 4.37 1.97
FORMING SU (a) Rolling Spent Emu: Pollutant or pollutant property mg/off-kg (lb/million emulsions Chromium Zinc Ammonia Fluoride Oil & Grease	JBCATEGORY lsions - BPT Maximum for any one day n off-lbs) of ma 0.033 0.109 9.95 4.440 1.49	Maximum for monthly average agnesium rolled with 0.014 0.046 4.37 1.97 0.895
FORMING SU (a) Rolling Spent Emu: Pollutant or pollutant property mg/off-kg (lb/million emulsions Chromium Zinc Ammonia Fluoride Oil & Grease TSS	JBCATEGORY lsions - BPT Maximum for any one day n off-lbs) of ma 0.033 0.109 9.95 4.440	Maximum for monthly average agnesium rolled with 0.014 0.046 4.37 1.97 0.895 1.46

(b) Forging Spent Lubricants - BPT

There shall be no discharge of process wastewater pollutants.

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(c) Forging Contact Cooling Water - BPT

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Pollutant or	Maximum for	Maximum fo	
pollutant property	any one day	monthly av	erage
ng/off-kg (lb/millior with water	n off-lbs) of forge	ed magnesium co	oled
Chromium	1.27	0.520	
Zinc	4.22	1.77	
Ammonia	385	170	-
Fluoride	172	76.3	
Oil & Grease	57.8	34.7	,
TSS	119	56.4	
pH Within the	range of 7.5 to 10	J. J at all time	5
	Cleaning Wastewat	cer - BPT	
(d) Forging Equipment			r
(d) Forging Equipment Pollutant or pollutant property	Maximum for	cer - BPT Maximum fo monthly av	
(d) Forging Equipment Pollutant or pollutant property	Maximum for any one day	Maximum fo monthly av	
(d) Forging Equipment Pollutant or pollutant property mg/off-kg (lb/millior Chromium	Maximum for any one day n off-lbs) of magne 0.018	Maximum fo monthly av esium forged 0.007	
(d) Forging Equipment Pollutant or pollutant property mg/off-kg (lb/millior Chromium Zinc	Maximum for any one day n off-lbs) of magne 0.018 0.059	Maximum fo monthly av esium forged 0.007 0.025	
(d) Forging Equipment Pollutant or pollutant property mg/off-kg (lb/millior Chromium Zinc	Maximum for any one day n off-lbs) of magne 0.018 0.059 5.32	Maximum fo monthly av esium forged 0.007 0.025 2.34	
(d) Forging Equipment Pollutant or pollutant property mg/off-kg (lb/millior Chromium Zinc Ammonia Fluoride	Maximum for any one day n off-lbs) of magne 0.018 0.059 5.32 2.38	Maximum fo monthly av esium forged 0.007 0.025 2.34 1.06	
(d) Forging Equipment Pollutant or pollutant property mg/off-kg (lb/millior Chromium Zinc Ammonia Fluoride Oil& Grease	Maximum for any one day n off-lbs) of magne 0.018 0.059 5.32 2.38 0.798	Maximum fo monthly av esium forged 0.007 0.025 2.34 1.06 0.479	
(d) Forging Equipment Pollutant or pollutant property mg/off-kg (lb/millior Chromium Zinc Ammonia Fluoride Oil& Grease TSS	Maximum for any one day n off-lbs) of magne 0.018 0.059 5.32 2.38	Maximum fo monthly av esium forged 0.007 0.025 2.34 1.06 0.479 0.778	erage

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million chill methods	off-lbs) of magne	sium cast with direct
Chromium	1.74	0.711
Zinc	5.77	2.41
Ammonia	527	232
Fluoride	235	105
Oil & Grease	79.0	47.4
TSS	162	77.1
pH Within the	range of 7.5 to 10	.0 at all times
(f) Surface Treatment	Spent Baths - BPI	
(f) Surface Treatment	-	
(f) Surface Treatment Pollutant or pollutant property	- Maximum for	Maximum for monthly average
Pollutant or	Maximum for any one day	Maximum for monthly average
Pollutant or pollutant property mg/off-kg (lb/million	Maximum for any one day	Maximum for monthly average
Pollutant or pollutant property mg/off-kg (lb/million treated	Maximum for any one day off-lbs) of magne	Maximum for monthly average sium surface
Pollutant or pollutant property mg/off-kg (lb/million treated Chromium	Maximum for any one day off-lbs) of magne 0.205	Maximum for monthly average sium surface 0.084
Pollutant or pollutant property mg/off-kg (lb/million treated Chromium Zinc	Maximum for any one day off-lbs) of magne 0.205 0.681	Maximum for monthly average sium surface 0.084 0.285
Pollutant or pollutant property mg/off-kg (lb/million treated Chromium Zinc Ammonia	Maximum for any one day off-lbs) of magne 0.205 0.681 62.1	Maximum for monthly average sium surface 0.084 0.285 27.3
Pollutant or pollutant property mg/off-kg (lb/million treated Chromium Zinc Ammonia Fluoride	Maximum for any one day off-lbs) of magne 0.205 0.681	Maximum for monthly average sium surface 0.084 0.285
Pollutant or pollutant property	Maximum for any one day off-lbs) of magne 0.205 0.681 62.1 27.8	Maximum for monthly average sium surface 0.084 0.285 27.3 12.3
Pollutant or pollutant property mg/off-kg (lb/million treated Chromium Zinc Ammonia Fluoride Oil & Grease TSS	Maximum for any one day off-lbs) of magne 0.205 0.681 62.1 27.8 9.32	Maximum for monthly average sium surface 0.084 0.285 27.3 12.3 5.59 9.09

(e) Direct Chill Casting Contact Cooling Water - BPT

(g) Surface Treatment Rinse - BPT

Pollutant o		Maximum for	Maximum for	
pollutant p	property	any one day	monthly average	je
		· · · · · · · · · · · · · · · · · · ·		
mg/off-kg (treated	lb/million	off-lbs) of magne	esium surface	
Chromium	: -	8.32	3.4	
Zinc	1990 - E. 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 1990 - 199	27.6	11.5	
Ammonia		2520	1110	
Fluoride	,	1130	499	
Oil & Greas	e	378	227	
TSS	.	775	369	
	lithin the	range of 7.5 to 10		
	· · · · · · · · · · · · · · · · · · ·	· .		
(h) Sawing	or Grindin	g Spent Emulsions	- BPT	
Pollutant o	r	Maximum for	Maximum for	
Pollutant o	r			
Pollutant o pollutant p	roperty	Maximum for any one day	Maximum for monthly average	ge
Pollutant o pollutant p mg/off-kg (roperty	Maximum for	Maximum for monthly average	je
Pollutant o pollutant p	roperty	Maximum for any one day	Maximum for monthly average	ge
Pollutant o pollutant p mg/off-kg (ground	roperty	Maximum for any one day off-lbs) of magne	Maximum for monthly averagesium sawed or	je
Pollutant o pollutant p mg/off-kg (ground Chromium	roperty	Maximum for any one day off-lbs) of magne 0.009	Maximum for monthly averagesium sawed or 0.004	ge
Pollutant o pollutant p mg/off-kg (ground Chromium Zinc	roperty	Maximum for any one day off-lbs) of magne 0.009 0.029	Maximum for monthly averagesium sawed or 0.004 0.012	ge
Pollutant o pollutant p mg/off-kg (ground Chromium Zinc Ammonia	roperty	Maximum for any one day off-lbs) of magne 0.009 0.029 2.60	Maximum for monthly averagesium sawed or 0.004 0.012 1.15	je
Pollutant o pollutant p mg/off-kg (ground Chromium Zinc Ammonia Fluoride	r property lb/million	Maximum for any one day off-lbs) of magne 0.009 0.029 2.60 1.16	Maximum for monthly averagesium sawed or 0.004 0.012 1.15 0.515	je
Pollutant o pollutant p mg/off-kg (ground Chromium Zinc Ammonia Fluoride Oil & Greas	r property lb/million	Maximum for any one day off-lbs) of magne 0.009 0.029 2.60 1.16 0.390	Maximum for monthly average esium sawed or 0.004 0.012 1.15 0.515 0.234	je
Pollutant o pollutant p mg/off-kg (ground Chromium Zinc Ammonia Fluoride Oil & Greas TSS	e	Maximum for any one day off-lbs) of magne 0.009 0.029 2.60 1.16	Maximum for monthly average esium sawed or 0.004 0.012 1.15 0.515 0.234 0.381	je

(i) Degreasing Spent Solvents - BPT

There shall be no discharge of process wastewater

pollutants.

(j) Wet Air Pollution Control Scrubber Blowdown - BPT

Pollutant pollutant	Maximum for any one day			
mg/off-kg repaired c	off-lbs) of m	agnesium sanded	and	- 1
Chromium Zinc Ammonia Fluoride Oil & Grea TSS pH	0.273 0.904 82.5 36.9 12.4 25.4 cange of 7.5 t	0.112 0.378 36.3 16.4 7.43 12.1 20 10.0 at all ti	.mes	

(a) Rolling Spent Emulsions - BAT

Pollutant or pollutant property		Maximum for any one day	Maximum for monthly average		
mg/off-kg emulsions	(1b/million	off-lbs) of	magnesium rolled	with	
Chromium Zinc Ammonia Fluoride		0.033 0.109 9.95 4.44	0.014 0.046 4.37 1.97		

(b) Forging Spent Lubricants - BAT

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There	shall	be	no	discharge	of	process	wastewater
pollutants.		r Fa		•			

(c) Forging Contact Cooling Water - BAT

Pollutant pollutant	Maximum for any one day	Maximum monthly	for average
mg/off-kg with water	off-lbs) of forge	d magnésium	cooled
Chromium Zinc Ammonia Fluoride	0.127 0.422 38.5 17.2	0.052 0.177 17.0 7.63	

(d) Forging Equipment Cleaning Wastewater - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly averge	: : :
mg/off-kg	(lb/million	off-lbs) of magr	nesium forged	-
Chromium Zinc Ammonia Fluoride		0.002 0.006 0.532 0.238	0.0007 0.003 0.234 0.106	, ,

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(e) Direct Chill Casting Contact Cooling Water - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly averge
mg/off-kg chill met!		off-lbs) of magn	esium cast with direct
Chromium		1.74	0.711
Zinc Ammonia		5.77 527	2.41 232
Fluoride		235	105
<u></u>	i		

(f) Surface Treatment Spent Baths - BAT

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of magnesium surface
treated

Chromium	0.205	0.084	2.1
Zinc	0.681	0.285	
Ammonia	62.1	27.3	
Fluoride	27.8	12.3	
. 6 mp.ee		4 ·	

(g) Surface Treatment Rinse - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg treated	(lb/million	off-lbs) of magn	esium surface
Chromium Zinc		0.832	0.340 1.16
Ammonia Fluoride		252 113	111 49.9

(h) Sawing or Grinding Spent Emulsions - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg ground	(lb/million	off-lbs) of magn	nesium sawed or
Chromium		0.009	0.004
Zinc		0.029	0.012
Ammonia		2.60	1.15
Fluoride		1.16	0.515

(i) Degreasing Spent Solvents - BAT

There shall be no discharge of process wastewater pollutants.

(j) Wet Air Pollution Control Scrubber Blowdown - BAT

Pollutant pollutant	Maximum any one		Maximum monthly	
~	 *	4	· 4	5

mg/off-kg (lb/million off-lbs) of magnesium sanded and repaired or forged

Chromium	0.273	0.112		
Zinc	0.904	0.378		-
Ammonia	82.5	36.3	ana a ruma	
Fluoride	36.9	16.4	17 . 1	

SUBPART C: BPT AND BAT MASS LIMITATIONS FOR THE NICKEL-COBALT FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - BPT

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There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - BPT

Pollutant or	Maximum for	Maximum for	
pollutant property	any one day	monthly average	
mg/off-kg (lb/million with emulsions	off-lbs) of nick	el-cobalt rolled	
Chromium	0.075	0.031	•
Nickel	0.327	0.216	
Fluoride	10.1	4.49	
Oil & Grease	3.4	2.04	
TSS	6.97	3.32	
pH Within the r	ange of 7.5 to 1	0.0 at all times	

(c) Rolling Contact Cooling Water - BPT

	1.	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millio	n off-lbs) of nicke	el-cobalt rolled
with water		· · · · · · · · · · · ·
Chromium	1.66	0.679
Nickel	7.24	4.79
Fluoride	225	99.6
Oil & Grease	75.4	45.3
TSS	155	73.5
pH Within the	range of 7.5 to 10	0.0 at all times

(d) Tube Reducing Spent Lubricant - BPT

There shall be no discharge of process wastewater pollutants.

(e) Drawing Spent Neat Oils - BPT

There shall be no discharge of process wastewater pollutants.

(f) Drawing Spent Emulsions - BPT

Pollutant pollutant	Maximum any one	 Maximum monthly	for average	
				1

mg/off-kg (lb/million off-lbs) of nickel-cobalt drawn
with emulsions

Chromium				0.042				0.017	
Nickel				0.183				0.121	
Fluoride				5.68				2.52	
Oil & Grea	ase			1.91				1.15	
TSS				3.91				1.86	
pH	Within	the	range	of 7.5	to	10.0	at	all times	

(g) Extrusion Spent Lubricants - BPT

There	shall	be	no	discharge	of	process	wastewater
pollut	ants.						ана стала на селото н Селото на селото на с

(h) Extrusion Press or Solution Heat Treatment Contact Cooling Water - BPT

Pollutant	Maximum for	Maximum for
pollutant	any one day	monthly average
mg/off-kg heat trea	off-lbs) of extruded	l nickel-cobalt
Chromium	0.037	0.015
Nickel	0.160	0.106
Fluoride	4.95	2.20
Oil & Gre	1.67	0.999
TSS	3.41	1.63
pH	ange of 7.5 to 10.0	at all times

(i) Extrusion Press Hydraulic Fluid Leakage - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of nickel-cobalt extruded

Chromium	0.102	0.042
Nickel	0.446	0.295
Fluoride	13.8	6.13
Oil & Grease	4.64	2.79
TSS	9.51	4.53
pH Within the	range of 7.5 to 10.0	at all times

(j) Forging Equipment Cleaning Wastewater - BPT

Pollutant or pollutant property	Maximum for	Maximum for
porrucanc propercy	any one day	monthly average
mg/off-kg (lb/million	n off-lbs) of nicke	l-cobalt forged
	0 010	0.007
	0.018	0.007 0.051
Chromium Nickel Fluoride	0.018 0.077 2.38	0.051 1.06
Nickel	0.077	0.051
Nickel Fluoride	0.077 2.38	0.051 1.06

(k) Forging Contact Cooling Water - BPT

Pollutant o pollutant p	Maximum for any one day	Maximum for monthly average	
mg/off-kg (cooled with	off-lbs) of forge	d nickel-cobalt	
Chromium Nickel Fluoride Oil & Greas TSS pH W	0.209 0.910 28.2 9.48 19.5 ange of 7.5 to 10	0.086 0.602 12.5 5.69 9.25 .0 at all times	

(1) Forging Press Hydraulic Fluid Leakage - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
mg/off-kg	(lb/million	off-lbs) of nick	el-cobalt forged	, a . 4 . 4
Chromium Nickel Fluoride Oil & Grea TSS pH		0.083 0.359 11.2 3.74 7.67 range of 7.5 to 1	0.034 0.238 4.94 2.25 3.65 0.0 at all times	1 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4

(m) Forging Spent Lubricants - BPT

There shall be no discharge of process wastewater pollutants.

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(n) Stationary Casting Contact Cooling Water - BPT

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/millio stationary casting me		ckel-cobalt cast with
Chromium	5.33	2.18
Nickel	23.3	15.4
Fluoride	720	320
Oil & Grease	242	145
TSS	496	236
pH Within the	range of 7.5 to 10	0.0 at all times
·····		· · · · · · · · · · · · · · · · · · ·
	1.	

(o) Vacuum Melting Steam Condensate - BPT

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There shall be no allowance for the discharge of process wastewater pollutants.

(p) Metal Powder Production Atomization Wastewater - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of nickel-cobalt metal
powder atomized

Chromium	1.16	0.472
Nickel	5.03	3.33
Nickel Fluoride	156	69.2
Oil & Grease	52.4	31.5
TSS	108	51.1
pH Within th	e range of 7.5 to	10.0 at all times

(q) Annealing and Solution Heat Treatment Contact Cooling Water - BPT

There shall be no allowance for the discharge of process wastewater pollutants.

(r) Wet Air Pollution Control Scrubber Blowdown - BPT

Pollutant or	Maximum for	Maximum for	,
pollutant property	any one day	monthly average	,
mg/off-kg (lb/million	off-lbs) of nicke	el-cobalt formed	
Chromium	0.357	0.146	
Nickel	1.56	1.03	
Fluoride	48.2	21.4	
Oil & Grease	16.2	9.72	
TSS	33.2	15.8	
pH Within the	range of 7.5 to 10).0 at all times	

(s) Surface Treatment Spent Baths - BPT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg treated	(lb/million	off-lbs) of ni	ckel-cobalt surface
Chromium	ase	0.412	0.169
Nickel		1.80	1.19
Fluoride		55.7	24.7
Oil & Grea		18.7	11.2
TSS		38.4	18.3
pH		ange of 7.5 to	10.0 at all times

(t) Surface Treatment Rinse - BPT

Pollutant o pollutant j		Maximum fo any one da		
mg/off-kg treated	(lb/million o	off-lbs) of a	nickel-cobalt surface	
Chromium Nickel Fluoride Oil & Greas TSS pH N		10.4 45.3 1410 472 968 ange of 7.5	4.25 30.0 623 283 460 to 10.0 at all times	

Pollutant	or	Maximum for	Maximum for
	property	any one day	monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of nicke	el-cobalt alkaline
Chromium Nickel Fluoride Oil & Grea TSS pH		0.015 0.065 2.02 0.678 1.39 range of 7.5 to 10	0.006 0.043 0.895 0.407 0.661 0.0 at all times
	MICHIIN CHE		
(v) Alkali	ine Cleaning	Rinse - BPT	
Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of nicke	l-cobalt alkaline
Chromium		1.03	0.420
Nickel		4.48	2.96

Within the range of 7.5 to 10.0 at all times

(u) Alkaline Cleaning Spent Baths - BPT

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(w) Molten Salt Rinse - BPT

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Pollutant or		Maximum for	Maximum for	
pollutant p	roperty	any one day	monthly ave	erage .
	1 h/m + 1 l + c n	off lbg) of might		
with molten		off-lbs) of nicke	er-cobart breate	: 0
	Burt		•	
Chromium		3.72	1.52	. ¹
Nickel		16.2	10.7	ا بىر . م
Fluoride		502	223	
Oil & Grease	e	169	101	· · · · ·
TSS		346	165	
pH W:	ithin the 1	range of 7.5 to 10	0.0 at all times	
			······	······
(x) Ammonia	Rinse - BI	РT	н Малана Алана (1995)	
(x) Ammonia Pollutant or		PT Maximum for	Maximum for	
Pollutant of	r	· · · · · · · · · · · · · · · · · · ·	Maximum for monthly ave	• • • • •
Pollutant on pollutant p	r roperty	Maximum for any one day	monthly ave	erage
Pollutant or pollutant pr mg/off-kg (1	r roperty lb/million	Maximum for	monthly ave	erage
Pollutant on pollutant p	r roperty lb/million	Maximum for any one day	monthly ave	erage
Pollutant or pollutant pr mg/off-kg (1 with ammonia	r roperty lb/million	Maximum for any one day off-lbs) of nicke	monthly ave	erage
Pollutant or pollutant pr mg/off-kg (1 with ammonia Chromium	r roperty lb/million	Maximum for any one day off-1bs) of nicke 0.007	monthly ave el-cobalt treate 0.003	erage
Pollutant or pollutant pr mg/off-kg (1 with ammonia Chromium Nickel	r roperty lb/million	Maximum for any one day off-lbs) of nicke	monthly ave el-cobalt treate 0.003 0.019	erage
Pollutant or pollutant pr mg/off-kg (1 with ammonia Chromium Nickel Fluoride	r roperty lb/million a solution	Maximum for any one day off-1bs) of nicke 0.007 0.029	monthly ave el-cobalt treate 0.003	erage
Pollutant or pollutant pr mg/off-kg (1 with ammonia Chromium	r roperty lb/million a solution	Maximum for any one day off-1bs) of nicke 0.007 0.029 0.881	monthly ave el-cobalt treate 0.003 0.019 0.391	erage

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(y) Sawing or Grinding Spent Emulsions - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	;
	(lb/million o with emulsion	ff-lbs) of nickel s	-cobalt sawed	8 - -
Chromium Nickel Fluoride		0.018 0.076 2.35 0.788	0.007 0.050 1.04	1 - 4
Oil & Grea TSS	ase	0.788 1.62	0.473 0.769	
pH	Within the ra	nge of 7.5 to 10.		
(z) Sawir	ng or Grinding	Rinco - RDT	- //	

(z) Sawing or Grinding Rinse - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	-
	(lb/million o nickel-cobalt	ff-lbs) of nickel-c rinsed	obalt sawed	
Chromium Nickel Fluoride Oil & Grea TSS pH		0.797 3.48 108 36.2 74.2 nge of 7.5 to`10.0	0.326 2.30 47.8 21.7 35.3 at all times	-

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(aa) Steam Cleaning Condensate - BPT

Pollutant or pollutant proper	Maximum for ty any one day	Maximum for monthly average
.	llion off-lbs) of nick	el-cobalt steam
cleaned		
Chromium	0.013	0.006
Nickel	0.058	0.039
Fluoride	1.79	0.795
Oil & Grease	0.602	0.361
TSS	1.24	0.587
	the range of 7.5 to 1	0.0 at all times

(ab) Hydrostatic Tube Testing and Ultrasonic Testing Wastewater - BPT

There shall be no allowance for the discharge of process wastewater pollutants.

(ac) Degreasing Spent Solvents - BPT

There shall be no discharge of process wastewater pollutants.

(ad) Dye Penetrant Testing Wastewater - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	1
	(lb/million c penetrant meth	off-lbs) of nicke od	l-cobalt tested	1 2 3
Chromium Nickel Fluoride Oil & Gre TSS pH		0.094 0.409 12.7 4.26 8.74 ange of 7.5 to 10	0.039 0.271 5.63 2.56 4.16 .0 at all times	

(ae) Electrocoating Rinse - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millio electrocoated	n off-lbs)	of nickel-cobalt
Chromium	1.48	0.607
Nickel	6.47	4.28
Fluoride	201	89.0
Oil & Grease	67.4	40.5
TSS	138	65.7
pH Within the ra	nge of 7.5 to	10.0 at all times

(af) Miscellaneous Wastewater Sources - BPT

Pollutant pollutant		Maximum for any one day		Maximum for monthly average
mg/off-kg formed	(lb/millio	n off-lbs)	of	nickel-cobalt
Chromium Nickel Fluoride Oil & Gre TSS pH	ase Within the ra	0.108 0.473 14.7 4.92 10.1 nge of 7.5 t	o 10.0 a	0.044 0.313 6.50 2.95 4.80 t all times

(a) Rolling Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

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Pollutant pollutant	Maximum for any one day	Maximum for monthly average	e .
mg/off-kg with emuls	off-lbs) of nic	kel-cobalt rolled	e i
Chromium Nickel Fluoride	0.063 0.094 10.1	0.026 0.063 4.49	

(b) Rolling Spent Emulsions - BAT

(c) Rolling Contact Cooling Water - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
		off-lbs) of nicke	el-cobalt rolled
with wate	1		
Chromium		0.028	0.011
Nickel		0.042	0.028

(d) Tube Reducing Spent Lubricants - BAT

There shall be no discharge of process wastewater pollutants.

(e) Drawing Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

(f) Drawing Spent Emulsions - BAT

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of nickel-cobalt drawn
with emulsions

Chromium	0.036	0.015
Nickel	0.053	0.036
Fluoride	5.68	2.52

(g) Extrusion Spent Lubricants - BAT

There shall be no discharge of process wastewater pollutants.

(h) Extrusion Press or Solution Heat Treatment Contact Cooling Water - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg heat treat		off-lbs) of extru	ded nickel-cobalt
neat treat	leu	·	ī
Chromium		0.031	0.013
		0.031 0.046	0.013 0.031 2.20

(i) Extrusion Press Hydraulic Fluid Leakage - BAT

Pollutant pollutant		Maximum f any one d		um for 1y average
mg/off-kg	(lb/million	off-lbs) of	nickel-cobalt	extruded
Chromium Nickel Fluoride	•	0.086 0.128 13.8	0.0 0.0 6.1	86

(j) Forging Equipment Cleaning Wastewater - BAT

Pollutant or	Maximum	for	Maximum	for	
pollutant property	any one	day	monthly	average	
	!				

mg/off-kg (lb/million off-lbs) of nickel-cobalt forged

Nickel0.0020.002Fluoride0.2380.106			
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(k) Forging Contact Cooling Water - BAT

Pollutant or	Maximum for	Maximum for	
pollutant property	any one day	monthly average	
mg/off-kg (lb/million with water	off-lbs) of forged	nickel-cobalt	cooled
Chromium	0.018	0.007	
Nickel	0.026	0.018	
Fluoride	2.82	1.25	

(1) Forging Press Hydraulic Fluid Leakage - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
mg/off-kg	(1b/million	off-lbs) of nick	cel-cobalt forged	ł
Chromium Nickel Fluoride		0.069 0.103 11.2	0.028 0.069 4.94	

(m) Forging Spent Lubricants - BAT

There shall be no discharge of process wastewater pollutants.

(n) Stationary Casting Contact Cooling Water - BAT

Pollutant or pollutant pro	operty	Maximum for any one day		age
mg/off-kg (] stationary ca			E nickel-cobalt cast	with
Chromium Nickel		0.448	0.182 0.448	
Fluoride		72.0	32.0	

(o) Vacuum Melting Steam Condensate - BAT

There shall be no allowance for the discharge of

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wastewater pollutants.

(p) Metal Powder Production Atomization Wastewater - BAT

		is the basis in the
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
pollucune propercy	any one aay	ononitige average
		A CONTRACTOR AND A CONTRACTOR
	'.	
<pre>mg/off-kg (lb/million</pre>	off-lbs) of nicke	1-cobalt metal
powder atomized		"福山"之""
powder decimiled		,
Chromium	0 070	³⁷ 0.393
	0.970	
Nickel	1.44	[₩] 0.970
Fluoride	156	69.2
	,	

(q) Annealing and Solution Heat Treatment Contact Cooling Water - BAT

There shall be no allowance for the discharge of wastewater pollutants.

(r) Wet Air Pollution Control Scrubber Blowdown - BAT

Pollutant pollutant		Maximum fo any one da		е
mg/off-kg	(lb/million	off-lbs) of	nickel-cobalt formed	
Chromium Nickel Fluoride		0.300 0.446 48.2	0.122 0.300 21.4	

(s) Surface Treatment Spent Baths - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
mg/off-kg treated		off-lbs) of nic	kel-cobalt surface	1
Chromium Nickel Fluoride	2* 	0.346 0.514 55.7	0.141 0.346 24.7	

(t) Surface Treatment Rinse - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
mg/off-kg treated	(lb/million	off-lbs) of nick	el-cobalt surface	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Chromium Nickel Fluoride	4 - 4 4 - 4 2 - 44	0.873 1.30 141	0.354 0.873 62.3	

(u) Alkaline Cleaning Spent Baths - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
	(lb/million c	off-lbs) of nickel-	-cobalt alkaline
cleaned			
Chromium	x.	0.013	0.005
Nickel	,	0.019	0.013
Fluoride	,	2.02	0.895
	·		· · · · · · · · · · · · · · · · · · ·
		j. i	
(v) Alkal:	ine Cleaning F	linse - BAT	
Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
-			

Chromium	0.086	0.035	ан Ал
Nickel	0.128	0.086	
Fluoride	13.9	6.15	* 4

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(w) Molten Salt Rinse - BAT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of nickel-cobalt treated
with molten salt

Chromium	0.312	0.127	1	,	
Nickel	0.464	0.312			,
Fluoride	50.2	22.3	:		
	I				

Pollutant or pollutant pro		Maximum any one		Maximum for monthly average	<u></u>
mg/off-kg (l with ammonia	b/million solution	off-lbs) (of nicke	el-cobalt treated	
Chromium Nickel Fluoride		0.000 0.008 0.88	3 [.]	0.002 0.006 0.391	

(x) Ammonia Rinse - BAT

(y) Sawing or Grinding Spent Emulsions - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
	(lb/million with emulsi	off-lbs) of nicke ons	l-cobalt sawed
Chromium		0.015	0.006
Nickel	. '	0.022	0.015

(z) Sawing or Grinding Rinse - BAT

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
	анан алан алан алан алан алан алан алан	
<pre>mg/off-kg (lb/millic nickel-cobalt rinsed</pre>		l or ground
nickel-cobalt rinsed	1	
		0.027 0.067

Pollutant pollutant		Maximum fo any one da		
mg/off-kg cleaned	(lb/million	off-lbs) of	nickel-cobalt ste	eam
Chromium Nickel Fluoride		0.011 0.017 1.79	0.005 0.011 0.795	

(ab) Hydrostatic Tube Testing and Ultrasonic Testing Wastewater - BAT

There shall be no allowance for the discharge of process wastewater pollutants.

(ac) Degreasing Spent Solvents - BAT

(aa) Steam Cleaning Condensate - BAT

There shall be no discharge of process wastewater pollutants.

(ad) Dye Pentrant Testing Wastewater - BAT

Pollutant pollutant		Maximum fo any one d		mum for hly average
	(lb/million rant method	off-lbs) of	nickel-cobalt	tested with
Chromium Nickel Fluoride		0.079 0.117 12.7		032 079 63

(ae) Electrocoating Rinse - BAT

Pollutant or pollutant propert	Maximum fo y any one da	
mg/off-kg (lb electrocoated	/million off-1	bs) of nickel-cobalt
Chromium Nickel Fluoride	1.25 1.86 201	0.506 1.25 89.0

(af) Miscellaneous Wastewater Sources - BAT

Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of nicke	el-cobalt formed
Chromium		0.091	0.037
Nickel		0.136	0.091
Fluoride	4	14.7	6.50
SUBPART D	•	AT MASS LIMITATION RMING SUBCATEGORY	NS FOR THE PRECIOUS
			and a state
-			
(a) Roll	ing Spent Ne	at Oils - BPT	ni ni j
(a) Roll	ing Spent Ne	at Oils - BPT	and a second sec

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pollutants.

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(b) Rolling Spent Emulsions - BPT

			······································
Pollutant		aximum for	Maximum for
pollutant	property a:	ny one day	monthly average
			· · · · · · · · · · · · · · · · · · ·
		-lbs) of preciou	s metals rolled
with emuls	lons		
		0.026	0 010
Chromium		0.026	0.012
Copper		0.147	0.077 0.010
Cyanide Silver	۰.	0.023 0.032	0.013
Oil & Grea		1.54	0.925
TSS	.se	3.16	1.51
	Within the read		
pH	within the range	e of 7.5 to 10.0	at all times
<u></u>			
	5		1
(c) Drawi	ng Spent Neat O	ile – BPT	
	ng bene neae o		
	4		
There	shall be no	discharge of	process wastewater
			Process (nubcendeer
pollutants	^		;
Ferree	-		
			i
			4 -
(d) Drawin	g Spent Emulsion	ns - BPT	. ÷
(,	5 - F		-
Pollutant	or Ma	aximum for	Maximum for
		ny one day	monthly average
.		1 1	1 1 1 1 1 1 1 1 1 1
	· · · · · · · · · · · · · · · · · · ·		
mg/off-kg	(lb/million off	-lbs) of preciou	s metals drawn
with emuls		, -	-
Cadmium		0.016	0.007
Copper		0.091	0.048
Cyanide		0.014	0.006
Silver		0.020	0.008
Oil & Grea	se	0.950	0.570
TSS		1.95	0.926
pH	Within the range	e of 7.5 to 10.0	
-	5		· · · ·

(e) Drawing Spent Soap Solutions - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
			uteraje
	(1b/million solutions	off-lbs) of preci	ous metals drawn
Cadmium		0.001	0.0005
Copper		0.006	0.003
Cyanide		0.0009	0.0004
Silver		0.001	0.0006
Oil & Grea	ase	0.063	0.038
TSS	$(1,1,2,\dots,n) \in \mathbb{R}^{n}$	0.128	0.061
рH	Within the	range of 7.5 to 10	0.0 at all times
· ·		· .	tion Wastewater - BP
Pollutant		Maximum for	ntion Wastewater - BP Maximum for monthly average
Pollutant pollutant	or property	Maximum for any one day	Maximum for monthly average
Pollutant pollutant	or property (lb/million	Maximum for	Maximum for monthly average
Pollutant pollutant mg/off-kg	or property (lb/million	Maximum for any one day	Maximum for monthly average
Pollutant pollutant mg/off-kg wet atomiz	or property (lb/million	Maximum for any one day off-lbs) of preci	Maximum for monthly average ous metals powder
Pollutant pollutant mg/off-kg wet atomi: Cadmium	or property (lb/million	Maximum for any one day off-lbs) of preci 2.27	Maximum for monthly average ous metals powder 1.00
Pollutant pollutant mg/off-kg wet atomi: Cadmium Copper	or property (lb/million	Maximum for any one day off-lbs) of preci 2.27 12.7	Maximum for monthly average ous metals powder 1.00 6.70
Pollutant pollutant mg/off-kg wet atomiz Cadmium Copper Cyanide	or property (lb/million zed	Maximum for any one day off-lbs) of preci 2.27 12.7 1.94	Maximum for monthly average ous metals powder 1.00 6.70 0.802
Pollutant pollutant mg/off-kg wet atomiz Cadmium Copper Cyanide Silver	or property (lb/million zed	Maximum for any one day off-lbs) of preci 2.27 12.7 1.94 2.70	Maximum for monthly average ous metals powder 1.00 6.70 0.802 1.14
Pollutant pollutant mg/off-kg wet atomiz Cadmium Copper Cyanide Silver Dil & Grea	or property (lb/million zed	Maximum for any one day off-lbs) of preci 2.27 12.7 1.94 2.70 134	Maximum for monthly average ous metals powder 1.00 6.70 0.802 1.14 80.2 130
Pollutant pollutant mg/off-kg wet atomiz Cadmium Copper Cyanide Silver Dil & Grea TSS	or property (lb/million zed	Maximum for any one day off-lbs) of preci 2.27 12.7 1.94 2.70 134 274	Maximum for monthly average ous metals powder 1.00 6.70 0.802 1.14 80.2 130

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Pollutant or	Maximum for	Maximum for	,
pollutant property	any one day	monthly average	
mg/off-kg (lb/million metals heat treated	off-lbs) of extru	ided precious	-
Cadmium	1.42	0.626	
Copper	7.93	4.17	
Cyanide	1.21	0.501	
Silver	1.71	0.709	:
Oil & Grease	83.4	50.1	
TSS	171	81.3	1
	ange of 7.5 to 10		
ph within the	ange 01 /.5 c0 10	. v at all times	I
.(h) Semi-Continuous on Cooling Water - BI	?T	- 	
Pollutant or	Maximum for	Maximum for	
pollutant property	any one day	monthly average	
mg/off-kg (lb/million the semi-continuous of			÷
Cadmium	3.50		ţ
		1.55	
Copper	—		t
Copper Cvanide	19.6 2.99	10.3	
Copper Cyanide Silver	19.6 2.99	10.3 1.24	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Cyanide Silver	19.6 2.99 4.23	10.3 1.24 1.75	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Cyanide Silver Oil & Grease	19.6 2.99 4.23 206	10.3 1.24 1.75 124	
Cyanide Silver Oil & Grease TSS	19.6 2.99 4.23	10.3 1.24 1.75 124 201	

(g) Heat Treatment Contact Cooling Water - BPT

(i) Stationary Casting Contact Cooling Water - BPT

There shall be no discharge of process wastewater pollutants.

(j) Direct Chill Casting Contact Cooling Water - BPT

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
		our motola roat
mg/off-kg (lb/millio by the direct chill		ous metals cast
Cadmium	3.67	1.62
Copper	20.5	10.8
Cyanide	3.13	1.30
Silver	4.43	1.84
Oil & Grease	216	130
TSS	443	211
pH Within the	range of 7.5 to 10	.0 at all times
· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · ·
(k) Shot Casting Con	tact Cooling Water	- BPT
		and the second
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
		ener mehele abet
mg/off-kg (lb/millio	n orr-rps) or preci	ous metais snot

cast Cadmium 1.25 0.551 Copper 6.98 3.67 Cyanide 1.07 0.441 Silver 0.624 1.51 73.4 Oil & Grease 44.1 151 71.6 TSS Within the range of 7.5 to 10.0 at all times pН

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(1) Wet Air Pollution Control Scrubber Blowdown - BPT

There shall be no discharge of process wastewater pollutants.

(m) Pressure Bonding Contact Cooling Water - BPT

Pollutant or pollutant pro		ximum for y one day	Maximum for monthly average	
mg/off-kg (lb base metal pr		lbs) of precious	metal and	
Cadmium Copper Cyanide Silver Oil & Grease TSS pH Wit	hin the range	0.029 0.159 0.024 0.034 1.67 3.43 of 7.5 to 10.0 a	0.013 0.084 0.010 0.014 1.00 1.63 at all times	

(n) Surface Treatment Spent Baths - BPT

Pollutant pollutant	Maximum for any one day	Maximum for monthly average	e
mg/off-kg surface ti	off-lbs) of preciou	is metals	-
Cadmium Copper Cyanide Silver Oil & Grea TSS pH	0.033 0.183 0.028 0.040 1.93 3.95 cange of 7.5 to 10.0	0.015 0.097 0.012 0.017 1.16 1.88) at all times	

(o) Surface Treatment Rinse - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
ng/off-kg (lb/millior	n off-lbs) of preci	ious metals
surface treated		
Cadmium	2.10	0.924
Copper	11.7	6.16
Cyanide	1.79	0.739
Silver	2.53	1.05
Oil & Grease	123	73.9
rss	253	120
pH Within the	range of 7.5 to 10	0.0 at all times
·····	······································	
······	· · · · ·	
······		
(p) Alkaline Cleaning	g Spent Baths - BPI	P
(p) Alkaline Cleaning Pollutant or	g Spent Baths - BP1 Maximum for	r Maximum for
Pollutant or		
	Maximum for	Maximum for
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
Pollutant or pollutant property mg/off-kg (lb/million	Maximum for any one day	Maximum for monthly average
Pollutant or pollutant property mg/off-kg (lb/million alkaline cleaned	Maximum for any one day n off-lbs) of preci	Maximum for monthly average ious metals
Pollutant or pollutant property mg/off-kg (lb/millior alkaline cleaned Cadmium	Maximum for any one day	Maximum for monthly average ious metals 0.009
Pollutant or pollutant property mg/off-kg (lb/millior alkaline cleaned Cadmium Copper	Maximum for any one day n off-lbs) of preci 0.021 0.114	Maximum for monthly average ious metals 0.009 0.060
Pollutant or pollutant property mg/off-kg (lb/million alkaline cleaned Cadmium Copper Cyanide	Maximum for any one day n off-lbs) of preci 0.021 0.114 0.018	Maximum for monthly average ious metals 0.009 0.060 0.007
Pollutant or pollutant property mg/off-kg (lb/million alkaline cleaned Cadmium Copper Cyanide Silver	Maximum for any one day n off-lbs) of preci 0.021 0.114 0.018 0.025	Maximum for monthly average ious metals 0.009 0.060 0.007 0.010
Pollutant or pollutant property mg/off-kg (lb/million alkaline cleaned Cadmium Copper Cyanide Silver	Maximum for any one day n off-lbs) of preci 0.021 0.114 0.018	Maximum for monthly average ious metals 0.009 0.060 0.007 0.010 0.720
Pollutant or pollutant property mg/off-kg (lb/million alkaline cleaned Cadmium Copper Cyanide Silver Oil & Grease TSS	Maximum for any one day n off-lbs) of preci 0.021 0.114 0.018 0.025 1.20 2.46	Maximum for monthly average ious metals 0.009 0.060 0.007 0.010 0.720 1.170
Pollutant or pollutant property mg/off-kg (lb/million alkaline cleaned Cadmium Copper Cyanide Silver Dil & Grease TSS	Maximum for any one day n off-lbs) of preci 0.021 0.114 0.018 0.025 1.20	Maximum for monthly average ious metals 0.009 0.060 0.007 0.010 0.720 1.170

(q) Alkaline Cleaning Rinse - BPT

Pollutant pollutant	Maximum fo any one da		
mg/off-kg alkaline o	n off-lbs) of	precious metals	
Cadmium Copper Cyanide Silver Oil & Grea TSS pH	3.81 21.3 3.25 4.59 224 459 range of 7.5	1.68 11.2 1.35 1.91 135 219 to 10.0 at all ti	mes

(r) Alkaline Cleaning Prebonding Wastewater - BPT

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average	1
mg/off-kg (lb/million		cious metal and base	
metal cleaned prior t	o bonding		
Cadmium	3.95	1.74	,
Copper	22.1	11.6	
Cyanide	3.37	1.39	
Silver	4.76	1.97	ŀ
Oil & Grease	232	139	
TSS	476	226	
pH Within the	range of 7.5 to 1	10.0 at all times	:

(s) Tumbling or Burnishing Wastewater - BPT

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				1.1
Pollutant	or	Maximum for	Maximum for	
pollutant	property	any one day	monthly average	e.
ma/off-ka	(lb/million	off-lbs) of r	precious metals tumble	4
or burnis		COLL IDD) OF F		× , ,
Cadmium		4.12	1.82	•
Copper Cyanide		23.0 3.51	12.1 1.45	
Silver	1 A.	4.96	2.06	· · ·
Oil & Gre	ase	242	145	· · · ·
TSS	Χ.	496	236	
рH	Within the	range of 7.5 t	to 10.0 at all times	
	'	•		
		i i		-
(t) Sawi	ng or Grindi	ng Spent Neat	Oils - BPT	
	n .		5 34.400	`
Ther	e shall be	e no discharge	e of process wastew	ater
		e no discharge	e of process wastew	ater
Ther pollutant		e no discharge	e of process wastew	ater
		e no discharge	e of process wastew	ater
		e no discharge	e of process wastew	ater
pollutant	S.	e no discharge ng Spent Emuls:		ater
pollutant (u) Sawin	s. g or Grindir	ng Spent Emuls	lons - BPT	ater
pollutant (u) Sawin Pollutant	s. g or Grindir or	ng Spent Emuls Maximum for	ions - BPT Maximum for	
pollutant (u) Sawin Pollutant	s. g or Grindir	ng Spent Emuls Maximum for	ions - BPT Maximum for	
pollutant (u) Sawin Pollutant pollutant	s. g or Grindir or property	ng Spent Emuls: Maximum for any one day	lons - BPT Maximum for y monthly avera	
pollutant (u) Sawin Pollutant pollutant mg/off-kg	s. g or Grindir or property	ng Spent Emuls Maximum for any one day n off-lbs) of p	ions - BPT Maximum for	
pollutant (u) Sawin Pollutant pollutant mg/off-kg or ground	s. g or Grindir or property (lb/millior	ng Spent Emuls Maximum for any one day n off-lbs) of p ons	lons - BPT Maximum for monthly average precious metals sawed	
pollutant (u) Sawin Pollutant pollutant mg/off-kg	s. g or Grindir or property (lb/millior	ng Spent Emuls: Maximum for any one day n off-lbs) of p ons 0.032 0.178	lons - BPT Maximum for monthly average precious metals sawed 0.014 0.094	
pollutant (u) Sawin Pollutant pollutant mg/off-kg or ground Cadmium Copper Cyanide	s. g or Grindir or property (lb/millior	ng Spent Emuls: Maximum for any one day n off-lbs) of p ons 0.032 0.178 0.027	ions - BPT Maximum for monthly avera precious metals sawed 0.014 0.094 0.011	
pollutant (u) Sawin Pollutant pollutant mg/off-kg or ground Cadmium Copper Cyanide Silver	s. g or Grindir or property (lb/millior with emulsi	ng Spent Emuls Maximum for any one day n off-lbs) of p ons 0.032 0.178 0.027 0.039	Lons - BPT Maximum for monthly average precious metals sawed 0.014 0.094 0.011 0.016	
pollutant (u) Sawin Pollutant pollutant mg/off-kg or ground Cadmium Copper Cyanide Silver Oil & Gre	s. g or Grindir or property (lb/millior with emulsi	ng Spent Emuls Maximum for any one day n off-lbs) of p ons 0.032 0.178 0.027 0.039 1.87	Ions - BPT Maximum for monthly average precious metals sawed 0.014 0.094 0.011 0.016 1.12	
pollutant (u) Sawin Pollutant pollutant mg/off-kg or ground Cadmium Copper Cyanide Silver	s. g or Grindir or property (lb/millior with emulsi	ng Spent Emuls Maximum for any one day n off-lbs) of p ons 0.032 0.178 0.027 0.039 1.87 3.83	Lons - BPT Maximum for monthly average precious metals sawed 0.014 0.094 0.011 0.016	

(v) Degreasing Spent Solvents - BPT

There shall be no discharge of process wastewater pollutants.

(a) Rolling Spent Neat Oils - BAT

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(b) Rolling Spent Emulsions - BAT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million with emulsions	n off-lbs) of precio	us metals rolled
Cadmium	0.026	0.012
Copper	0.147	0.077
Cyanide	0.023	0.010
Silver	0.032	0.013
(c) Drawing Spent Ne	eat Oils - BAT	· · ·
There shall be	no discharge of	process wastewater
pollutants.		
-		· .
(d) Drawing Spent Emu	lsions - BAT	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million with emulsions	n off-lbs) of precio	us metals drawn
with emulsions		
with emulsions Cadmium	0.016	0.007
with emulsions Cadmium Copper	0.016 0.091	0.007 0.048
with emulsions	0.016	0.007
with emuisions Cadmium Copper Cyanide	0.016 0.091 0.014 0.020	0.007 0.048 0.006
with emulsions Cadmium Copper Cyanide Silver (e) Drawing Spent Soa Pollutant or	0.016 0.091 0.014 0.020 ap Solutions - BAT Maximum for	0.007 0.048 0.006 0.008 Maximum for
with emulsions Cadmium Copper Cyanide Silver (e) Drawing Spent Soa Pollutant or	0.016 0.091 0.014 0.020 Ap Solutions - BAT	0.007 0.048 0.006 0.008
with emulsions Cadmium Copper Cyanide Silver (e) Drawing Spent Soa Pollutant or pollutant property mg/off-kg (lb/million	0.016 0.091 0.014 0.020 Ap Solutions - BAT Maximum for any one day	0.007 0.048 0.006 0.008 Maximum for monthly average
with emulsions Cadmium Copper Cyanide Silver (e) Drawing Spent Soa Pollutant or pollutant property mg/off-kg (lb/million with soap solutions	0.016 0.091 0.014 0.020 Ap Solutions - BAT Maximum for any one day	0.007 0.048 0.006 0.008 Maximum for monthly average
with emulsions Cadmium Copper Cyanide Silver (e) Drawing Spent Soa Pollutant or pollutant property mg/off-kg (lb/million with soap solutions Cadmium	0.016 0.091 0.014 0.020 Ap Solutions - BAT Maximum for any one day n off-1bs) of precio	0.007 0.048 0.006 0.008 Maximum for monthly average us metals drawn
with emulsions Cadmium Copper Cyanide Silver (e) Drawing Spent Soa Pollutant or pollutant property mg/off-kg (lb/million with soap solutions Cadmium Copper	0.016 0.091 0.014 0.020 Ap Solutions - BAT Maximum for any one day n off-1bs) of precio 0.001	0.007 0.048 0.006 0.008 Maximum for monthly average us metals drawn 0.0005 0.003 0.0004
with emulsions Cadmium Copper Cyanide Silver	0.016 0.091 0.014 0.020 Ap Solutions - BAT Maximum for any one day n off-1bs) of precio 0.001 0.001	0.007 0.048 0.006 0.008 Maximum for monthly average us metals drawn 0.0005 0.003

Pollutant or	Maximum for	Maximum for
pollutant property	y any one day	monthly average
	lion off-lbs) of preci	ious metals powder
wet atomized		
Cadmium	2.27	1.00
Copper	12.7	6.68
Cyanide	1.94	0.802
Silver	2.74	1.14
(g) Heat Treatment	t Contact Cooling Wate	er – BAT
Pollutant or	Maximum for	Maximum for
pollutant property		monthly average
ng/off-kg (lb/mil) neat treated	lion off-lbs) of preci	ious metals
an an trans	0 1 4 0	0.000
	0.142	0.063
Copper	0.793	0.417
Copper Cyanide	0.793 0.121	
Copper Cyanide Silver	0.793	0.417 0.050
Cadmium Copper Cyanide Silver Gold	0.793 0.121 0.171	0.417 0.050 0.071
Copper Cyanide Silver Gold	0.793 0.121 0.171 us and Continuous Cast	0.417 0.050 0.071
Copper Cyanide Silver Gold (h) Semi-Continuou Cooling Water Pollutant or	0.793 0.121 0.171 us and Continuous Cast - BAT Maximum for	0.417 0.050 0.071
Copper Cyanide Silver Gold (h) Semi-Continuou Cooling Water Pollutant or	0.793 0.121 0.171 us and Continuous Cast - BAT Maximum for	0.417 0.050 0.071
Copper Cyanide Silver Gold (h) Semi-Continuou Cooling Water Pollutant or pollutant property mg/off-kg (lb/mili	0.793 0.121 0.171 us and Continuous Cast - BAT Maximum for y any one day Lion off-1bs) of preci	0.417 0.050 0.071 ing Contact Maximum for monthly average Lous metals cast by
Copper Cyanide Silver Gold (h) Semi-Continuou Cooling Water Pollutant or pollutant property mg/off-kg (lb/mil) the semi-continuou	0.793 0.121 0.171 us and Continuous Cast - BAT Maximum for y any one day Lion off-1bs) of preci us or continuous metho	0.417 0.050 0.071 ing Contact Maximum for monthly average Lous metals cast by
Copper Cyanide Silver Gold (h) Semi-Continuou Cooling Water Pollutant or pollutant property mg/off-kg (lb/mil) the semi-continuou	0.793 0.121 0.171 us and Continuous Cast - BAT Maximum for any one day Lion off-1bs) of preci s or continuous metho	0.417 0.050 0.071 ing Contact Maximum for monthly average Lous metals cast by
Copper Cyanide Silver Gold (h) Semi-Continuou Cooling Water Pollutant or pollutant property mg/off-kg (lb/mill the semi-continuou Cadmium	0.793 0.121 0.171 us and Continuous Cast - BAT Maximum for y any one day Lion off-1bs) of preci us or continuous metho	0.417 0.050 0.071 ing Contact Maximum for monthly average lous metals cast by od
Copper Cyanide Silver Gold (h) Semi-Continuou Cooling Water Pollutant or pollutant property mg/off-kg (lb/mil) the semi-continuou	0.793 0.121 0.171 us and Continuous Cast - BAT Maximum for y any one day Lion off-1bs) of preci 1s or continuous metho 0.350	0.417 0.050 0.071 ing Contact Maximum for monthly average lous metals cast by od 0.155

(f) Metal Powder Production Wet Atomization Wastewater - BAT

(i) Stationary Casting Contact Cooling Water - BAT

There shall be no discharge of process wastewater pollutants.

(j) Direct Chill Casting Contact Cooling Water - BAT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of precious metals cast
by the direct chill method

Cadmium	0.3676	0.162
Copper	2.05	1.08
Cyanide	0.313	0.130
Silver	0.443	0.184

(k) Shot Casting Contact Cooling Water - BAT

Pollutant pollutant			um for ne day	Maximum for monthly average
mg/off-kg cast	(1bmillion	off-lbs)	of precio	ous metals shot
Cadmium	,		0.125	0.055
Copper		,	0.698	♡ 0.367
Cyanide			0.107	0.044
Silver			0.151	0.063

(1) Wet Air Pollution Control Scrubber Blowdown - BAT

Pollutant or	Maximum for	Maximum for
pollutant proper	ty any one day	monthly average
mg/off-kg (lb/mi) metal pressure bo	llion off-lbs) of preci- onded	ous metal and base
Cadmium	0.0297	0.013
Copper	0.159	0.084
Cyanide	0.0247	0.010
Silver	0.0342	0.014
(n) Surface Treat	tment Spent Baths - BAT	· · · · · · · · · · · · · · · · · · ·
Pollutant or	Maximum for	Maximum for
pollutant propert	ty any one day	monthly average
mg/off-kg (lb/mil surface treated	llion off-lbs) of preci	ous metals
surface treated		
	Llion off-lbs) of precis 0.033 0.183	ous metals 0.015 0.097
surface treated Cadmium	0.033	0.015
surface treated Cadmium Copper	0.033 0.183	0.015 0.097
surface treated Cadmium Copper Cyanide	0.033 0.183 0.028	0.015 0.097 0.012
surface treated Cadmium Copper Cyanide Silver	0.033 0.183 0.028	0.015 0.097 0.012
surface treated Cadmium Copper Cyanide Silver	0.033 0.183 0.028 0.040	0.015 0.097 0.012
surface treated Cadmium Copper Cyanide Silver (0) Surface Treat Pollutant or	0.033 0.183 0.028 0.040 :ment Rinse - BAT Maximum for	0.015 0.097 0.012 0.017
surface treated Cadmium Copper Cyanide Silver (0) Surface Treat Pollutant or pollutant propert	0.033 0.183 0.028 0.040 :ment Rinse - BAT Maximum for	0.015 0.097 0.012 0.017 Maximum for monthly average
surface treated Cadmium Copper Cyanide Silver (0) Surface Treat Pollutant or pollutant propert mg/off-kg (lb/mil treated	0.033 0.183 0.028 0.040 :ment Rinse - BAT Maximum for :y any one day :lion off-1bs) of precio	0.015 0.097 0.012 0.017 Maximum for monthly average ous metals surface
surface treated Cadmium Copper Cyanide Silver (0) Surface Treat Pollutant or pollutant propert mg/off-kg (lb/mil treated Cadmium	0.033 0.183 0.028 0.040 cment Rinse - BAT Maximum for cy any one day llion off-lbs) of precio	0.015 0.097 0.012 0.017 Maximum for monthly average
surface treated Cadmium Copper Cyanide Silver (0) Surface Treat Pollutant or pollutant propert mg/off-kg (lb/mil	0.033 0.183 0.028 0.040 :ment Rinse - BAT Maximum for :y any one day :lion off-1bs) of precio	0.015 0.097 0.012 0.017 Maximum for monthly average ous metals surface 0.093

(m) Pressure Bonding Contact Cooling Water - BAT

(p) Alkaline Cleaning Spent Baths - BAT

Pollutant pollutant		Maximu any on		Maximum for monthly average
mg/off-kg cleaned	(lb/million	off-lbs)	of precious	metals alkaline
Cadmium Copper Cyanide Silver			0.021 0.114 0.018 0.025	0.009 0.060 0.007 0.010

(q) Alkaline Cleaning Rinse - BAT

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Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of precio	us metals alkaline
Cadmium		0.381	0.168
Copper Cyanide		2.13 0.325	1.12 0.135
Silver		0.459	0.191

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Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
	(lb/million ned prior t		ous metal and base	1
Cadmium		0.400	0.174	
Copper		2.210	1.16	
Cyanide		0.337	0.139	
Silver		0.476	0.197	
				1

(r) Alkaline Cleaning Prebonding Wastewater - BAT

(s) Tumbling or Burnishing Wastewater - BAT

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Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average	
mg/off-kg (lb/milli or burnished	on off-lbs) of preci	ous metals tumbled	
Cadmium	0.412	0.182	
Copper	2.300	1.21	i
Cyanide	0.351	0.145	
Silver	0.496	0.206	

(t) Sawing or Grinding Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

(u) Sawing or Grinding Spent Emulsions - BAT

Pollutant o	r	Maximum for	Maximum for
pollutant p	roperty	any one day	monthly average
T T		4 4	1 5
	÷		
	lb/million o ith emulsion	ff-lbs) of precious s	metals sawed
Cadmium		0.0327	0.014
Copper		0.178	0.094
Cyanide		0.0277	0.011
		0.0381	
Silver		0.0381	0.016
			ter and the second s
			· · ·
			$= \left(\left(\left(\left(\frac{1}{2} \right)^{2} \right)^{2} \right)^{2} \right)^{2} \left(\left(\frac{1}{2} \right)^{2} \right)^{2} \left(\left(\left(\left(\left(\left(\left(\left(\frac{1}{2} \right)^{2} \right)^{2} \right)^{2} \right)^{2} \right)^{2} \right)^{2} \right)^{2} \right)^{2} \left($
(v) Degrea	sing Spent S	olvents - BAT	
		•** •	• · · · · · · · · · · · · · · · · · · ·
There	shall be	no discharge of	process wastewater
	. 1		, · · ·
pollutants.			· · · · · · · · · · · · · · · · · · ·
	•		
SUBPART E:		MASS LIMITATIONS F ING SUBCATEGORY	OR THE REFRACTORY
		, :	

(a) Rolling Spent Neat Oils and Graphite Based Lubricants - BAT

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average	
mg/off-kg (lb/millio: with emulsions	n off-lbs) of refra	ctory metals rolled	
Copper Nickel Fluoride Molybdenum Oil & Grease TSS pH Within the	0.815 0.824 25.5 2.84 8.58 17.6 range of 7.5 to 10	0.429 0.545 11.3 1.47 5.15 8.37 .0 at all times	

(c) Drawing Spent Lubricants - BPT

(b) Rolling Spent Emulsions - BPT

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Spent Lubricants - BPT

Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of refractory metals extruded 2.26 1.19 Copper Nickel 2.29 1.51 Fluoride 70.8 31.4 4.07 7.87 Molybdenum 23.8 Oil & Grease 14.3 48.8 23.2 TSS Within the range of 7.5 to 10.0 at all times pН (f) Forging Spent Lubricants - BPT There shall be no discharge of process wastewater pollutants. (g) Forging Contact Cooling Water - BPT Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of forged refractory metals cooled with water Copper 0.614 0.323 Nickel 0.620 0.410 Fluoride 19.2 8.53 Molybdenum 2.14 1.11 Oil & Grease 6.46 3.88 TSS 13.3 6.30 Within the range of 7.5 to 10.0 at all times pН

(e) Extrusion Press Hydraulic Fluid Leakage - BPT

Pollutant	or	Maximum for	Maximum for	
		any one day	monthly average	3
mg/off-kg formed	(ID/MILLION	off-lbs) of refra	ctory metals	;
Copper		2.59	1.36	
Nickel		2.61	1.73	
Fluoride		80.9	35.9	
Molybdenum	n	8.99	4.65	
Oil & Grea	ase	27.2	16.3	
TSS		55.8	26.5	
pH	Within the	range of 7.5 to 10	.0 at all times	;
(i) Metal	Powder Prod	uction Wastewater	- BPT	
	*.	Maximum for	- BPT Maximum for	
Pollutant	*.	Maximum for		2
Pollutant pollutant mg/off-kg	or property	Maximum for any one day	Maximum for	
Pollutant pollutant mg/off-kg produced	or property	Maximum for any one day off-lbs) of refra	Maximum for monthly average ctory metals powder	
Pollutant pollutant mg/off-kg produced Copper	or property	Maximum for any one day off-lbs) of refra 0:534	Maximum for monthly average ctory metals powder 0.281	
Pollutant pollutant mg/off-kg produced Copper Nickel	or property	Maximum for any one day off-lbs) of refra 0.534 0.540	Maximum for monthly average ctory metals powder 0.281 0.357	
Pollutant pollutant mg/off-kg produced Copper Nickel Fluoride	or property (lb/million	Maximum for any one day off-lbs) of refra 0.534 0.540 16.70	Maximum for monthly average ctory metals powder 0.281 0.357 7.42	
Pollutant pollutant mg/off-kg produced Copper Nickel Fluoride Molybdenum	or property (lb/million	Maximum for any one day off-lbs) of refra 0.534 0.540 16.70 1.86	Maximum for monthly average ctory metals powder 0.281 0.357 7.42 0.961	
Pollutant pollutant mg/off-kg produced Copper Nickel Fluoride Molybdenum Oil & Grea	or property (lb/million n ase	Maximum for any one day off-lbs) of refra 0.534 0.540 16.70 1.86 5.62 11.5	Maximum for monthly average ctory metals powder 0.281 0.357 7.42 0.961 3.37 5.48	
Pollutant pollutant mg/off-kg produced Copper Nickel Fluoride Molybdenum	or property (lb/million n ase	Maximum for any one day off-lbs) of refra 0.534 0.540 16.70 1.86	Maximum for monthly average ctory metals powder 0.281 0.357 7.42 0.961 3.37 5.48	

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(h) Equipment Cleaning Wastewater - BPT

(j) Metal Powder Production Floor Wash Wastewater - BPT

There shall be no discharge of process wastewater pollutants.

(k) Metal Powder Pressing Spent Lubricants - BPT

There shall be no discharge of process wastewater pollutants.

(1) Surface Treatment Spent Baths - BPT

Pollutant or pollutant pr	Maximum for any one day	Maximum for monthly average
mg/off-kg (] surface trea	off-lbs) of re	fractory metals
Copper Nickel Fluoride Molybdenum Oil & Grease TSS pH Wi	$\begin{array}{c} 0.739 \\ 0.747 \\ 23.2 \\ 2.57 \\ 7.78 \\ 16.0 \end{array}$	0.389 0.494 10.3 1.33 4.68 7.59 10.0 at all times

(m) Surface Treatment Rinse - BPT

Pollutant of		Maximum for	Maximum for
pollutant p		any one day	monthly average
mg/off-kg (treated	lb/million	off-lbs) of re	efractory metals surface
Copper		230	121
Nickel		233	154
Fluoride		7200	3200
Molybdenum		800	414
Oil & Grease		2420	1450
TSS		4960	2360
pH W		ange of 7.5 to	5 10.0 at all times

Pollutant	or	Maximum for	Maximum for
	property	any one day	monthly average
	· · · · · · · · · · · ·		
mg/off-kg cleaned	(lb/million	off-lbs) of refi	ractory metals alkaline
Copper		0.635	0.334
Nickel		0.641	0.424
Fluoride		19.9	8.82
Molybdenum		2.21	1.14
Oil & Grea	ase	6.68	4.01
TSS		13.7	6.52
pH	Within the :	range of 7.5 to 1	LO.O at all times
	na Classina		
· ·		Rinse - BPT	
Pollutant	or	Maximum for	Maximum for
Pollutant		Maximum for	Maximum for monthly average
Pollutant pollutant mg/off-kg	or property	Maximum for any one day	
Pollutant pollutant	or property	Maximum for any one day	monthly average
Pollutant pollutant mg/off-kg cleaned	or property	Maximum for any one day	monthly average
Pollutant pollutant mg/off-kg	or property	Maximum for any one day off-lbs) of refr	monthly average actory metals alkaline
Pollutant pollutant mg/off-kg cleaned Copper	or property	Maximum for any one day off-lbs) of refr 1550	monthly average actory metals alkaline 816
Pollutant pollutant mg/off-kg cleaned Copper Nickel	or property (lb/million	Maximum for any one day off-lbs) of refr 1550 1570	monthly average actory metals alkaline 816 1040
Pollutant pollutant mg/off-kg cleaned Copper Nickel Fluoride	or property (lb/million	Maximum for any one day off-lbs) of refr 1550 1570 48600	monthly average actory metals alkaline 816 1040 21600
Pollutant pollutant mg/off-kg cleaned Copper Nickel Fluoride Molybdenum	or property (lb/million	Maximum for any one day off-lbs) of refr 1550 1570 48600 5400	monthly average actory metals alkaline 816 1040 21600 2790
Pollutant pollutant mg/off-kg cleaned Copper Nickel Fluoride Molybdenum Oil & Grea TSS	or property (lb/million	Maximum for any one day off-lbs) of refr 1550 1570 48600 5400 16300 33500	monthly average actory metals alkaline 816 1040 21600 2790 9790

(n) Alkaline Cleaning Spent Baths - BPT

(p) Molten Salt Rinse - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
	n off-lbs) of refra	actory metals treated
with molten salt		· · · ·
Copper	12.1	6.33
Nickel	12.2	8.04
Fluoride	377	167
Molybdenum	41.9	21.7
Oil & Grease	127	76.0
TSS	260	124
pH Within the	range of 7.5 to 10	0.0 at all times
(q) Tumbling or Burni	shing Wastewater -	- BPT
· • • • •	• 1	
Pollutant or	Maximum for	Maximum for
(q) Tumbling or Burni Pollutant or pollutant property	Maximum for	
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
Pollutant or pollutant property mg/off-kg (lb/millior	Maximum for any one day	Maximum for
Pollutant or pollutant property mg/off-kg (lb/millior	Maximum for any one day	Maximum for monthly average
Pollutant or pollutant property mg/off-kg (lb/millior or burnished	Maximum for any one day a off-lbs) of refra	Maximum for monthly average actory metals tumbled
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper	Maximum for any one day a off-lbs) of refra 23.8	Maximum for monthly average actory metals tumbled 12.5
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper Nickel	Maximum for any one day n off-lbs) of refra 23.8 24.0	Maximum for monthly average actory metals tumbled 12.5 15.9
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper Nickel Fluoride	Maximum for any one day a off-lbs) of refra 23.8 24.0 744	Maximum for monthly average actory metals tumbled 12.5 15.9 330
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper Nickel Fluoride Molybdenum	Maximum for any one day n off-lbs) of refra 23.8 24.0 744 82.7	Maximum for monthly average actory metals tumbled 12.5 15.9 330 42.8
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper Nickel Fluoride Molybdenum Oil & Grease	Maximum for any one day a off-lbs) of refra 23.8 24.0 744 82.7 250	Maximum for monthly average actory metals tumbled 12.5 15.9 330 42.8 150
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper Nickel Fluoride Molybdenum Oil & Grease TSS	Maximum for any one day a off-lbs) of refra 23.8 24.0 744 82.7 250 513	Maximum for monthly average actory metals tumbled 12.5 15.9 330 42.8 150 244
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper Nickel Fluoride Molybdenum Oil & Grease TSS	Maximum for any one day a off-lbs) of refra 23.8 24.0 744 82.7 250	Maximum for monthly average actory metals tumbled 12.5 15.9 330 42.8 150 244
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper Nickel Fluoride Molybdenum Oil & Grease TSS	Maximum for any one day a off-lbs) of refra 23.8 24.0 744 82.7 250 513	Maximum for monthly average actory metals tumbled 12.5 15.9 330 42.8 150 244
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper Nickel Fluoride Molybdenum Oil & Grease TSS	Maximum for any one day a off-lbs) of refra 23.8 24.0 744 82.7 250 513	Maximum for monthly average actory metals tumbled 12.5 15.9 330 42.8 150 244
Pollutant or pollutant property mg/off-kg (lb/millior or burnished Copper Nickel Fluoride Molybdenum Oil & Grease TSS	Maximum for any one day a off-lbs) of refra 23.8 24.0 744 82.7 250 513	Maximum for monthly average actory metals tumbled 12.5 15.9 330 42.8 150 244

(r) Sawing or Grinding Spent Neat Oils - BPT

There shall be no discharge of process wastewater pollutants.

Pollutant pollutant		Maximum fo any one da		aximum for onthly avera	ge
	(lb/million of with emulsion		refractory	metals sawe	đ
Copper Nickel Fluoride Molybdenum Oil & Grea TSS pH		0.565 0.570 17.7 1.97 5.94 12.2 ange of 7.5	to 10.0 at	0.297 0.377 7.84 1.02 3.57 5.79 all times	

(s) Sawing or Grinding Spent Emulsions - BPT

(t) Sawing or Grinding Contact Cooling Water - BPT

Pollutant or	r	Maximum for	Maximum for	
pollutant p	roperty	any one day	monthly average	
Ferrare Fe	<u>r</u> r		------	
4				
	lh/million of	f-lba) of refrector	www.wotola.govod	
		f-lbs) of refractor	ry metals sawed	
or ground w	ith contact o	cooling water		
				4
Copper		46.2	24.3	
Nickel	# 1	46.7	30.9	
Fluoride		1450	642	
	<i></i>	161	83.1	3
Molybdenum	- * # #		•••	
Oil & Grease	e ; ;	486	292	-
TSS		997	474	
pH W:	ithin [:] the rar	nge of 7.5 to 10.0 a	at all times	
F				4

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(u) Sawing or Grinding Rinse - BPT

Pollutant or	Maximum for	Maximum for	ge
pollutant property	any one day	monthly avera	
mg/off-kg (lb/million refractory metals ring		or ground	·
Copper	0.257	0.135	
Nickel	0.259	0.172	
Fluoride	8.03	3.57	
Molybdenum	0.893	0.462	
Oil & Grease	2.70	1.62	
TSS	5.54	2.63	
pH Within the	range of 7.5 to 10	.0 at all times	

(v) Wet Air Pollution Control Scrubber Blowdown - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million		
ground, surface coate	d or surface treat	ced
Copper	1.50	0.787
Nickel	1.51	1.00
Fluoride	46.8	20.8
Molybdenum	5.20	2.69
Oil & Grease	15.8	9.45
TSS	32.3	15.4
pH Within the	range of 7.5 to 10	0.0 at all times
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Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
ng/off-kg	(lb/million	off-lbs) of ref	fractory metals formed
Copper		0.656	0.345
Nickel		0.663	0.438
Fluoride		20.6	9.11
Molybdenum	ı	2.28	1.18
Oil & Grea	ase	6.9	4.14
rss		14.2	6.73
рH	Within the	range of 7.5 to	10.0 at all times
(x) Dye H	enetrant Te	sting Wastewater	- BPT
Pollutant	or	Maximum for	Maximum for
	property		
ng/off-kg	(lb/million	off-lbs) of ref rant methods	
ng/off-kg tested wit	(lb/million	off-lbs) of ref	
ng/off-kg tested wit Copper	(lb/million	off-lbs) of ref rant methods	Fractory metals
ng/off-kg tested wit Copper Nickel	(lb/million	off-lbs) of ref rant methods 0.150 0.150 4.62	Tractory metals
ng/off-kg tested wit Copper Nickel Fluoride Molybdenum	(lb/million h dye penet:	off-lbs) of ref rant methods 0.150 0.150	Tractory metals 0.078 0.099
ng/off-kg cested wit Copper Nickel Fluoride Molybdenum	(lb/million h dye penet:	off-lbs) of ref rant methods 0.150 0.150 4.62 0.513 1.60	0.078 0.099 2.05 0.266 0.931
ng/off-kg tested wit Copper Nickel Fluoride Molybdenum Dil & Grea	(lb/million h dye penet: se	off-lbs) of ref rant methods 0.150 0.150 4.62 0.513 1.60 3.20	Eractory metals 0.078 0.099 2.05 0.266 0.931 1.52
ng/off-kg cested wit Copper Nickel Fluoride Molybdenum Dil & Grea	(lb/million h dye penet: se	off-lbs) of ref rant methods 0.150 0.150 4.62 0.513 1.60 3.20	0.078 0.099 2.05 0.266 0.931
ng/off-kg tested wit Copper Nickel Fluoride Molybdenum Dil & Grea ISS	(lb/million h dye penet: se	off-lbs) of ref rant methods 0.150 0.150 4.62 0.513 1.60 3.20	Eractory metals 0.078 0.099 2.05 0.266 0.931 1.52
ng/off-kg cested wit Copper Nickel Fluoride Molybdenum Dil & Grea	(lb/million h dye penet: se	off-lbs) of ref rant methods 0.150 0.150 4.62 0.513 1.60 3.20	Eractory metals 0.078 0.099 2.05 0.266 0.931 1.52
ng/off-kg tested wit Copper Nickel Fluoride Molybdenum Dil & Grea	(lb/million h dye penet: se	off-lbs) of ref rant methods 0.150 0.150 4.62 0.513 1.60 3.20	Eractory metals 0.078 0.099 2.05 0.266 0.931 1.52
ng/off-kg tested wit Copper Nickel Fluoride Molybdenum Dil & Grea	(lb/million h dye penet: se	off-lbs) of ref rant methods 0.150 0.150 4.62 0.513 1.60 3.20	Eractory metals 0.078 0.099 2.05 0.266 0.931 1.52
ng/off-kg tested wit Copper Nickel Fluoride Molybdenum Dil & Grea DSS DH	(lb/million h dye penet: se Within the r	off-lbs) of ref rant methods 0.150 0.150 4.62 0.513 1.60 3.20	Tractory metals 0.078 0.099 2.05 0.266 0.931 1.52 10.0 at all times
ng/off-kg tested wit Copper Nickel Fluoride Molybdenum Dil & Grea ISS OH	(lb/million h dye penet: se Within the r	off-lbs) of ref rant methods 0.150 0.150 4.62 0.513 1.60 3.20 range of 7.5 to	Tractory metals 0.078 0.099 2.05 0.266 0.931 1.52 10.0 at all times
ng/off-kg tested wit Copper Nickel Fluoride Molybdenum Dil & Grea TSS DH	(lb/million h dye penet: se Within the s	off-lbs) of ref rant methods 0.150 4.62 0.513 1.60 3.20 range of 7.5 to	Tractory metals 0.078 0.099 2.05 0.266 0.931 1.52 10.0 at all times
ng/off-kg tested wit Copper Nickel Fluoride Molybdenum Dil & Grea TSS DH	(lb/million h dye penet: se Within the sing Spent (off-lbs) of ref rant methods 0.150 4.62 0.513 1.60 3.20 range of 7.5 to	Contemporation of the second s

(w) Miscellaneous Wastewater Sources - BPT

(a) Rolling Spent Neat Oils and Graphite Based Lubricants - BAT

There shall be no discharge of process wastewater

pollutants.

(b) Rolling Spent Emulsions - BAT

Pollutant or pollutant pro	Maximu any or		Maximum for monthly average
mg/off-kg (lb with emulsion	off-lbs;	of refra	actory metals rolled
Copper).549	0.262
Nickel).236 5.5	0.159
Fluoride			11.3

(c) Drawing Spent Lubricants - BAT

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Spent Lubricants - BAT

Pollutant or pollutant property Maximum for any one day Maximum monthly mg/off-kg (lb/million off-lbs) of refractory metals extruded 0.655 0.730 Copper 1.5 0.730 Nickel 0.655 0.441 Fluoride 71.0 31.4 Molybdenum 5.99 2.66 (f) Forging Spent Lubricants - BAT There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Any one day Maximum monthly	average
<pre>mg/off-kg (lb/million off-lbs) of refractory metals extruded Copper 1.5 0.730 Nickel 0.655 0.441 Fluoride 71.0 31.4 Molybdenum 5.99 2.66 (f) Forging Spent Lubricants - BAT There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Follutant or Maximum for Maximum</pre>	
extruded Copper 1.5 0.730 Nickel 0.655 0.441 Fluoride 71.0 31.4 Molybdenum 5.99 2.66 (f) Forging Spent Lubricants - BAT There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	;
Nickel 0.655 0.441 Fluoride 71.0 31.4 Molybdenum 5.99 2.66 (f) Forging Spent Lubricants - BAT There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	· · · · · · · · · · · · · · · · · · ·
Nickel 0.655 0.441 Fluoride 71.0 31.4 Molybdenum 5.99 2.66 (f) Forging Spent Lubricants - BAT There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	· · · · · · · · · · · · · · · · · · ·
Fluoride 71.0 31.4 Molybdenum 5.99 2.66 (f) Forging Spent Lubricants - BAT There shall be no discharge of process we pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for	
Molybdenum 5.99 2.66 (f) Forging Spent Lubricants - BAT There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	
There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	· · · · ·
There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	· · ·
There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	
There shall be no discharge of process w pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	
pollutants. (g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	
(g) Forging Contact Cooling Water - BAT Pollutant or Maximum for Maximum	vastewater
Pollutant or Maximum for Maximum	1 44 - 1
Pollutant or Maximum for Maximum	с. т
Pollutant or Maximum for Maximum	
Pollutant or Maximum for Maximum	
	• •
pollutant property any one day monthly	
	average
mg/off-kg (lb/million off-lbs) of forged refractory cooled with water	,
Copper 0.041 0.02	metals
Nickel 0.018 0.01	
Fluoride 1.92 0.85	20 .2
Molybdenum 0.163 0.07	20 22

(e) Extrusion Press Hydraulic Fluid Leakage - BAT

(h) Equipment Cleaning Wastewater - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of refra	actory metals formed
Copper	n	0.174	0.083
Nickel		0.075	0.051
Fluoride		8.09	3.59
Molybdenum		0.684	0.303

(i) Metal Powder Production Wastewater - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg produced	(lb/million	off-lbs) of refra	actory metals powder
Copper		0.360	0.172
Nickel		0.155	0.104
Fluoride		16.7	7.42
TTUCTTUC			0.627

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(j) Metal Powder Production Floor Wash Wastewater - BAT

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(k) Metal Powder Pressing Spent Lubricants - BAT

There shall be no discharge of process wastewater pollutants.

(1) Surface Treatment Spent Baths - BAT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/mill surface treated	ion off-lbs) of refrac	ctory metals
Copper Nickel Fluoride Molybdenum	0.498 0.214 23.2 1.96	0.237 0.144 10.3 0.868
(m) Surface Treatm	ent Rinse - BAT	
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/mill treated	ion off-lbs) of refrac	ctory metals surface
Copper Nickel Fluoride Molybdenum	15.5 6.66 720. 60.9	7.38 4.48 320. 27.0
	· · · · · · · · · · · · · · · · · · ·	
		، ۱۹۹۰ - ۱۹۹۹ ۱۹۹۰ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹

(n) Alkaline Cleaning Spent Baths - BAT

pollutant property		
	any one day	monthly average
ng/off-kg (lb/million	off-lbs) of refra	actory metals
alkaline cleaned	:	
Copper	0.428	0.204
Nickel	0.184	0.124
Fluoride	19.9	8.82
Molybdenum	1.68	0.745
	<u>, , , , , , , , , , , , , , , , , , , </u>	
(o) Alkaline Cleaning	Rinse - BAT	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million	off-lbs) of refra	actory metals
alkaline cleaned		
Copper	10.5	4.98
Nickel	4.49	3.02
Fluoride	486.	216.
Molybdenum	41.1	18.2
1		44 1
(p) Molten Salt Rinse	- BAT	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million		
treated with molten s		actory metars
Coppor	0.810	0.386
Copper Nickel	0.348	0.234
Fluoride	37.7	16.7
Molybdenum	3.19	1.41
	, =	
	· · · · · · · · · · · · · · · · · · ·	

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg or burnish		off-lbs) of refr	actory metals tumbled
Copper	a	1.60	0.763
Nickel		0.688	0.463
Fluoride		74.4	33.0
Molybdenum		6.29	2.79

(q) Tumbling or Burnishing Wastewater - BAT

(r) Sawing or Grinding Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

(s) Sawing or Grinding Spent Emulsions - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million with emulsi		actory metals sawed
Copper	n	0.380	0.181
Nickel		0.164	0.110
Fluoride		17.7	7.84
Molybdenum		1.50	0.663

(t) Sawing or Grinding Contact Cooling Water - BAT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millio	n off-lbs) of refra	ctory metals sawed
or ground with conta		-
Copper	3.11	1.48
Nickel	1.34	0.899
Fluoride	145.0	64.2
Molybdenum	12.2	5.42
(u) Sawing or Grindi	ng Rinse - BAT	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
Copper Nickel Fluoride Molybdenum	0.018 0.008 0.803 0.068	0.009 0.005 0.357 0.030
(v) Wet Air Pollutio	n Control Scrubber	Blowdown - BAT
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millio surface coated or su	n off-lbs) of refra rface treated	
The formula of the second s		
Copper	1.01	0.480
Copper Nickel	0.433	0.291
The formula of the second s		

(w) Miscellaneous Wastewater Sources - BAT

Pollutant pollutant		Maximum fo any one da		aximum onthly	for average
mg/off-kg	(lb/million	off-lbs) of	refractory	metals	formed
Copper Nickel Fluoride Molybdenum	ı	0.442 0.190 20.6 1.74		0.211 0.128 9.11 0.770	

(x) Dye Penetrant Testing Wastewater - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg tested	(lb/million	off-lbs) of refra	actory metals product
Copper	a	0.100	0.048
Nickel		0.043	0.029
Fluoride		4.62	2.05
Molybdenum		0.391	0.173

(y) Degreasing Spent Solvents

There shall be no discharge of process wastewater pollutants.

SUBPART F: BPT AND BAT MASS LIMITATIONS FOR THE TITANIUM FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - BPT

(b) Rolling Contact Cooling Water - BPT

•	Maximum for	Maximum for
operty	any one day	monthly average
	off-lbs) of tit	anium rolled with
	1.4 2.05 7.13 651	0.586 0.976 2.98 286
	97.6 200	129 58.6 95.2 10.0 at all times
Spent Neat	Oils - BPT	
shall be	nod discharge	of process wastewater
:	·.	·
on spent Ne	at Oils - BPT	
shall be	nod discharge	of process wastewater
on Spent Em	ulsions - BPT	
	Maximum for any one day	Maximum for monthly average
	off-lbs) of tit	anium extruded
	0.021 0.030 0.105	0.009 0.015 0.044
	ing water thin the r Spent Neat shall be on spent Ne shall be on Spent Em	b/million off-lbs) of tit. b/million off-lbs) of tit. ing water 1.4 2.05 7.13 651 291 97.6 200 thin the range of 7.5 to Spent Neat Oils - BPT shall be nod discharge on spent Neat Oils - BPT shall be nod discharge on Spent Emulsions - BPT Maximum for coperty any one day b/million off-lbs) of tit ons 0.021

Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
ng/off-kg	(lb/million	off-lbs) of titan	ium extruded
Cyanide		0.052	0.022
Lead		0.075	0.036
Zinc		0.260	0.109
Ammonia		23.7	10.5
Fluoride		10.6	4.70
Oil & Grea	ase	3.56	2.14
TSS		7.30	3.47
	Within the	range of 7.5 to 10	
	<u> </u>		
(g) Forgin	ng Spent Lub	ricants - BPT	
There	e shall be	no discharge o	f process wastewate
There	e shall be	no discharge o	f process wastewate
		no discharge o	f process wastewate
		no discharge o	f process wastewate
		no discharge o	f process wastewate
		no discharge o	f process wastewate
pollutant:	5.		
pollutant:	5.	no discharge o ooling Water - BPT	
pollutant: (h) Forgin	s. ng Contact C	ooling Water - BPT	
pollutant: (h) Forgin Pollutant	s. ng Contact C or	ooling Water - BPT Maximum for	Maximum for
pollutant: (h) Forgin Pollutant	s. ng Contact C	ooling Water - BPT	
pollutant: (h) Forgin Pollutant pollutant	ng Contact C or property	ooling Water - BPT Maximum for any one day	Maximum for monthly average
pollutant: (h) Forgin Pollutant pollutant mg/off-kg	s. ng Contact C or property (lb/millio	ooling Water - BPT Maximum for	Maximum for monthly average
pollutant: (h) Forgin Pollutant pollutant mg/off-kg	s. ng Contact C or property (lb/millio	ooling Water - BPT Maximum for any one day	Maximum for monthly average
pollutant: (h) Forgin Pollutant pollutant mg/off-kg with wate:	s. ng Contact C or property (lb/millio	ooling Water - BPT Maximum for any one day n off-lbs) of for	Maximum for monthly average ged titanium coole
pollutant: (h) Forgin Pollutant pollutant mg/off-kg with wate: Cyanide	s. ng Contact C or property (lb/millio	ooling Water - BPT Maximum for any one day n off-1bs) of for 0.580	Maximum for monthly average ged titanium coole 0.240
pollutants (h) Forgin Pollutant pollutant mg/off-kg with wates Cyanide Lead	s. ng Contact C or property (lb/millio	ooling Water - BPT Maximum for any one day n off-lbs) of for 0.580 0.840	Maximum for monthly average ged titanium coole 0.240 0.400
pollutant: (h) Forgin Pollutant pollutant mg/off-kg with wate: Cyanide Lead	s. ng Contact C or property (lb/millio	ooling Water - BPT Maximum for any one day n off-1bs) of for 0.580	Maximum for monthly average ged titanium coole 0.240
pollutant: (h) Forgin Pollutant pollutant mg/off-kg with wate: Cyanide Lead Zinc	s. ng Contact C or property (lb/millio	ooling Water - BPT Maximum for any one day n off-lbs) of for 0.580 0.840	Maximum for monthly average ged titanium coole 0.240 0.400
pollutants (h) Forgin Pollutant pollutant mg/off-kg with wates Cyanide Lead Zinc Ammonia	s. ng Contact C or property (lb/millio	ooling Water - BPT Maximum for any one day n off-lbs) of for 0.580 0.840 2.92 267	Maximum for monthly average ged titanium coole 0.240 0.400 1.22 117
pollutants (h) Forgin Pollutant pollutant mg/off-kg with wates Cyanide Lead Zinc Ammonia Fluoride	ng Contact C or property (lb/millio	ooling Water - BPT Maximum for any one day n off-lbs) of for 0.580 0.840 2.92 267 119	Maximum for monthly average ged titanium coole 0.240 0.400 1.22 117 52.8
pollutant: (h) Forgin Pollutant pollutant mg/off-kg with wate: Cyanide Lead Zinc Ammonia Fluoride Oil & Grea	ng Contact C or property (lb/millio	ooling Water - BPT Maximum for any one day n off-lbs) of for 0.580 0.840 2.92 267 119 40.0	Maximum for monthly average ged titanium coole 0.240 0.400 1.22 117 52.8 24.0
pollutants (h) Forgin Pollutant pollutant mg/off-kg with wates Cyanide Lead Zinc Ammonia Fluoride	ng Contact C or property (1b/millio r	ooling Water - BPT Maximum for any one day n off-lbs) of for 0.580 0.840 2.92 267 119	Maximum for monthly average ged titanium coole 0.240 0.400 1.22 117 52.8 24.0 39.0

(f) Extrusion Press Hydraulic Fluid Leakage - BPT

(i) Forging Equipment Cleaning Wastewater - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million	off-lbs) of titanium	forged
Cyanide	0.012	0.005
Lead	0.017	0.008
Zinc	0.059	0.025
Ammonia	5.33	2.35
Fluoride	2.38	1.06
Oil & Grease	0.800	0.480
TSS	1.64	0.780
pH Within the	range of 7.5 to 10.0	at all times

(j) Forging Press Hydraulic Fluid Leakage - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million	off-lbs) of titani	um forged
Cyanide	0.293	0.121
Lead	0.424	0.202
Zinc	1.48	0.616
Ammonia	135	59.2
Fluoride	60.1	26.7
Oil & Grease	20.2	12.1
TSS	41.4	19.7
pH Within the	range of 7.5 to 10.	0 at all times

(k) Tube Reducing Spent Lubricants - BPT

There shall be no discharge of process wastewater pollutants.

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(1) Heat Treatment Contact Cooling Water - BPT

There shall be no allowance for the discharge of process wastewater pollutants.

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(m) Surface Treatment Spent Baths - BPT

TSS

pH

Oil & Grease

			1	
Pollutant	or	Maximum for	Maximum for	•
pollutant	property	any one day	monthly ave	rage
~			-	
				······································
mg/off-kg	(lb/million	off-lbs) of titan	ium surface tre	ated
Cyanide		0.061	0.025	
Lead		0.088	0.042	<u>.</u>
Zinc		0.304	0.127	
Ammonia		27.7	12.2	•
Fluoride		12.4	5.49	
Oil & Grea	ase	4.16	2.50	
TSS		8.53	4.06	Ŷ
pH	Within the p	range of 7.5 to 10	.0 at all times	
-				
			······································	······································
				÷
(n) Surfac	ce Treatment	Rinse - BPT		1. s
		· · · · · · · · · · · · · · · · · · ·		· · ·
Pollutant		Maximum for	Maximum for	5
pollutant	property	any one day	monthly ave	rage
			· ·	2 1 1
mg/off-kg	(lb/million	off-lbs) of titan	ium surface tre	ated
				Aus
Cyanide		8.47	3.51	annan tra staa kriss
Lead		12.3	5.84	
Zinc		42.7	17.8	
Ammonia		3,890	1,710	•
Fluoride		1,740	771	1
011 6 6		504	251	

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Within the range of 7.5 to 10.0 at all times

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(o) Wet Air Pollution Control Scrubber Blowdown - BPT

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Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg or forged	(lb/million	off-lbs) of titan	ium surface treated
Cyanide		0.621	0.257
Lead		0.899	0.428
Zinc		3.13	1.31
Ammonia		285	126
Fluoride		128	56.5
Oil & Grea		42.8	25.7
TSS		87.8	41.8
pH		range of 7.5 to 10	0.0 at all times

(p) Alkaline Cleaning Spent Baths - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of titanium	alkaline
Cyanide Lead		0.070 0.101	0.029 0.048
Zinc		0.351	0.147
Ammonia		32.0	14.1
Fluoride		14.3	6.34
Oil & Grea	se	4.80	2.88
TSS	1 m	9.84	4.68
pH	Within the r	ange of 7.5 to 10.0	at all times

Pollutant	or	Maximum for	Maximum f	or
pollutant	property	any one day	monthly a	verage
_				:
mg/off-kg	(lb/million	of-lbs) of titan	ium alkaline c	leaned
		•		
Cyanide		0.801	0.331	
Lead		1.16	0.552	i i
Zinc		4.03	1.69	· · · · · · · · · · · · · · · · · · ·
Ammonia		370	162	
Fluoride		164	72.9	
Oil & Grea	ase	55.2	33.1	
TSS		113	53.8	
pH	Within the m	range of 7.5 to l	0.0 at all tim	es
(r) Molter	n Salt Rinse	- BPT		
•••				
Pollutant	or	Maximum for	Maximum f	
Pollutant	or		Maximum f monthly a	
Pollutant	or	Maximum for		
Pollutant pollutant	or property	Maximum for any one day	monthly a	verage
Pollutant pollutant mg/off-kg	or property (lb/million	Maximum for	monthly a	verage
Pollutant pollutant mg/off-kg	or property	Maximum for any one day	monthly a	verage
Pollutant pollutant mg/off-kg molten sa:	or property (lb/million	Maximum for any one day n of-lbs) of t	monthly a itanium rinse	verage
Pollutant pollutant mg/off-kg molten sal Cyanide	or property (lb/million	Maximum for any one day n of-lbs) of t 0.277	monthly a itanium rinse 0.115	verage
Pollutant pollutant mg/off-kg molten sa: Cyanide Lead	or property (lb/million	Maximum for any one day n of-lbs) of t 0.277 0.401	monthly a itanium rinse 0.115 0.191	verage
Pollutant pollutant mg/off-kg molten sa Cyanide Lead Zinc	or property (lb/million	Maximum for any one day n of-lbs) of t 0.277 0.401 1.40	monthly a itanium rinse 0.115 0.191 0.583	verage
Pollutant pollutant mg/off-kg molten sal Cyanide Lead Zinc Ammonia	or property (lb/million	Maximum for any one day n of-lbs) of t 0.277 0.401 1.40 128	monthly a itanium rinse 0.115 0.191 0.583 56.0	verage
Pollutant pollutant mg/off-kg molten sa Cyanide Lead Zinc Ammonia Fluoride	or property (lb/million lt treatment	Maximum for any one day n of-lbs) of t 0.277 0.401 1.40 128 56.8	monthly a itanium rinse 0.115 0.191 0.583 56.0 25.2	verage
Pollutant pollutant mg/off-kg molten sal Cyanide Lead Zinc Ammonia Fluoride Oil & Grea	or property (lb/million lt treatment	Maximum for any one day n of-lbs) of t 0.277 0.401 1.40 128 56.8 19.1	monthly a itanium rinse 0.115 0.191 0.583 56.0 25.2 11.5	verage
Pollutant pollutant mg/off-kg molten sal Cyanide Lead Zinc Ammonia Fluoride Oil & Grea TSS	or property (lb/million Lt treatment	Maximum for any one day n of-lbs) of t 0.277 0.401 1.40 128 56.8	monthly a itanium rinse 0.115 0.191 0.583 56.0 25.2 11.5 18.6	verage d after

(q) Alkaline Cleaning Rinse - BPT

(s) Tumbling Wastewater - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg	(lb/million	off-lbs) of titan	ium tumbled
Cyanide Lead Zinc Ammonia Fluoride Oil & Grea TSS pH		0.229 0.332 1.16 110. 47.0 15.8 32.4 range of 7.5 to 10	0.095 0.158 0.482 46. 20.9 9.48 15.4 .0 at all times
There	e shall be	g Spent Neat Oils no discharge of	- BPT process wastewater
pollutant	5•		
(u) Sawine	g or Grinding	Spent Emulsions	- BPT
Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg with an e		off-lbs) of titan	ium sawed or ground
Cyanide Lead Zinc Ammonia Fluoride Oil & Grea TSS pH		0.053 0.077 0.267 24.4 10.9 3.66 7.51 cange of 7.5 to 10	0.022 0.037 0.112 10.7 4.83 2.20 3.57 0.0 at all times

(v) Sawin	g or Grinding	Contact Coolin	g Water - BPT	-
Pollutant pollutant		Maximum for any one day	Maximum for monthly average	1
	(lb/million act cooling wa		tanium sawed or ground	E 1 1
Cyanide Lead Zinc Ammonia Fluoride Oil & Grea TSS	ase	1.38 2.00 6.95 635 283 95.2 195	0.571 0.952 2.91 279 126 57.1 92.8	
pH	Within the ra	nge of 7.5 to 1	10.0 at all times	•

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(w) Dye Penetrat Testing Wastewater - BPT Pollutant or Maximum for Maximum for any one day pollutant property monthly average mg/off-kg (lb/million of-lbs) of titanium tested with dye penetrant methods Cyanide 0.325 0.135 Lead 0.471 0.224 Zinc 1.64 0.683 Ammonia 149 65.7 66.7 Fluoride 29.6 Oil & Grease 22.4 13.5 TSS 45.9 21.9 Within the range of 7.5 to 10.0 at all times ЪЦ (x) Hydrotesting Wastewater - BPT There shall be no discharge of process wastewater pollutants. (y) Miscellaneous Wastewater Sources - BPT Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of titanium formed Cyanide 0.010 0.004 Lead 0.014 0.007 Zinc 0.048 0.020 Ammonia 4.32 1.90 Fluoride 1.93 0.856 Oil & Grease 0.648 0.389 1.33 TSS 0.632 Within the range of 7.5 to 10.0 at all times pН

(z) Degreasing Spent Solvents - BPT

(a) Rolling Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

(b) Rolling Contact Cooling Water - BAT

Pollutant pollutant		Maximum for any one day	Maximum fo monthly av	
	(lb/million act cooling	off-lbs) of titani water	ium rolled	:
Cyanide Lead Zinc Ammonia Fluoride		0.142 0.205 0.713 65.1 29.1	0.059 0.098 0.298 28.6 12.90	

(c) Drawing Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

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(e) Extrusion Spent Lubricants - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titan	ium extruded
Cyanide		0.021	0.009
Lead		0.030	0.015
Zinc		0.105	0.044
Ammonia		9.59	4.22
Fluoride		4.28	1.90

(f) Extrusion Press Hydraulic Fluid Leakage - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titan	nium extruded
Cyanide		0.052	0.022
Lead		0.075	0.036
Zinc		0.260	0.109
Ammonia		23.7	10.5
Fluoride		10.6	4.70

(g) Forging Spent Lubricants - BAT

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There shall be no discharge of process wastewater

pollutants.

(h) Forging Contact Cooling Water - BAT

Pollutant or pollutant prop		num for one day	Maximum fo monthly av	
mg/off-kg (lb with water	/million off-1	.bs) of forged	l titanium	cooled
Cyanide Lead Zinc Ammonia Fluoride		0.029 0.042 0.146 13.3 5.95	0.012 0.020 0.061 5.86 2.64	

(i) Forging Equipment Cleaning Wastewater - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
mg/off-kg	(lb/million	off-lbs) of titanium	forged	
Cyanide Lead Zinc Ammonia Fluoride		0.012 0.017 0.059 5.33 2.38	0.005 0.008 0.025 2.35 1.06	

(j) Forging Press Hydraulic Fluid Leakage - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	·
mg/off-kg	(lb/million	off-lbs) of titanium	forged	
Cyanide Lead Zinc Ammonia Fluoride		0.293 0.424 1.48 135 60.1	0.121 0.202 0.616 59.2 26.7	1 1 1

(k) Tube Reducing Spent Lubricants - BAT

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There shall be no discharge of process wastewater pollutants.

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(1) Heat Treatment Contact Cooling Water - BAT

There shall be no discharge allowance for process wastewater pollutants.

(m) Surface Treatment Spent Baths - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	· ·
mg/off-kg	(lb/million	off-lbs) of titanio	um surface treated	
Cyanide Lead Zinc Ammonia Fluoride		0.061 0.088 0.304 27.7 12.4	0.025 0.042 0.127 12.2 5.49	

(n) Surface Treatment Rinse - BAT Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of titanium surface treated Cyanide 0.847 0.351 Lead 1.23 0.584 Zinc 4.27 1.78 Ammonia 389 171 Fluoride 174 77.1

(o) Wet Air Pollution Control Scrubber Blowdown - BAT Pollutant or Maximum for Maximum for any one day pollutant property monthly average mg/off-kg (lb/million off-lbs) of titanium surface treated or forged Cvanide 0.062 0.026 0.090 0.043 Lead 0.131 Zinc 0.313 Ammonia 28.5 12.6 Fluoride 12.8 5.68 (p) Alkaline Cleaning Spent Baths - BAT Maximum for Pollutant or Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) ot titanium alkaline cleaned 0.070 0.029 Cyanide 0.101 Lead ···· 0.048 0.351 Zinc 0.147 Ammonia 32.0 14.1 Fluoride 14.3 6.34 (q) Alkaline Cleaning Rinse - BAT Pollutant or Maximum for Maximum for pollutant property any one day monthly average and and the second **...**, . mg/off-kg (lb/million off-lbs) of titanium alkaline cleaned 0.080 0.033 Cyanide Lead 0.116 0.055 0.403 Zinc 0.169 Ammonia 36.8 16.2 Fluoride 16.4 7.29

(r) Molten Salt Rinse - BAT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million molten salt	off-lbs) of	titanium treated with
Cyanide	0.277	0.115
Lead	0.401	0.191
Zinc	1.40	0.583
Ammonia	128	56.0
Fluoride	56.8	25.2

(s) Tumbling Wastewater - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	k 2
mg/off-kg	(lb/million	off-lbs) of titanium	tumbled	
Cyanide Lead Zinc Ammonia Fluoride		0.023 0.033 0.116 11.0 4.70	0.010 0.016 0.048 4.63 2.09	

(t) Sawing or Grinding Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

(u) Sawing or Grinding Spent Emulsions - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg with emuls	(lb/million sions	off-lbs) of titanium	sawed or ground
Cyanide		0.053	0.022
Lead		0.077	0.037
Zinc		0.267	0.112
Ammonia		24.4	10.7
Fluoride		10.9	4.83

(v) Sawing or Grinding Contact Cooling Water - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million c act cooling wa	off-lbs) to titanium ter	sawed or ground
Cyanide		0.138	0.057
Lead		0.200	0.095
Zinc		0.695	0.291
Ammonia		63.5	27.9
Fluoride		28.3	12.6

(w) Dye Penetrant Testing Wastewater - BAT

Pollutant pollutant	Maximum any one	-	
mg/off-kg penetrant	off-lbs)	of	titanium tested with dye
Cyanide Lead Zinc Ammonia Fluoride	0.3 0.4 1.6 149 66.7	54	0.135 0.224 0.683 65.7 29.6

(x) Hydrotesting Wastewater - BAT

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There	shall	be	no	discharge	of	process	wastewater
pollutants.	,		÷	· · ·			

(y) Miscellaneous Wastewater Sources - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	;
mg/off-kg	(lb/million	off-lbs) of titanin	um formed	-
Cyanide Lead Zinc Ammonia Fluoride		0.010 0.014 0.048 4.32 1.93	0.004 0.007 0.020 1.90 0.856	

(z) Degreasing Spent Solvents - BAT

There shall be no discharge of process wastewater pollutants.

SUBPART G: BPT and BAT MASS LIMITATIONS FOR THE URANIUM FORMING SUBCATEGORY

(a) Extrusion Spent Lubricants - BPT

There shall be no discharge process wastewater pollutants.

Maximum for Maximum for Pollutant or pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of uranium extruded Cadmium 0.117 0.052 Chromium 0.152 0.062 Copper 0.654 0.344 Lead 0.145 0.069 Nickel 0.661 0.437 Fluoride 20.5 9.08 Molybdenum 2.28 1.18 Oil & Grease 6.88 4.13 TSS 14.1 6.71 pH Within the range of 7.5 to 10.0 at all times (c) Heat Treatment Contact Cooling Water - BPT Pollutant or Maximum for monthly average Maximum for pollutant property any one day mg/off-kg (lb/million off-lbs) of extruded or forged uranium heat treated Cadmium 0.646 0.285 Chromium 0.836 0.342 Copper 3.61 1.90 Lead 0.798 0.380 Nickel 3.65 2.42 Fluoride 113 50.2 Molybdenum 12.6 6.5 Oil & Grease 38.0 22.8 TSS . 77.9 37.1 pН Within the range of 7.5 to 10.0 at all times (d) Forging Spent Lubricants - BPT There shall be no discharge of process wastewater pollutants.

(b) Extrusion Tool Contact Cooling Water - BPT

Pollutant	or	Maximum for	Maximum for
	property	any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of uranium	surface treated
Cadmium		0.010	0.004
Chromium		0.012	0.005
Copper		0.052	0.027
Lead		0.012	0.006
Nickel		0.052	0.035
Fluoride		1.62	0.718
lolybdenur		0.180	0.093
Dil & Grea	ase	0.544	0.327
rss		1.12	0.531
рН	Within the	range of 7.5 to 10.0	at all times
(f) Surfa	re Treatment	Rinse - BPT	
(I) SUITA	ce ileacment		
Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
	······································	and a second and a second s	
lg/off-kg	(lb/million	off-lbs) of uranium	surface treated
	(lb/million		
Ladmium	(lb/million	0.115	0.050
admium Chromium	(lb/million		
Ladmium Chromium Copper	(lb/million	0.115 0.149 0.641	0.050 0.061
Ladmium Chromium Copper Jead	(lb/million	0.115 0.149	0.050 0.061 0.337
Ladmium Chromium Copper Lead Lickel	(lb/million	0.115 0.149 0.641 0.142	0.050 0.061 0.337 0.068
Ladmium Chromium Copper Lead Jickel Fluoride		0.115 0.149 0.641 0.142 0.647	0.050 0.061 0.337 0.068 0.428
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum	1	0.115 0.149 0.641 0.142 0.647 20.1	0.050 0.061 0.337 0.068 0.428 8.90
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum Dil & Grea	1	$\begin{array}{c} 0.115\\ 0.149\\ 0.641\\ 0.142\\ 0.647\\ 20.1\\ 2.23 \end{array}$	0.050 0.061 0.337 0.068 0.428 8.90 1.16
Cadmium Chromium Copper Sead Nickel Nickel Fluoride Molybdenum Dil & Grea	1 1380	$\begin{array}{c} 0.115\\ 0.149\\ 0.641\\ 0.142\\ 0.647\\ 20.1\\ 2.23\\ 6.74 \end{array}$	0.050 0.061 0.337 0.068 0.428 8.90 1.16 4.05 6.57
ng/off-kg Cadmium Chromium Copper Gead Nickel Fluoride Molybdenum Dil & Grea CSS	1 1380	0.115 0.149 0.641 0.142 0.647 20.1 2.23 6.74 13.8	0.050 0.061 0.337 0.068 0.428 8.90 1.16 4.05 6.57
Cadmium Chromium Copper Sead Nickel Nickel Fluoride Molybdenum Dil & Grea	1 1380	0.115 0.149 0.641 0.142 0.647 20.1 2.23 6.74 13.8	0.050 0.061 0.337 0.068 0.428 8.90 1.16 4.05 6.57
Cadmium Chromium Copper Jead Nickel Vluoride Cluoride Clybdenum Dil & Grea	1 1380	0.115 0.149 0.641 0.142 0.647 20.1 2.23 6.74 13.8	0.050 0.061 0.337 0.068 0.428 8.90 1.16 4.05 6.57
Cadmium Chromium Copper Sead Nickel Fluoride Molybdenum Dil & Grea	1 1380	0.115 0.149 0.641 0.142 0.647 20.1 2.23 6.74 13.8	0.050 0.061 0.337 0.068 0.428 8.90 1.16 4.05 6.57

(e) Surface Treatment Spent Baths - BPT

(g) Wet Air Pollution Control Scrubber Blowdown - BPT

Pollutant	property	Maximum for any one day	Maximum for
	propercy	any one day	monthly average
ıg∕off−kg	(lb/million	n off-lbs) of uran	ium surface treated
Cadmium		0.001	0.0006
Chromium		0.002	0.0007
Copper		0.007	0.004
Lead		0.002	
Nickel		0.007	0.005
Fluoride		0.208	0.092
Molybdenu	n	0.023	
Oil [®] & Grea		0.070	
TSS		0.143	0.068
рH	Within the	range of 7.5 to 1	0.0 at all times
	-	ng Spent Emulsions	
Pollutant	-	Maximum for	- BPT Maximum for monthly average
Pollutant pollutant mg/off-kg with emul	or property (lb/million	Maximum for any one day n off-lbs) of uran	Maximum for monthly average ium sawed or ground
Pollutant pollutant mg/off-kg with emul Cadmium	or property (lb/million	Maximum for any one day n off-lbs) of uran 0.002	Maximum for monthly average ium sawed or ground 0.0009
Pollutant pollutant mg/off-kg with emul Cadmium Chromium	or property (lb/million	Maximum for any one day n off-lbs) of uran 0.002 0.003	Maximum for monthly average ium sawed or ground 0.0009 0.001
Pollutant pollutant mg/off-kg with emula Cadmium Chromium Copper	or property (lb/million	Maximum for any one day n off-lbs) of uran 0.002 0.003 0.011	Maximum for monthly average ium sawed or ground 0.0009 0.001 0.006
Pollutant pollutant mg/off-kg with emula Cadmium Chromium Copper Lead	or property (lb/million	Maximum for any one day n off-lbs) of uran 0.002 0.003 0.011 0.003	Maximum for monthly average ium sawed or ground 0.0009 0.001 0.006 0.001
Pollutant pollutant mg/off-kg with emula Cadmium Chromium Copper Lead Nickel	or property (lb/million	Maximum for any one day n off-lbs) of uran 0.002 0.003 0.011 0.003 0.011	Maximum for monthly average ium sawed or ground 0.0009 0.001 0.006 0.001 0.001 0.007
Pollutant pollutant mg/off-kg with emula Cadmium Chromium Copper Lead Nickel Fluoride	or property (lb/million sions	Maximum for any one day n off-lbs) of uran 0.002 0.003 0.011 0.003 0.011 0.338	Maximum for monthly average ium sawed or ground 0.0009 0.001 0.006 0.001 0.007 0.150
Pollutant pollutant mg/off-kg with emul Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum	or property (lb/million sions	Maximum for any one day n off-lbs) of uran 0.002 0.003 0.011 0.003 0.011 0.338 0.038	Maximum for monthly average ium sawed or ground 0.0009 0.001 0.006 0.001 0.007 0.150 0.020
Pollutant pollutant mg/off-kg with emula Cadmium Chromium Copper Lead Nickel Fluoride	or property (lb/million sions	Maximum for any one day n off-lbs) of uran 0.002 0.003 0.011 0.003 0.011 0.338	Maximum for monthly average ium sawed or ground 0.0009 0.001 0.006 0.001 0.007 0.150

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Pollutant or	Maximum for	Maximum for	
pollutant property	any one day	monthly average	
mg/off-kg (lb/mill	ion off-lbs) of uraniu	m sawed or	
ground with contac			
Cadmium	0.561	0.248	
Chromium	0.726	0.297	
Copper	3.14	1.65	
Lead	0.693	0,330	
Nickel	3.17	2.1	
Fluoride	98.2	43.6	
Molybdenum	10.9	5.65	,
Oil & Grease	33.0	19.8	
TSS	67.7	32.2	1
pH Within t	he range of 7.5 to 10.	0 at all times	
(j) Sawing or Grin			:
(j) Sawing or Grin Pollutant or	Maximum for	Maximum for	
-	Maximum for	Maximum for monthly average	· · ·
(j) Sawing or Grin Pollutant or pollutant property	Maximum for	monthly average	· · · · · · · · · · · · · · · · · · ·
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed	Maximum for any one day ion off-lbs) of sawed o	monthly average or ground uranium	
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed Cadmium	Maximum for any one day ion off-lbs) of sawed 0.002	monthly average or ground uranium 0.0007	· · · · · · · · · · · · · · · · · · ·
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed Cadmium Chromium	Maximum for any one day ion off-lbs) of sawed 0.002 0.002	monthly average or ground uranium 0.0007 0.0009	· · ·
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed Cadmium Chromium Copper	Maximum for any one day ion off-lbs) of sawed 0.002 0.002 0.009	monthly average or ground uranium 0.0007 0.0009 0.005	· · · · · · · · · · · · · · · · · · ·
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed Cadmium Chromium Copper Lead	Maximum for any one day ion off-lbs) of sawed 0.002 0.002 0.009 0.002	monthly average or ground uranium 0.0007 0.0009 0.005 0.001	
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed Cadmium Chromium Copper Lead Nickel	Maximum for any one day ion off-lbs) of sawed 0.002 0.002 0.009 0.002 0.009 0.002 0.009	monthly average or ground uranium 0.0007 0.0009 0.005 0.001 0.006	
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed Cadmium Chromium Copper Lead Nickel Fluoride	Maximum for any one day ion off-lbs) of sawed 0.002 0.002 0.009 0.002 0.009 0.002 0.009 0.277	monthly average or ground uranium 0.0007 0.0009 0.005 0.001 0.006 0.123	
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum	Maximum for any one day ion off-lbs) of sawed 0.002 0.002 0.009 0.002 0.009 0.002 0.009 0.277 0.031	monthly average or ground uranium 0.0007 0.0009 0.005 0.001 0.006 0.123 0.016	
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum Oil & Grease	Maximum for any one day ion off-lbs) of sawed 0.002 0.002 0.009 0.002 0.009 0.277 0.031 0.093	monthly average or ground uranium 0.0007 0.0009 0.005 0.001 0.006 0.123 0.016 0.056	
(j) Sawing or Grin Pollutant or pollutant property mg/off-kg (lb/mill rinsed Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum Oil & Grease TSS	Maximum for any one day ion off-lbs) of sawed 0.002 0.002 0.009 0.002 0.009 0.002 0.009 0.277 0.031	monthly average or ground uranium 0.0007 0.0009 0.005 0.001 0.006 0.123 0.016 0.056 0.091	

(i) Sawing or Grinding Contact Cooling Water - BPT

(k) Area Cleaning Rinse - BPT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of uranium	1 formed
Cadmium	se	0.015	0.007
Chromium		0.019	0.008
Copper		0.082	0.043
Lead		0.018	0.009
Nickel		0.083	0.055
Fluoride		2.56	1.14
Molybdenum		0.284	0.147
Oil & Grea		0.858	0.515
TSS		1.76	0.837
pH		range of 7.5 to 10.0	0 at all times

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(1) Drum Washwater - BPT

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mg/off-kg (lb/million off-lbs) of uranium formed Cadmium 0.015 0.007 Chromium 0.020 0.008 Copper 0.084 0.045 Lead 0.019 0.009 Nickel 0.085 0.057 Fluoride 2.64 1.17 Molybdenum 0.293 0.152 Oil & Grease 0.886 0.532 TSS 1.82 0.864	Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
Cadmium0.0150.007Chromium0.0200.008Copper0.0840.045Lead0.0190.009Nickel0.0850.057Fluoride2.641.17Molybdenum0.2930.152Oil & Grease0.8860.532TSS1.820.864			
Chromium 0.020 0.008 Copper 0.084 0.045 Lead 0.019 0.009 Nickel 0.085 0.057 Fluoride 2.64 1.17 Molybdenum 0.293 0.152 Oil & Grease 0.886 0.532 TSS 1.82 0.864	mg/off-kg (lb/million	off-lbs) of uranium	formed
Chromium 0.020 0.008 Copper 0.084 0.045 Lead 0.019 0.009 Nickel 0.085 0.057 Fluoride 2.64 1.17 Molybdenum 0.293 0.152 Oil & Grease 0.886 0.532 TSS 1.82 0.864	Cadmium	0.015	0.007
Copper 0.084 0.045 Lead 0.019 0.009 Nickel 0.085 0.057 Fluoride 2.64 1.17 Molybdenum 0.293 0.152 Oil & Grease 0.886 0.532 TSS 1.82 0.864			
Lead0.0190.009Nickel0.0850.057Fluoride2.641.17Molybdenum0.2930.152Oil & Grease0.8860.532TSS1.820.864			0.045
Nickel0.0850.057Fluoride2.641.17Molybdenum0.2930.152Oil & Grease0.8860.532TSS1.820.864	Teed	0.019	0.009
Molybdenum0.2930.152Oil & Grease0.8860.532TSS1.820.864		0.085	0.057
Oil & Grease0.8860.532TSS1.820.864	Fluoride	2.64	1.17
TSS 1.82 0.864	Molybdenum	0.293	0.152
	Oil & Grease	0.886	0.532
	TSS	1.82	0.864
pH Within the range of 7.5 to 10.0 at all times	pH Within the	range of 7.5 to 10.0	at all times

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Pollutant pollutant		ty		ximum y one	-	Maximu monthl	m for y average	e
mg/employ	ee – da	Y				ŀ		
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenu Oil & Gre TSS pH	ase	the	range	of 7.	17.8 23.1 99.6 22.0 101 3,120 347 1,050 2,150 5 to 10.0	; ; 1	7.86 9.43 52.4 10.5 66.6 ,390 179 629 ,020 times	

(m) Laundry Washwater - BPT

(n) Degreasing Spent Solvents - BPT

There shall be no discharge of process wastewater pollutants.

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(a) Extrusion Spent Lubricants - BAT

There shall be no discharge of process wastewater pollutants.

(b) Extrusion Tool Contact Cooling Water - BAT

Pollutant pollutant		Maximun any one		Maximum monthly	
mg/off-kg	(lb/million	off-lbs)	of uranium	extruded	
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenur	n		0.007 0.013 0.044 0.010 0.019 2.05 0.173		.003 .005 .021 .005 .013 .908 .077

mg/off-kg (lb/million off-lbs) of extruded or forged uranium heat treated Cadmium 0.006 0.003 Chromium 0.012 0.005 Copper 0.040 0.019 Lead 0.009 0.004 Nickel 0.017 0.012 Fluoride 1.86 0.827 Molybdenum 0.158 0.070 (d) Forging Spent Lubricants - BAT There shall be no discharge of process wastewater pollutants.	Pollutant or pollutant property	Maximum for any one day	Maximu monthl	m for y average
Chromium 0.012 0.005 Copper 0.040 0.019 Lead 0.009 0.004 Nickel 0.017 0.012 Fluoride 1.86 0.827 Molybdenum 0.158 0.070 (d) Forging Spent Lubricants - BAT There shall be no discharge of process wastewater pollutants.		off-lbs) of extruc	led or for	ged uranium
There shall be no discharge of process wastewater pollutants.	Chromium Copper Lead Nickel Fluoride	0.012 0.040 0.009 0.017 1.86	0 0 0 0 0	.005 .019 .004 .012 .827
pollutants.	(d) Forging Spent Lubri	icants - BAT		: : : :
	There shall be r	no discharge of	process	wastewater

(c) Heat Treatment Contact Cooling Water - BAT

(e) Surface Treatment Spent Baths - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	7 x x
mg/off-kg	(lb/million	off-lbs) of uranium	surface treated	
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum	1 _	0.006 0.010 0.035 0.008 0.015 1.62 0.137	0.002 0.004 0.017 0.004 0.010 0.718 0.061	

(f) Surface Treatment Rinse - BAT

Pollutant pollutant		Maximur any one		Maximum for monthly average
mg/off-kg	(lb/million	off-lbs)	of uranium	surface treated
Cadmium		t	0.068	0.027
Chromium			0.125	0.051
Copper			0.432	0.206
Lead			0.095	0.044
Nickel			0.186	0.125
Fluoride	·•		20.1	8.90
Molybdenu	n		1.70	0.752

Pollutant pollutant		Maximu any on		Maximum for monthly average	
mg/off-kg	(lb/million	off-lbs)	of uranium	surface treated	
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum	n		0.0007 0.001 0.005 0.001 0.002 0.208 0.018	0.0003 0.0005 0.002 0.0005 0.001 0.092 0.008	

(g) Wet Air Pollution Control Scrubber Blowdown - BAT

(h) Sawing or Grinding Spent Emulsions - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg with emuls		off-lbs) of uranium	a sawer or ground
Cadmium	n	0.001	0.0005
Chromium		0.002	0.0009
Copper		0.007	0.004
Lead		0.002	0.001
Nickel		0.003	0.002
Fluoride		0.338	0.150
Molybdenur		0.029	0.013

(i) Sawing or Grinding Contact Cooling Water - BAT

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Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
ng/off-kg (lb/million		um sawed or ground
with contact cooling w	vater	
Cadmium	0.033	0.013
Chromium	0.061	0.025
Copper	0.211	0.101
Lead	0.046	0.022
Nickel	0.091	0.061
Fluoride	9.82	4.36
Molybdenum	0.830	0.368
(j) Sawing or Grinding		
Pollutant or	Maximum for	Maximum for
		Maximum for monthly average
Pollutant or	Maximum for any one day	monthly average
Pollutant or pollutant property ng/off-kg (lb/million	Maximum for any one day	monthly average
Pollutant or pollutant property ng/off-kg (lb/million rinsed	Maximum for any one day off-lbs) of sawed	monthly average or ground uranium 0.0004 0.0007
Pollutant or pollutant property ng/off-kg (lb/million rinsed Cadmium	Maximum for any one day off-lbs) of sawed 0.001	monthly average or ground uranium 0.0004 0.0007 0.003
Pollutant or pollutant property ng/off-kg (lb/million rinsed Cadmium Chromium Copper Lead	Maximum for any one day off-lbs) of sawed 0.001 0.002 0.006 0.002	monthly average or ground uranium 0.0004 0.0007 0.003 0.0006
Pollutant or pollutant property ng/off-kg (lb/million rinsed Cadmium Chromium Copper Lead Nickel	Maximum for any one day off-lbs) of sawed 0.001 0.002 0.006 0.002 0.003	monthly average or ground uranium 0.0004 0.0007 0.003 0.0006 0.002
Pollutant or pollutant property ng/off-kg (lb/million rinsed Cadmium Chromium Copper Lead	Maximum for any one day off-lbs) of sawed 0.001 0.002 0.006 0.002	monthly average or ground uranium 0.0004 0.0007 0.003 0.0006

(k) Area Cleaning Rinse - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	i
mg/off-kg	(lb/million	off-lbs) of uranium	formed	1 7
Cadmium		0.009	0.004	
Chromium		0.016	0.007	,
Copper		0.055	0.026	
Lead		0.012	0.006	
Nickel		0.024	0.016	
Fluoride		2.56	1.14	
Molybdenum	1	0.216	0.096	
Molybdenum	1	0.216	0.096	

(1) Drum Washwater - BAT

Pollutant	or	Maximum	for	Maximum	for	
pollutant	property	any one	day	monthly	average	

mg/off-kg (lb/million off-lbs) of uranium formed

Cadmium	0.009	0.004
Chromium	0.017	0.007
Copper	0.057	0.027
Lead	0.013	0.006
Nickel	0.025	0.017
Fluoride	2.64	1.17
Molybdenum	0.223	0.099

(m) Laundry Washwater - BAT

Pollutant or pollutant property	Maximum f any one c		Maximum for monthly average	
mg/employee - day			:	
Cadmium		5.24	2.10	
Chromium		9.70	3.93	
Copper		33.6	16.0	:
Lead		7.34	3.41	
Nickel		14.4	9.70	
Fluoride		1,560	692	
Molybdenum		132	58.4	1

(n) Degreasing Spent Solvents - BAT

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There shall be no discharge of process wastewater pollutants.

SUBPART H: BPT AND BAT MASS LIMITATIONS FOR THE ZINC FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - BPT

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
mg/off-kg emulsions	(lb/million o	ff-lbs) of zinc	rolled with	
Chromium Copper Cyanide Zinc Oil & Grea TSS pH N		0.0006 0.003 0.0004 0.002 0.028 0.057 ge of 7.5 to 10.	0.0003 0.002 0.0002 0.0009 0.017 0.027 0 at all times.	

(c) Rolling Contact Cooling Water - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million cooling water	off-lbs) of zinc	rolled with contact
Chromium	0.236	0.097
Copper	1.02	0.536
Cyanide	0.156	0.065
Zinc	0.783	0.327
Oil & Grease	10.7	6.43
TSS	22.0	10.5
pH Within the ra	ange of 7.5 to 10	.0 at all times.

(d) Drawing Spent Emulsions - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million	off-lbs) of zinc	drawn with emulsions
Chromium	0.003	0.001
Copper	0.011	0.006
Cyanide	0.002	0.0007
Zinc	0.009	0.004
Oil & Grease	0.116	0.070
TSS	0.238	0.113
pH Within the ra	ange of 7.5 to 10	.0 at all times

Pollutant pollutant	Maximum for any one day	Maximum f monthly a	
mg/off-kg chill meth	off-lbs) of zind	c cast by the d	lirect
Chromium Copper Cyanide Zinc Oil & Grea TSS pH Wit	0.222 0.960 0.147 0.738 10.1 20.7 ge of 7.5 to 10.0	0.091 0.505 0.061 0.308 6.06 9.85 0 at all times	, , , , ,

(e) Direct Chill Casting Contact Cooling Water - BPT

(f) Stationary Casting Contact Cooling Water - BPT

There shall be no discharge of process wastewater pollutants.

(g) Heat Treatment Contact Cooling Water - BPT

Pollutant or	Maximum for	Maximum for	
pollutant property	any one day	monthly average	
mg/off-kg (lb/million	n off-lbs) of zinc	heat treated	i
Chromium	0.336	0.138	
Copper	1.45	0.763	
Cyanide	0.221	0.092	
Zinc	1.12	0.466	
Oil & Grease	15.3	9.16	
TSS	31.3	14.9	
pH Within the rat	nge of 7.5 to 10.0	at all times	

(h) Surface Treatment Spent Baths - BPT

Pollutant or	Maximum for	Maximum for	
pollutant property	any one day	monthly average	
mg/off-kg (lb/million	off-lbs) of zinc	surface treated	
Chromium	0.039	0.016	
Copper	0.169	0.089	
Cyanide	0.026	0.011	
Zinc	0.130	0.054	
Oil & Grease	1.78	1.07	
TSS	3.64	1.73	
pH Within the rat	nge of 7.5 to 10.	0 at all times.	

(i) Surface Treatment Rinse - BPT

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Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million o	off-lbs) of zinc	surface treated
Chromium	1.58	0.645
Copper	6.80	3.58
Cyanide	1.04	0.430
Zinc	5.23	2.19
Oil & Grease	71.6	43.0
TSS	147	69.8
pH Within the rang	ge of 7.5 to 10.0) at all times.

(j) Alkaline Cleaning Spent Baths - BPT

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/milli	on off-lbs) of zinc	alkaline cleaned
Chromium Copper Cyanide Zinc Oil & Grease TSS pH Within the	$\begin{array}{c} 0.002\\ 0.007\\ 0.001\\ 0.005\\ 0.071\\ 0.146\\ range \mbox{ of } 7.5 \mbox{ to } 10. \end{array}$	0.0007 0.004 0.0004 0.002 0.043 0.069 0 at all times.

(k) Alkaline Cleaning Rinse - BPT

Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of zin	c alkaline cleaned
Chromium		0.744	0.304
Copper		3.21	1.69
Cyanide		0.490	0.203
Zinc		2.47	1.03
Oil & Grea	ase	33.8	20.3
TSS		69.3	33.0
	thin the ra		.0 at all times.

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(1)	Sawing	or Grinding	Spent	Emulsions	-	\mathbf{BPT}
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Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million with emulsions	off-lbs) of zinc	sawed or ground
Chromium Copper Cyanide Zinc Oil & Grease TSS pH Within the ray	0.011 0.045 0.007 0.035 0.476 0.976 nge of 7.5 to 10.0	0.005 0.024 0.003 0.015 0.286 0.464

(m) Electrocoating Rinse - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/milli	on off-lbs) of zinc	electrocoated
Chromium	1.01	0.412
Copper	4.35	2.29
Cyanide	0.664	0.275
Zinc	3.35	1.40
Oil & Grease	45.8	27.5
TSS	93.9	44.7
pH Within the	range of 7.5 to 10.0	at all times.

(n) Degreasing Spent Solvents - BPT

There shall be no discharge of process wastewater pollutants.

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - BAT

Pollutant pollutant		Maximum for any one day	Maximum monthly	for average
mg/off-kg emulsions	(lb/million	off-lbs) of zind	c rolled with	
Chromium Copper Cyanide Zinc		0.0005 0.002 0.0003 0.002	0.0002 0.0009 0.0001 0.0006	

(c) Rolling Contact Cooling Water - BAT

Pollutant pollutant		Maximum fo any one da		Maximum monthly	
mg/off-kg cooling wa		off-lbs) of	zinc	rolled with	contact
Chromium		0.020		0.009	
Copper		0.069		0.033	
Cyanide	τ.	0.011		0.004	
Zinc		0.055		0.023	

(d) Drawing Spent Emulsions - BAT

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average

mg/off-kg (lb/million off-lbs) of zinc drawn with emulsions

Chromium Copper	0.002 0.008	0.0009 0.004	
Cyanide	0.001	0.0005	
Zinc	0.006	0.003	

(e) Direct Chill Casting Contact Cooling Water - BAT

Pollutant pollutant	Maximum for any one day	Maximum monthly	for average	····· ·
mg/off-kg chill meth	off-lbs) of zinc	cast by the	direct	
Chromium Copper Cyanide Zinc	0.019 0.065 0.010 0.052	0.008 0.031 0.004 0.021		

(f) Stationary Casting Contact Cooling Water - BAT

There shall be no discharge of process wastewater pollutants.

(g) Heat Treatment Contact Cooling Water - BAT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	- 1
mg/off-kg	(lb/million	off-lbs) of zinc	heat treated	
Chromium Copper Cyanide Zinc		0.029 0.098 0.016 0.078	0.012 0.047 0.006 0.032	· · · · ·
<u></u>		······································		

(h) Surface Treatment Spent Baths - BAT

Pollutant or pollutant pro	Maximum operty any one		average
mg/off-kg (lb	/million off-lbs) (of zinc surface tre	ated
Chromium Copper Cyanide Zinc	0.033 0.114 0.018 0.091	0.014 0.054 0.007 0.038	

(i) Surface Treatment Rinse - BAT

Pollutant or	Maximum	for	Maximum	for
pollutant proper	ty any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of zinc surfact treated

Chromium	0.133	0.054
Copper	0.458	0.219
Cyanide	0.072	0.029
Zinc	0.365	0.151
	*	

(j) Alkaline Cleaning Spent Baths - BAT

Pollutant	•	Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of zin	c alkaline cleaned
Chromium		0.002	0.0006
Copper		0.005	0.002
Cyanide		0.0007	0.0003
Zinc		0.004	0.002

(k) Alkaline Cleaning Rinse - BAT

Pollutant pollutant		Maximum any one		Maximum for monthly average	
mg/off-kg	(lb/million	off-lbs)	of zinc	alkaline cleaned	-
Chromium Copper Cyanide Zinc		0.626 2.17 0.338 1.73		0.254 1.03 0.135 0.710	1

(1) Sawing or Grinding Spent Emulsions - BAT

Pollutant pollutant		Maximum for any one day	Maximum monthly	
mg/off-kg with emuls		off-lbs) of zinc	sawed or gro	ound
Chromium Copper Cyanide Zinc		0.009 0.031 0.005 0.025	0.004 0.015 0.002 0.010	
	rocoating Rir			
Pollutant pollutant		Maximum for any one day	Maximum monthly	
mg/off-kg	(lb/million	off-lbs) of zinc	electrocated	1
Chromium Copper Cyanide Zinc		0.085 0.293 0.046 0.234	0.035 0.140 0.019 0.096	

(n) Degreasing Spent Solvents - BAT

There shall be no discharge of process wastewater pollutants.

SUBPART I: BPT AND BAT MASS LIMITATIONS FOR THE ZIRCONIUM-HAFNIUM FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - BPT

There shall be no discharge of process wastewater pollutants.

(b) Drawing Spent Lubricants - BPT

There shall be no discharge of process wastewater pollutants.

(c) Extrusion Spent Emulsions - BPT

There shall be no discharge of process wastewater

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pollutants.

Pollutant		Maximum for	Maximum for	
pollutant	property	any one day	monthly average	
ng/off-kg	(lb/millio)	n off-lbs) of zirco	onium-hafnium	
extruded			· · · · · · · · · · · · · · · · · · ·	
Chromium		0.104	0.043	•
Lyanide		0.069	0.029	
Nickel		0.455	0.301	
Ammonia Fluoride		31.6 14.1	13.9 6.26	;
Dil & Grea	ase	4.74	2.85	
rss		9.72	4.62	
H Wi	thin the ra	ange of 7.5 to 10.0) at all times.	
			······································	. <u> </u>
			,	
e) Swagi	ng Spent Ne	eat Oils - BPT		
c , <u>c</u> , <u>c</u> , <u>s</u>			<i>.</i>	
(Tile a second				
There	e shall be	e no discharge of	process wastewate	I.
		e no discharge of	process wastewate	r
		e no discharge of	process wastewate	r
ollutants	5.			r
ollutants f) Heat J	S. Freatment Co	ontact Cooling Wate	er – BPT	r
ollutants f) Heat 1 Pollutant	S. Preatment Co	ontact Cooling Wate Maximum for	er - BPT Maximum for	r
ollutants f) Heat 1 Pollutant	S. Preatment Co	ontact Cooling Wate	er – BPT	r
ollutants (f) Heat 1 Pollutant pollutant	Preatment Co or property	ontact Cooling Wate Maximum for any one day	er - BPT Maximum for monthly average	r.
ollutants f) Heat J Collutant collutant	Preatment Co or property	ontact Cooling Wate Maximum for	er - BPT Maximum for monthly average	r.
ollutants f) Heat J Collutant collutant	Preatment Co or property	ontact Cooling Wate Maximum for any one day	er - BPT Maximum for monthly average	r
ollutants (f) Heat 1 Pollutant pollutant	Preatment Co or property	ontact Cooling Wate Maximum for any one day	er - BPT Maximum for monthly average	r
oollutants (f) Heat T Collutant oollutant ng/off-kg reated Chromium	Preatment Co or property	Ontact Cooling Wate Maximum for any one day n off-lbs) of zirco 0.151	er - BPT Maximum for monthly average onium-hafnium heat 0.062	r
oollutants (f) Heat T Collutant oollutant ng/off-kg reated Chromium Cyanide	Preatment Co or property	Ontact Cooling Wate Maximum for any one day n off-lbs) of zirco 0.151 0.100	er - BPT Maximum for monthly average onium-hafnium heat 0.062 0.041	r
ollutants (f) Heat 7 Pollutant collutant ag/off-kg reated Chromium Cyanide Jickel	Preatment Co or property	Ontact Cooling Wate Maximum for any one day n off-lbs) of zirco 0.151 0.100 0.659	er - BPT Maximum for monthly average onium-hafnium heat 0.062 0.041 0.436	r
f) Heat 7 Pollutant pollutant ollutant g/off-kg reated Chromium yanide lickel mmonia	Preatment Co or property	Maximum for any one day n off-lbs) of zirco 0.151 0.100 0.659 45.7	er - BPT Maximum for monthly average onium-hafnium heat 0.062 0.041 0.436 20.1	r.
ollutants (f) Heat 7 Pollutant ollutant ag/off-kg reated Chromium Yanide Jickel Mmonia Yuoride	Preatment Co or property (lb/millior	Maximum for any one day n off-lbs) of zirco 0.151 0.100 0.659 45.7 20.4	er - BPT Maximum for monthly average onium-hafnium heat 0.062 0.041 0.436 20.1 9.06	r
f) Heat 7 Pollutant pollutant ollutant g/off-kg reated Chromium yanide lickel mmonia	Preatment Co or property (lb/millior	Maximum for any one day n off-lbs) of zirco 0.151 0.100 0.659 45.7	er - BPT Maximum for monthly average onium-hafnium heat 0.062 0.041 0.436 20.1	r

(d) Extrusion Press Hydraulic Fluid Leakage - BPT

(g) Tube Reducing Spent Lubricants - BPT

There shall be no discharge of process wastewater pollutants.

(h) Surface Treatment Spent Baths - BPT

	and the second		~		£
Pollutant	or	Maximum	tor	Maximum	IOL
POLLULAIL	QI.	FIGATINGIU	TOT		
	•		A	monthly	20707200
pollutant	nropertv	any one	uav	monuty	average
porracane	Propor of			-	-
-					

mg/off-kg (lb/million off-lbs) of zirconium-hafnium
surface treated

Chromium	0.150	0.061
Cyanide	0.099	0.041
Nickel	0.653	0.432
Ammonia	45.3	20.0
Fluoride	20.3	8.98
Oil & Grease	6.80	4.08
TSS	14.0	6.63
DH Within the	range of 7.5 to 10.0	at all times.
pH Within the	range of 7.5 to 10.0	at all times.

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(i) Surface Treatment Rinse - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly avera	age
mg/off-kg	(lb/million o	ff-lbs) of zig	rconium-hafnium	
surface tr	reated			
Chromium Cyanide		3.91 2.58	1.60 1.07	
Nickel Ammonia	1	17.1 ,190	11.3 521	
Fluoride Oil & Grea	•	529 178	235	
TSS	-	364	173	
pH Wi	thin the rang.	e of 7.5 to 10	0.0 at all times.	:

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(j) Alkaline Cleaning Spent Baths - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millio alkaline cleaned	n off-lbs) of zirco	nium-hafnium
Chromium	0.704	0.288
Cyanide	0.464	0.192
Nickel	3.07	2.03
Ammonia	214	93.8
Fluoride	95.2	42.3
Oil & Grease	32.0	19.2
TSS	65.6	31.2
pH Within the ra	ange of 7.5 to 10.0	at all times.

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Pollutant or pollutant pro	opertv	Maximum any one	2	Maximum monthly	average	
F	- E I	: 	2			
mg/off-kg (ll alkaline clea		off-lbs) (of zirconi	um-hafnium	, n .,	i Line i
Chromium		13.8	· · ·	5.65	·* ,	
Cyanide		9.11	* * * 2	3.77	•	
Nickel		60.3		39.9		
Ammonia		4,190	• 	1,840		
Fluoride		1870		829		÷.
Dil & Grease		628		377	•	
rss		1290	2	613	:	,
	in the ran		to 10.0 a		20	
	in the ran	ge or 7.5	10 10.0 a	C AII LIME		
(1) Sawing of	r Grinding	Spent Em	ulsions -	BPT	*,	• •
Pollutant or		Maximum	for ,	Maximum		• • •
Pollutant or		-	for ,			
<pre>(1) Sawing of Pollutant or pollutant pro- mg/off-kg (1) sawed or grow Chromium Chromium Chromium Chromium Fluoride Dil & Grease TSS</pre>	operty	- Maximum any one off-1bs) o	for day of zirconi 24 82 40	Maximum monthlý	average n 1 4	

(k) Alkaline Cleaning Rinse - BPT

(m) Wet Air Pollution Control Scrubber Blowdown - BPT

There shall be no allowance for the discharge of process wastewater pollutants.

(n) Degreasing Spent Solvents - BPT

There shall be no discharge of process wastewater pollutants.

(o) Degreasing Rinse - BPT

There shall be no discharge of process wastewater pollutants.

(p) Molten Salt Rinse - BPT

				1	
Pollutant	or	Maximum	for	Maximum	for
pollutant		any one		monthly	

mg/off-kg (lb/million off-lbs) of zirconium-hafnium
rinsed following molten salt treatment

Chromium	3.33	1.360
Cyanide	2.20	0.907
Nickel	14.5	9.60
Ammonia	1,010	443
Fluoride	450	200
Oil & Grease	151	90.7
TSS	310	148
pH Within	the range of 7.5 to	10.0 at all times.

Pollutant or	Maximum for	Maximum for
collutant property	any one day	monthly average
g/off-kg (lb/million awed or ground with		
Chromium	0.142	0.058
Cyanide	0.093	0.039
Nickel	0.617	0.408
Ammonia	42.8	18.8
Fluoride	19.1	8.48
Oil & Grease	6.42	3.85
TSS	13.2	6.26
	nge of 7.5 to 10.0	
	:	
(r) Sawing or Grindin	g Rinse - BPT	
Pollutant or	Maximum for	Maximum for
pollutant property		monthly average
mg/off-kg (lb/million hafnium rinsed	off-lbs) of sawed	or ground zirconium-
Chromium	0.792	0.324
Cyanide	0.522	0.216
Nickel	3.46	2.29
	3.40	
Ammonia	240	106
Ammonia Fluoride		106 47.5
Ammonia Fluoride Oil & Grease	240 107 36.0	106 47.5 21.6
Ammonia Fluoride Oil & Grease TSS	240 107 36.0 73.8	106 47.5 21.6 35.1
Ammonia Fluoride Oil & Grease TSS	240 107 36.0	106 47.5 21.6 35.1
Ammonia Fluoride Oil & Grease TSS	240 107 36.0 73.8	106 47.5 21.6 35.1
Ammonia Fluoride Oil & Grease TSS	240 107 36.0 73.8	106 47.5 21.6 35.1
Ammonia Fluoride Oil & Grease TSS	240 107 36.0 73.8	106 47.5 21.6 35.1
Ammonia Fluoride Oil & Grease TSS	240 107 36.0 73.8	106 47.5 21.6 35.1
Ammonia Fluoride Oil & Grease TSS	240 107 36.0 73.8	106 47.5 21.6 35.1

(q) Sawing or Grinding Contact Cooling Water - BPT

(s) Sawing or Grinding Spent Neat Oils - BPT

There shall be no discharge of process wastewater pollutants.

(t) Inspection and Testing Wastewater - BPT

Pollutant pollutant			Maximun any one				laximum in a standard sta Standard standard stan		
mg/off-kg	(lb/mi	llion of	f-lbs)	of :	zirco	nium-	-hafnium	tested	
Chromium Cyanide Nickel Ammonia Fluoride Oil & Grea TSS pH W		he range	0.0 0.0 2.0 0.3 0.6 0.6	05 30 6 17 08 32	10.0	at a	0.00 0.02 0.90 0.40 0.18 0.30	2 0 3 7 5 1	

(a) Rolling Spent Neat Oils - BAT

There shall be no discharge of process wastewater pollutants.

(b) Drawing Spent Lubricants - BAT

There shall be no discharge of process wastewater pollutants.

(c) Extrusion Spent Emulsions - BAT

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Press Hydraulic Fluid Leakage - BAT

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg extruded	(lb/million	off-lbs) of zircor	nium-hafnium .
Chromium		0.104	0.043
Cyanide		0.069	0.029
Nickel		0.455	0.301
Ammonia		31.6	13.9
Fluoride		14.1	6.26

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, . . (e) Swaging Spent Neat Oils - BAT

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There shall be no discharge of process wastewater pollutants.

(f) Heat Treatment Contact Cooling Water - BAT

Pollutant pollutant		Maximum for any one day		1
mg/off-kg treated	(lb/million	off-lbs) of z	irconium-hafnium heat	
Chromium Cyanide Nickel Ammonia Fluoride		0.015 0.010 0.066 4.57 2.04	0.006 0.004 0.044 2.01 0.906	•

(g) Tube Reducing Spent Lubricants - BAT

There shall be no discharge of process wastewater pollutants.

(h)	Surface	Treatment	Spent	Baths	—	BAT
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Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg surface tr		off-lbs) of zirc	onium-hafnium
Chromium	•	0.150	0.061
Cyanide		0.099	0.041
Nickel		0.653	0.432
Ammonia		45.3	20.0
Fluoride		20.3	8.98

(i) Surface Treatment Rinse - BAT

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of zirconium-hafnium
surface treated

Chromium	0.391	0.160	
Cyanide	0.258	0.107	
Nickel	1.71	1.13	
Ammonia	119	52.1	
Fluoride	52.9	23.5	

(j) Alkaline Cleaning Spent Baths - BAT

Pollutant				
FOTTUCANC	or	Maximum for	Maximum fo	r
pollutant	property	any one day	monthly av	erage
mg/off-kg alkaline		off-lbs) of zirc	onium-hafnium	-
Chromium		0.704	0.288	
Cyanide		0.464	0.192	1
Nickel		3.07	2.03	
Ammonia		214	93.8	
Fluoride		95.2	42.3	
	and and an and an and			
(k) Alkal:	ine Cleaning	Rinse - BAT	i.	
Pollutant		Maximum for	Maximum for	
n n 1 n + n + n + n + n + n + n + n + n	property	any one day	monthly or	27200
porrucane	propercy	any one day	monthly av	erage
•••				
mg/off-kg	(lb/million	off-lbs) of zirc		
mg/off-kg alkaline ((lb/million	off-lbs) of zirc	onium-hafnium	
mg/off-kg alkaline (Chromium	(lb/million	off-lbs) of zirc	onium-hafnium 0.565	erage
mg/off-kg alkaline Chromium Cyanide	(lb/million	off-lbs) of zirc 1.380 0.911	onium-hafnium 0.565 0.377	erage
mg/off-kg alkaline Chromium Cyanide Nickel	(lb/million	off-lbs) of zirc 1.380 0.911 6.03	onium-hafnium 0.565 0.377 3.99	er aye
mg/off-kg alkaline Chromium Cyanide Nickel Ammonia	(lb/million	off-lbs) of zirc 1.380 0.911 6.03 419	onium-hafnium 0.565 0.377 3.99 184	
	(lb/million	off-lbs) of zirc 1.380 0.911 6.03	onium-hafnium 0.565 0.377 3.99	
mg/off-kg alkaline Chromium Cyanide Nickel Ammonia	(lb/million	off-lbs) of zirc 1.380 0.911 6.03 419	onium-hafnium 0.565 0.377 3.99 184	
mg/off-kg alkaline Chromium Cyanide Nickel Ammonia Fluoride	(lb/million cleaned	off-lbs) of zirc 1.380 0.911 6.03 419	onium-hafnium 0.565 0.377 3.99 184 82.9	
mg/off-kg alkaline Chromium Cyanide Nickel Ammonia Fluoride	(lb/million cleaned	off-lbs) of zirc 1.380 0.911 6.03 419 187	onium-hafnium 0.565 0.377 3.99 184 82.9	

mg/off-kg (lb/million off-lbs) of zirconium-hafnium sawed
or ground with emulsionsChromium0.124Cyanide0.082Nickel0.540

37.5

16.7

Ammonia

Fluoride

1.1

16.5

7.42

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(m) Wet Air Pollution Control Scrubber Blowdown - BAT

There shall be no allowance for the discharge of process wastewater pollutants.

(n) Degreasing Spent Solvents - BAT

There shall be no discharge of process wastewater pollutants.

 $x = -y_1 t$

(o) Degreasing Rinse - BATThere shall be no discharge of process wastewater

pollutants.

(p) Molten Salt Rinse - BAT

Pollutant or pollutant property	Maximum fo any one da		
mg/off-kg (lb/million following molten salt		zirconium-hafnium	rinsed
Chromium Cyanide Nickel Ammonia	0.220 1.45	0.136 0.091 0.960	
Ammonia Fluoride	101 45.0	44.3 20.0	

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
ma/off-ka (lb/millio)	off-lbc) of gire	onium-hafnium sawed or
ground with contact of		Jiium Harnium Sawed Of
Chromium	0.142	0.058
Cyanide	0.093	0.039
Nickel	0.617	0.408
Ammonia	42.8	18.8
Fluoride	19.1	8.48
	· · ·	1
(r) Sawing or Grindin	ng Rinse - BAT	
Pollutant of	Maximum for	Maximum for
pollutant property	any one day	monthly average
ma/off-ka (lb/million	off-lbg) of gawod	l or ground zirconium-
hafnium rinsed	I ULI-IDS) UL Sawed	
-	0.070	
Chromium	0.079	0.033
Cvanide	0 052	0 0 2 2

(q) Sawing or Grinding Contact Cooling Water - BAT

CHITOHITUH	0.0/9	0.033	
Cyanide	0.052	0.022	
Nickel	0.346	0.229	
Ammonia	24.0	10.6	
Fluoride	10.7	4.75	

(s) Sawing or Grinding Spent Neat Oils - BAT and the data of the state of the state

There shall be no discharge of process wastewater pollutants.

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(t) Inspection and Testing Wastewater - BAT

	or	Maximum fo	
pollutant	property	any one da	ay monthly average
mg/off-kg	(lb/million	off-lbs) of	zirconium-hafnium tested
Chromium		0.007	0.003
Cyanide		0.005	0.002
Nickel		0.030	0.020
Ammonia		2.06	0.903
Fluoride		0.917	0.407

SUBPART J: BPT AND BAT MASS LIMITATIONS FOR THE METAL POWDERS SUBCATEGORY

(a) Metal Powder Production Atomization Wastewater - BPT

Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
1			

mg/off-kg (lb/million off-lbs) of powder wet atomized

Copper	9.58	5.04
Cyanide	1.46	0.605
Lead	2.12	1.01
Oil & Grease	101	60°°5
TSS	207	98.3
pH Within	the range of 7.5 to 10.0	at all times.

(b) Sizing Spent Neat Oils - BPT

There shall be no discharge of process wastewater pollutants.

Pollutant o pollutant p	—	Maximum for any one day	Maximum for monthly average	je
mg/off-kg (lb/million of	f-lbs) of pow	der sized	
Copper Cyanide		0.028 0.004	0.015 0.002	
Lead Oil & Greas TSS	e	0.006 0.292 0.599	0.003 0.175 0.285	
	in the range		0 at all times.	•

(c) Sizing Spent Emulsion - BPT

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(d) Oil-Resin Impregnation Wastewater - BPT

There shall be no discharge of process wastewater

pollutants.

(e) Steam Treatment Wet Air Pollution Control Scrubber Blowdown - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of powder metallurgy parts
steam treated

Copper	1.51	0.792
Cyanide	0.230	0.095
Lead	0.333	0.159
Oil & Grease	15.9	9.51
TSS	32.5	15.5
pH Within	the range of 7.5 to 10.0 at all	times.

(f) Tumbling, Burnishing and Cleaning Wastewater - BPT

Pollutant or pollutant pro		Maximum for any one day	Maximum for monthly average	е
mg/off-kg (lb tumbled, burn			ler metallurgy parts	
Copper Cyanide Lead Oil & Grease TSS pH Withi	n the range	8.36 1.28 1.85 88.0 181 of 7.5 to 10	4.40 0.528 0.880 52.800 85.8 0 at all times.	-

(g) Sawing or Grinding Spent Neat Oils - BPT

There shall be no discharge of process wastewater pollutants.

(h) Sawing or Grinding Spent Emulsion - BPT

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
	(lb/million o ground with em	ff-lbs) of powder n ulsion	netallurgy parts	· <u> </u>
Copper Cyanide Lead Oil & Grea TSS pH W:		0.035 0.005 0.008 0.362 0.742 e of 7.5 to 10.0 at	0.018 0.002 0.004 0.217 0.353 all times.	•

(i) Sawing or Grinding Contact Cooling Water - BPT

Maximum for any one day	Maximum for monthly average
	r metallurgy parts
3.08	1.62 0.195
	0.324
32.4	19.5
66.4	31.6
range of 7.5 to 10.0	
	any one day ion off-lbs) of powde th contact cooling 3.08 0.470 0.681 32.4

148

(j) Hot Pressing Contact Cooling Water - BPT

Pollutant of pollutant pollutant		Maximum fo any one da		Maximum for monthly a	
	ropercy				verage
mg/off-kg (pressing	lb/millio	n off-lbs) of	powder (cooled after	r a
Copper		16.7		8.80	
Cyanide	t	2.55		1.06	
Lead		3.70		1.76	
Oil & Greas	se '	176		106	
TSS		361		172	
pH Wit	hin the ra	ange of 7.5 to	0 10.0 at	t all times	•
		<u> </u>			

(k) Mixing Wet Air Pollution Control Scrubber Blowdown - BPT

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million	off-lbs) of powde	er mixed
Copper	15.0	7.90
Cyanide	2.29	0.948
Lead	3.32	1.58
Oil & Grease	158	94.8
TSS	324	154
pH Within the rang	ge of 7.5 to 10.0	at all times.

(1) Degreasing Spent Solvents - BPT

There shall be no discharge of process wastewater pollutants.

.

(a) Metal Powder Prod	uction Atomization	n Wastewater - BAT
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million	off-lbs) of powde	er wet atomized
Copper Cyanide Lead	9.58 1.46 2.12	5.04 0.605 1.01
(b) Sizing Spent Neat	Oils - BAT	
	oe no discharge	of process wastewater
pollutants.		
(c) Sizing Spent Emuls	sions - BAT	
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million	off-lbs) of powde	er sized
Copper Cyanide Lead	0.028 0.004 0.006	0.015 0.002 0.003

(d) Oil-Resin Impregnation Wastewater - BAT

There shall be no discharge of process wastewater pollutants.

(e) Steam Treatment Wet Air Pollution Control Scrubber Blowdown - BAT

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	:	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
ng/off-kg (lb/million steam treated	n off-lbs) of powde	r metallurgy parts
Steam treated		
Copper	1.51	0.792
Cyanide	0.230	0.095
Lead	0.333	0.159
······		ء مور <u>د م</u> اند المراجع معالم الم
(f) Tumbling, Burnish	ning and Cleaning W	lastewater - BAT
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millior		er metallurgy parts
tumbled, burnished, c	or cleaned	
Copper	8.36	4.40
Cyanide	1.28	0.528
Lead	1.85	0.880
<u> </u>		
(g) Sawing or Grindi	ng Spent Neat Oils	- BAT
There shall be	no discharge of	process wastewater
pollutants.		
	:	
(h) Sawing or Grindir	ng Spent Emulsions	- BAT
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millior sawed or ground with		r metallurgy parts
Copper	0.035	0.018
Cuanido	0 005	0 002

Copper		0.035	0.018
Cyanide		0.005	0.002
Lead	k	0.008	0.004
	1		

(i) Sawing or Grinding Contact Cooling Water - BAT

Pollutant or	Maximum for	Maximum for	:
pollutant property	any one day	monthly average	
mg/off-kg (lb/million with contact cooling	off-lbs) of powder	sawed or ground	
Copper	3.08	1.62	•
Cyanide	0.470	0.195	
Lead	0.681	0.324	

(j) Hot Pressing Contact Cooling Water - BAT

Pollutant pollutant		Maximur any one		Maximum monthly	for average
mg/off-kg	(lb/million	off-lbs)	of powder	cooled aft	ter pressing
Copper Cyanide Lead		16.7 2.55 3.70		8.80 1.06 1.760	

(k) Mixing Wet Air Pollution Control Scrubber Blowdown - BAT

Pollutant pollutant		Maximum fo any one da		m for y average	
mg/off-kg	(lb/million	off-lbs) of	powder mixed		1
Copper Cyanide Lead		15.0 2.29 3.32	7.9 0.9 1.9	948	

(1) Degreasing Spent Solvents - BAT

There shall be no discharge of process wastewater pollutants.

4. NSPS is being promulgated based on the model treatment technology of flow equalization, oil skimming, chemical precipitation, sedimentation, and filtration (lime, settle, and

filter) technology, and in-process flow reduction control methods, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide precipitation for the magnesium, nickel-cobalt, refractory metals, uranium, and zinc forming subcategories. Iron coprecipitation is included in this model treatment technology for removal of the pollutant molybdenum from wastewaters in the refractory metals and uranium forming subcategories. NSPS is being promulgated based on the model treatment technology of flow equalization, oil skimming, chemical precipitation and sedimentation (lime and settle) technology, and in-process flow reduction control methods, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide precipitation for the lead-tin-bismuth, precious metals, titanium, and zirconium-hafnium forming subcategories and the metal powders subcatetory. The following effluent standards are being promulgated for new sources:

SUBPART A: NEW SOURCE PERFORMANCE STANDARDS FOR THE LEAD-TIN-BISMUTH FORMING SUBCATEGORY

(a) Rolling Spent Emulsions - NSPS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/millio rolled with emulsion		-tin-bismuth
Antimony	0.067	0.030
Lead	0.010	0.005
Oil & Grease	0.468	0.281
TSS	0.960	0.457
pH Within the	range of 7.5 to 10	.0 at all times
-	-	

(b) Rolling Spent Soap Solutions - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millior rolled with soap solu		tin-bismuth
Antimony	0.124	0.055
Lead	0.018	0.009
Oil & Grease	0.860	0.520
TSS	1.80	0.840
pH Within the	range of 7.5 to 10	.0 at all times

(c) Drawing Spent Neat Oils - NSPS

There shall be no discharge of process wastewater pollutants.

(d) Drawing Spent Emulsions - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million drawn with emulsions	off-lbs) of lead-	tin-bismuth
Antimony	0.076	0.034
Lead Oil & Grease	0.011 0.526	0.005 0.316
TSS	1.087	0.513
	ange of 7.5 to 10	
• · · · · · · · · · · · · · · · · · · ·		· .
2.1		
(e) Drawing Spent Soap	Solutions - NSPS	
Pollutant or	Maximum for	Maximum for
(e) Drawing Spent Soap Pollutant or pollutant property		
Pollutant or pollutant property mg/off-kg (lb/million	Maximum for any one day off-lbs) of lead-	Maximum for monthly average
Pollutant or	Maximum for any one day off-lbs) of lead- ons 0.022	Maximum for monthly average tin-bismuth 0.010
Pollutant or pollutant property mg/off-kg (lb/million drawn with soap soluti Antimony Lead	Maximum for any one day off-lbs) of lead- ons 0.022 0.003	Maximum for monthly average tin-bismuth 0.010 0.002
Pollutant or pollutant property mg/off-kg (lb/million drawn with soap soluti Antimony Lead Oil & Grease	Maximum for any one day off-lbs) of lead- ons 0.022 0.003 0.149	Maximum for monthly average tin-bismuth 0.010 0.002 0.090
Pollutant or pollutant property mg/off-kg (lb/million drawn with soap soluti Antimony Lead Oil & Grease TSS	Maximum for any one day off-lbs) of lead- ons 0.022 0.003	Maximum for monthly average tin-bismuth 0.010 0.002 0.090 0.146

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Pollutant	Maximum for	Maximum for
pollutant	any one day	monthly average
mg/off-kg heat treat	off-lbs) of lead	-tin-bismuth
Antimony	0.414	0.185
Lead	0.061	0.030
Oil & Grea	2.88	1.73
TSS	5.91	2.81
pH	ange of 7.5 to 10	0.0 at all times

(f) Extrusion Press and Solution Heat Treatment Contact Cooling Water - NSPS

(g) Extrusion Press Hydraulic Fluid Leakage - NSPS

Pollutant or pollutant pro			Maximum for Monthly average
mg/off-kg (lk extruded	o/million off-:	lbs) of lead-tin-b	Dismuth
Antimony Lead Oil & Grease TSS pH Wit	chin the range	0.158 0.023 1.10 2.26 of 7.5 to 10.0 at	0.071 0.011 0.660 1.07 all times

(h) Continuous Strip Casting Contact Cooling Water - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millior		tin-bismuth
cast by the continuou	is strip method	
Antimony	0.003	0.001
Lead	0.0004	0.0002
Oil & Grease	0.020	0.012
TSS	0.041	0.020
	range of 7.5 to 10	.0 at all times
	1	-
(i) Comi-Continuous	ngot Conting Conto	at Cooling
(i) Semi-Continuous 1 Water - NSPS	ingot casting contai	ct cooring
Water - MSPS		
Pollutant or	Maximum for	Maximum for
pollutant property		monthly average
	· -	
And Andrew And		
mg/off-kg (lb/million	off_lbg/ of logd_	tin_higmuth (
	i oll-ips) ol ieau-	CIN-DISMUCN
ingot cast by the ser	ni-continuous metho	
	ni-continuous metho	d
Antimony Lead		

 Lead
 0.001
 0.0006

 Oil & Grease
 0.059
 0.036

 TSS
 0.121
 0.058

 pH
 Within the range of 7.5 to 10.0 at all times

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg shot cast	(lb/million o	ff-lbs) of lead-t	in-bismuth
Antimony		0.107	0.048
Lead		0.016	0.008
Oil & Grea		0.746	0.448
TSS		1.53	0.728
pH		nge of 7.5 to 10.	0 at all times

(j) Shot Casting Contact Cooling Water - NSPS

(k) Shot-Forming Wet Air Pollution Control Scrubber Blowdown - NSPS

Pollutant pollutant		Maximum for any one day	Maximum monthly	
mg/off-kg shot form		ff-lbs) of lead	-tin-bismuth	ι .
Antimony Lead Oil & Grea TSS pH	,	0.169 0.025 1.18 2.41 nge of 7.5 to 10	0.076 0.012 0.706 1.15).0 at all ti	.mes

(1) Alkaline Cleaning Spent Baths - NSPS

	1	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
	· · · · ·	· · ·
	1	
mg/off-kg (lb/million	n off-lbs) of lead-	tin-bismuth
alkaline cleaned		
Antimony	0.345	0.154
Lead	0.051	0.024
Oil & Grease	2.40	1.44
TSS	4.92	2.34
pH Within the	range of 7.5 to 10	
(m) Alkaline Cleaning	Rinse - NSPS	
(,		
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
Pollagene Proberol		
	······································	<u></u>
mg/off-kg (lb/million	off-lbs) of lead-	tin-higmuth
alkaline cleaned	i oli ibs) ol iead	CIII DISMUCII
arkarine creaned	<u>.</u>	
Antimony	0 679	0 202

,

Antimo	ony			0.678			,	0.30)2	
Lead	-			0.099				0.04	17	
Oil &	Grease			4.72				2.84	Ł	
TSS			I	9.68				4.60)	
pН	Within	the	range	of 7.5	to	10.0	at	all	times	

(n) Swaging Spent Emulsions - NSPS

Pollutant or	Maximum for	Maximum for	
pollutant property	any one day	monthly average	
		·····	
mg/off-kg (lb/millior	off-lbs) of lead-	tin-bismuth	
swaged with emulsion			
Buch dan e war		0.002	
Antimony	0.005	0.002	
Lead	0.0008	0.0004	
Oil & Grease	0.036	0.022	
TSS	0.073	0.035	
pH Within the	range of 7.5 to 10	.0 at all times	
*	5	и -	
			 i

(o) Degreasing Spent Solvents - NSPS

There shall be no discharge of process wastewater pollutants.

SUBPART B: NEW SOURCE PERFORMANCE STANDARDS FOR THE MAGNESIUM FORMING SUBCATEGORY

(a) Rolling Spent Emulsions - NSPS

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	• /			,
Pollutant	or	Maximum fo	r Maxiı	mum for
pollutant	property	any one day	y montl	hly average
- <u></u>				,
mg/off-kg	(lb/million	off-lbs) (of magnesium	rolled with
emulsions	100 - 100 Qu			
Chromium		0.028	0.0	011
Zinc		0.076		032
Ammonia		9.95	4.	37
Fluoride		4.44	1.9	97
Oil & Grea	ase	0.746	0.	746
TSS		1.12	0.8	895
рĦ	Within the ra	ange of 7.5	to 10.0 at al:	l times

(b) Forging Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(c) Forging Contact Cooling Water - NSPS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of forged magnesium cooled
with water

Chromium	0.107	0.044
Zinc	0.295	0.122
Ammonia	38.5	17.0
Fluoride	17.2	7.63
Oil & Grease	2.89	2.89
TSS	4.34	3.47
pH Within th	e range of 7.5 to	10.0 at all times

(d) Forging Equipment Cleaning Wastewater - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of magne	esium forged
Chromium		0.002	0.0006
Zinc		0.004	0.002
Ammonia		0.532	0.234
Fluoride		0.238	0.106
Oil & Gre		0.040	0.040
TSS		0.060	0.048
pH		ange of 7.5 to 10).0 at all times

(e) Direct Chill Casting Contact Cooling Water - NSPS

Pollutant pollutant		Maximum fo any one da		
	propercy			average
mg/off-kg chill meth		off-lbs) of	magnesium cast wit	ch direct
Chromium Zinc Ammonia Fluoride Oil & Grea TSS pH		1.46 4.03 527 235 39.5 59.3 cange of 7.5	0.593 1.66 232 105 39.5 47.4 to 10.0 at all tim	nes
			· · · · · · · · · · · · · · · · · · ·	

(f) Surface Treatment Spent Baths - NSPS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
mg/off-kg treated	(lb/million o	off-lbs) of magn	esium surface	
Chromium Zinc Ammonia Fluoride Oil & Gre TSS pH		0.173 0.476 62.1 27.8 4.66 6.99 ange of 7.5 to 1	0.070 0.196 27.3 12.3 4.66 5.60 0.0 at all times	

(g) Surface Treatment Rinse - NSPS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
mg/off-kg treated	(lb/million	off-lbs) of magn	esium surface	
Chromium Zinc Ammonia Fluoride Oil & Grea TSS pH		0.700 1.93 252 113 18.9 28.4 ange of 7.5 to 1	0.284 0.794 111 49.9 18.9 22.7 0.0 at all times	

(h) Sawing or Grinding Spent Emulsions - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million	off-lbs) of magne	esium sawed
or ground	· ·	
Chromium	0.007	0.003
Zinc	0.020	0.008
Ammonia	2.60	1.15
Fluoride Oil & Grease	1.16 0.195	0.515 0.195
TSS	0.293	0.234
	range of 7.5 to 10	
(i) Degreasing Spent	Solvents - NSPS	
	4	
There shall be	no discharge of	process wastewater
		– .
pollutants.		. ч
(j) Wet Air Pollution	Control Scrubber	Blowdown - NSPS
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
portucant property	any one day	monthly average
	······································	
mg/off-kg (lb/millio	n off-lbs) of m	nagnesium sanded and
repaired or forged		see a see a
Chromium	0.229	0.093
Zinc	0.632	0.260
Ammonia	82.5	36.3
Fluoride	36.9	16.4
Oil & Grease	6.19	6.19
TSS	9.29	7.43
pH Within the	range of 7.5 to 10).0 at all times
F	5	

SUBPART C: NEW SOURCE PERFORMANCE STANDARDS FOR THE NICKEL-COBALT FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - NSPS

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - NSPS

Pollutant pollutant		Maximur any one		Maximum monthly	for average	
mg/off-kg with emuls	(lb/million sions	off-lbs)	of nickel	-cobalt rc	lled	

Chromium	0.063	0.026
Nickel	0.094	0.063
Fluoride	10.1	4.49
Oil & Grease	1.70	1.70
TSS	2.55	2.04
pH Within t	the range of 7.5 to 10.0	at all times
ph wrenin c	the range or 7.5 to ro.0	at all times

(c) Rolling Contact Cooling Water - NSPS

Pollutant	or property	Maximum for any one day	Maximum for
porrucant	property	any one day	monthly average
mg/off-kg	(lh/million	off-lbs) of nicke	al-cobalt rolled
with wate		OIL-IDS) OF MICKE	er-cobait folled
	, Mad		
Chromium		0.028	0.012
Nickel	. * 1	0.042	0.028
Fluoride		4.49	1.99
Oil & Gre	ase	0.754	0.754
TSS		1.13	0.905
pН	89 1 1 1 1	range of 7.5 to 10	

(d) Tube Reducing Spent Lubricant - NSPS

There shall be no discharge of process wastewater pollutants.

(e) Drawing Spent Neat Oils - NSPS

There shall be no discharge of process wastewater pollutants.

(f) Drawing Spent Emulsions - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of nickel-cobalt drawn with emulsions

Chromium				0.036				0.015	
Nickel				0.053	-			0.036	
Fluoride		r		5.68				2.52	
Oil & Grea	ase			0.954				0.954	
TSS			· · · ·	1.43				1.15	
рH	Within	the	range	of 7.5	to	10.0	at	all times '	

(g) Extrusion Spent Lubricants - NSPS

There shall be no discharge of process wastewater

pollutants.

(h) Extrusion Press or Solution Heat Treatment Contact Cooling Water - NSPS

Pollutant	Maximum for	Maximum for
pollutant	any one day	monthly average
mg/off-kg heat trea	off-lbs) of extruded	nickel-cobalt
Chromium	0.031	0.013
Nickel	0.046	0.031
Fluoride	4.95	2.20
Oil & Grea	0.832	0.832
TSS	1.25	0.999
pH	ange of 7.5 to 10.0	at all times

(i) Extrusion Press Hydraulic Fluid Leakage - NSPS

Pollutant or	Maximum for	Maximum for	
pollutant property	any one day	monthly average	
mg/off-kg (lb/million	off-lbs) of nick	el-cobalt extruded	
Chromium	0.086	0.035	
Nickel	0.128	0.086	
Fluoride	13.8	6.13	
Oil & Grease	2.32	2.32	
TSS	3.48	2.79	
pH Within the rang	e of 7.5 to 10.0	at all times	

(j) Forging Equipment Cleaning Wastewater - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of nick	kel-cobalt forged
Chromium		0.002	0.0006
Nickel		0.002	0.002
Fluoride		0.238	0.106
Oil & Grea		0.040	0.040
TSS		0.060	0.048
pH		range of 7.5 to 1	10.0 at all times

(k) Forging Contact Cooling Water - NSPS

Pollutant pollutant		Maximum fo any one da		aximum for onthly average
mg/off-kg cooled wi	(lb/million th water	off-lbs)	of forged	nickel-cobalt
Chromium Nickel Fluoride Oil & Gre TSS PH	ase Within the ra	0.018 0.026 2.82 0.474 0.711 nge of 7.5	to 10.0 at	0.007 0.018 1.25 0.474 0.569 all times

(1) Forging Press Hydraulic Fluid Leakage - NSPS

Pollutant or Maximum for Maximum for pollutant property any one day monthly average

mg/off-kg (lb/million off-lbs) of nickel-cobalt forged

Chromium	0.069	0.028
Nickel	0.103	0.069
Fluoride	11.2	4.94
Oil & Grease	1.87	1.87
TSS	2.81	2.25
pH Within the	range of 7.5 to 10.0	at all times

(m) Forging Spent Lubricants - NSPS

There shall be no discharge of process wastewater

pollutants.

(n) Stationary Casting Contact Cooling Water - NSPS

Pollutant or	Maximum for	Maximum for
pollutant proper	ty any one day	monthly average

mg/off-kg (lb/million off-lbs) of nickel-cobalt cast with stationary casting methods

Chromium	0.448	
Nickel	0.666	0.448
Fluoride	72.0	32.0
Oil & Grease	12.1	12.1
TSS	18.2	14.5
pH Within the	e range of 7.5 to	10.0 at all times
-		· · · · · · · · · · · · · · · · · · ·

(o) Vacuum Melting Steam Condensate - NSPS

There shall be no allowance for the discharge of process wastewater pollutants.

Stranges of the

Pollutant	or	Maximum for	Maximum for	
pollutant	property	any one day	monthly average	
				<u> </u>
mg/off-kg powder ato		off-lbs) of nick	el-cobalt metal	
Chromium		0,970	0.393	
Nickel		1.44	0.970	
Fluoride		156	69.2	
Oil & Grea	se	26.2	26.2	
TSS		39.3	31.5	
pH	Within the	range of 7.5 to l	0.0 at all times	
~				
	ling and So - NSPS	lution Heat Treat	ment Contact Cooling	
	shall be stewater po		or the discharge of	
(r) Wet Ai	r Pollution	Control Scrubber	Blowdown - NSPS	4
Pollutant		Maximum for	Maximum for	
pollutant	property	any one day	monthly average	
mg/off-kg	(lb/million	off-lbs),of nick	el-cobalt formed	
Chromium		0.300	0.122	
Nickel		0.450	0.300	
Fluoride		48.2	21.4	
Oil & Grea	se sa s	8.1	8.1	
TSS		12.2	9.72	
pH	Within the	range of 7.5 to 1	0.0 at all times	

(p) Metal Powder Production Atomization Wastewater - NSPS

(s) Surface Treatment Spent Baths - NSPS

Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
ng/off-kg treated	(1b/million	off-1bs) of nicke	el-cobalt surface
Chromium		0.346	0.141
Nickel		0.515	0.346
Fluoride		55.7	24.7
Oil & Grea	ase	9.35	9.35
TSS		14.1	11.2
рН	Within the m	ange of 7.5 to 10	.0 at all times
-			
(+) Gurfo	, Brootmont	Rinse - NSPS	
(c) Sulla		RIIISE - NSFS	
Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
	(lb/million	off-lbs) of nicke	el-cobalt surface
treated			
Chromium		0.874	0.354

Chromium	0.874	0.354
Nickel	1.30	0.873
Fluoride	141	62.3
Oil & Grease	23.6	23.6
TSS	35.4	28.3
pH Within	the range of 7.5 to	10.0 at all times

(u) Alkaline Cleaning Spent Baths - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of nick	el-cobalt alkaline
Chromium	1	0.013	0.005
Nickel		0.019	0.013
Fluoride		2.02	0.895
Oil & Gre		0.339	0.339
TSS		0.509	0.407
pH		ange of 7.5 to 1	0.0 at all times

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cleaned	(lb/million o	off-lbs) of ni	ckel-cobalt alkaline
Chromium		0.086	0.035
Nickel		0.128	0.086
Fluoride		13.9	6.15
Oil & Grea		2.33	2.33
TSS		3.50	2.80
pH		ange of 7.5 to	10.0 at all times

(v) Alkaline Cleaning Rinse - NSPS

(w) Molten Salt Rinse - NSPS

Pollutant	*	Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg with molt		off-lbs) of nicke	el-cobalt treated
Chromium	ase	0.312	0.127
Nickel		0.464	0.312
Fluoride		50.2	22.3
Oil & Gre		8.44	8.44
TSS		12.7	10.1
pH	Within the	range of 7.5 to 10	0.0 at all times

(x) Ammonia Rinse - NSPS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	···
	(lb/million nia solution	off-lbs) of nicke	el-cobalt treated	
Chromium Nickel Fluoride Oil & Gre TSS pH		0.006 0.008 0.881 0.148 0.222 range of 7.5 to 10	0.002 0.006 0.391 0.148 0.178 0.0 at all times	

(y) Sawing or Grinding Spent Emulsions - NSPS

Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
	(lb/million balt rinsed	off-lbs) of sawed	or ground
Chromium		0.015	0.006
Nickel		0.022	0.015
Fluoride		2.35	1.04
Oil & Grea	ase	0.394	0.394
TSS		0.591	0.473
Нq	Within the	range of 7.5 to 10	.0 at all times
(z) Sawin	g or Grindin	g Rinse - NSPS	
Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
mg/off-kg or ground		off-lbs) of nicke	l-cobalt sawed
		off-lbs) of nicke 0.067	1-cobalt sawed 0.027

Nickel	0.100	0.067
Fluoride	10.8	4.78
Oil & Grease	1.81	1.81
TSS	2.72	2.17
pH Within t	he range of 7.5 to 10.0	at all times

(aa) Steam Cleaning Condensate - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of nic	kel-cobalt steam
Chromium		0.011	0.005
Nickel		0.017	0.011
Fluoride		1.79	0.795
Oil & Grea		0.301	0.301
TSS		0.452	0.361
pH		ange of 7.5 to 1	10.0 at all times

(ab) Hydrostatic Tube Testing and Ultrasonic Testing Wastewater - NSPS

There shall be no discharge of process wastewater pollutants.

(ac) Degreasing Spent Solvents - NSPS

There shall be no discharge of process wastewater pollutants.

(ad) Dye Penetrant Testing Wastewater - NSPS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of nickel cobalt tested with
dye penetrant method

Chromium	0.079	0.032
Nickel	0.117	0.079
Fluoride	12.7	5.63
Oil & Grease	2.13	2.13
TSS	3.20	2.56
pH Within the	range of 7.5 to 10.0	at all times

(ae) Electrocoating Rinse - NSPS

Pollutant pollutant		Maximum for any one day	Maximum monthly	
mg/off-kg electrocoa	(lb/millior ated	n off-lbs)	of nick	el-cobalt
Chromium Nickel Fluoride Oil & Grea TSS pH		1.25 1.86 201 33.7 50.6 nge of 7.5 to	0.506 1.25 89.0 33.7 40.5 10.0 at all ti	mes

(af) Miscellaneous Wastewater Sources - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of nick	cel-cobalt formed
Chromium		0.091	0.037
Nickel		0.136	0.091
Fluoride		14.7	6.50
Oil & Grea		2.46	2.46
TSS		3.69	2.95
pH		ange of 7.5 to 1	10.0 at all times

SUBPART D: NEW SOURCE PERFORMANCE STANDARDS FOR THE PRECIOUS METALS FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - NSPS

There shall be no discharge of process wastewater

pollutants.

(b) Rolling Spent Emulsions - NSPS

Pollutant or	Maximum for	Maximum for
pollutant propert	y any one day	monthly average
<u> </u>		land and a second
mg/off-kg (lb/mi] with emulsions	lion off-lbs) of preci	ous metals rolled
Cadmium	0.026	0.012
Copper	0.147	0.077
Cyanide	0.023	0.010
Silver	0.032	0.013
Oil & Grease	1.54	0.925
TSS	3.16	1.51
pH Within	the range of 7.5 to 10	0 at all times

(c) Drawing Spent Neat Oils - NSPS

There shall be no discharge of process wastewater pollutants.

Pollutant	or	Maximum for	Maximum for
	property		monthly average
Ponnaouno	Freberel		
mg/off-kg with emul		ff-lbs) of precious	metals drawn
Cadmium		0.017	0.007
Copper		0.091	0.048
Cyanide		0.014	0,006
Silver		0.020	0.008
Oil & Gre	ase	0.950	0.570
TSS		1.95	0.927
pH	Within the ra	nge of 7.5 to 10.0	
*		5	
(e) Drawi	ng Spent Soap	Solutions - NSPS	
Pollutant	or	Maximum for	Maximum for
pollutant		any one day	monthly average
F	<u> </u>		1
	i		
		ff-lbs) of precious	metals drawn
with soap	solutions		
	ē.		
Cadmium		0.001	0.0005
Copper		0.006	0.003
Cyanide		0.0009	0.0004
Silver		0.002	0.0006
Oil & Grea	ase	0.063	0.038
TSS	÷	0.128	0.061
pH	Within the ra	nge of 7.5 to 10.0	at all times
	1		
	ت و		
(f) Metal	Powder Produc	tion Atomization Wa	stewater - NSPS
Pollutant	or	Maximum for	Maximum for
		any one day	monthly average
porrucane	propercy	any one day	monthly average
mg/off-kg atomized	(lb/million o	ff-1bs) of precious	metals powder wet
0-2		2 27	1 00
Cadmium		2.27	
Copper		12.7	6.68
Cyanide		1.94	0.802
Silver		2.74	1.14
Oil & Grea	ase	134	80.2
TSS		274	131
pH	Within the ra	nge of 7.5 to 10.0	at all times
			,

(d) Drawing Spent Emulsions - NSPS

(g) Heat Treatment Contact Cooling Water - NSPS

Pollutant or	Maximum for	Maximum for
ollutant property	any one day	monthly average
ng/off-kg (lb/millior	n off-lbs) of preci	ous
etals heat treated		
admium	0.142	0.063
opper	0.793	0.417
yanide	0.121	0.050
ilver	0.171	0.071
il & Grease	8.34 17.1	5.01 8.13
SS H Within the	range of 7.5 to 10	
n within the		••• at all times
· ·		
h) Semi-Continuous a	and Continuous Cast	ing Contact
		ing contact
Cooling Water - N	JGDG	· ·
Cooling Water - N	ISPS	· ·
-	NSPS Maximum for	Maximum for
Pollutant or	Maximum for	Maximum for monthly average
ollutant or	Maximum for	
ollutant or ollutant property	Maximum for any one day	monthly average
ollutant or ollutant property g/off-kg (lb/millior	Maximum for any one day n off-lbs) of preci	monthly average ous metals cast
ollutant or ollutant property g/off-kg (lb/millior	Maximum for any one day n off-lbs) of preci	monthly average ous metals cast
ollutant or ollutant property g/off-kg (lb/millior y the semi-continuou	Maximum for any one day n off-lbs) of preci is or continuous me	monthly average ous metals cast thod
ollutant or ollutant property g/off-kg (lb/millior y the semi-continuou admium	Maximum for any one day n off-lbs) of preci ns or continuous me 0.350	monthly average ous metals cast thod 0.155
ollutant or ollutant property g/off-kg (lb/millior y the semi-continuou admium opper	Maximum for any one day n off-lbs) of preci ns or continuous me 0.350 1.96	monthly average ous metals cast thod 0.155 1.03
ollutant or ollutant property g/off-kg (lb/millior by the semi-continuou admium copper yanide	Maximum for any one day n off-lbs) of preci is or continuous me 0.350 1.96 0.299	monthly average ous metals cast thod 0.155 1.03 0.124
Pollutant or pollutant property ng/off-kg (lb/million by the semi-continuou cadmium copper cyanide lilver	Maximum for any one day n off-lbs) of preci ns or continuous me 0.350 1.96	monthly average ous metals cast thod 0.155 1.03 0.124 0.175
Pollutant or pollutant property ag/off-kg (lb/million by the semi-continuou cadmium copper cyanide silver Dil & Grease	Maximum for any one day n off-lbs) of preci is or continuous me 0.350 1.96 0.299 0.423	monthly average ous metals cast thod 0.155 1.03 0.124
Pollutant or pollutant property mg/off-kg (lb/million by the semi-continuou Cadmium Copper Cyanide Silver Dil & Grease CSS	Maximum for any one day n off-lbs) of preci is or continuous me 0.350 1.96 0.299 0.423 20.6	monthly average ous metals cast thod 0.155 1.03 0.124 0.175 12.4 20.1
Pollutant or pollutant property mg/off-kg (lb/million by the semi-continuou Cadmium Copper Cyanide Silver Dil & Grease TSS	Maximum for any one day n off-lbs) of preci is or continuous me 0.350 1.96 0.299 0.423 20.6 42.3	monthly average ous metals cast thod 0.155 1.03 0.124 0.175 12.4 20.1 0.0 at all times
Pollutant or pollutant property mg/off-kg (lb/million by the semi-continuou Cadmium Copper Cyanide Silver Dil & Grease CSS	Maximum for any one day n off-lbs) of preci is or continuous me 0.350 1.96 0.299 0.423 20.6 42.3	monthly average ous metals cast thod 0.155 1.03 0.124 0.175 12.4 20.1
Pollutant or pollutant property mg/off-kg (lb/million by the semi-continuou Cadmium Copper Cyanide Silver Dil & Grease CSS	Maximum for any one day n off-lbs) of preci is or continuous me 0.350 1.96 0.299 0.423 20.6 42.3 range of 7.5 to 10	monthly average ous metals cast thod 0.155 1.03 0.124 0.175 12.4 20.1 0.0 at all times

pollutants.

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Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
	• •	
mg/off-kg (lb/milli the direct chill me	on off-lbs) of preci thod	ous metals cast by
Cadmium	0.367	0.162
Copper	2.05	1.08
Cyanide	0.313	0.130
Silver	0.443	0.184
Oil & Grease	21.6	13.0
TSS	44.3	21.1
	e range of 7.5 to 10	.0 at all times

(j) Direct Chill Casting Contact Cooling Water - NSPS

(k) Shot Casting Contact Cooling Water - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cast	(lb/million	off-lbs) of precious	s metals shot
Cadmium		0.125	0.055
Copper		0.698	0.367
Cyanide		0.107	0.044
Silver		0.151	0.063
Oil & Grea		7.34	4.41
TSS		15.1	7.16
pH		ange of 7.5 to 10.0	at all times

(1) Wet Air Pollution Control Scrubber Blowdown - NSPS

There shall be no discharge of process wastewater

pollutants.

. . .

(m) Pressure Bonding Contact Cooling Water - NSPS

	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
	(lb/million ssure bonded	off-lbs) of preci	ous metal and base
actar pre.	build bonaca		
Cadmium		0.029	0.013
Copper		0.159	0.084
Cyanide		0.024	0.010
Silver		0.034	0.014
Oil & Grea	ase	1.67	1.00
TSS		3.43	1.63
рH	Within the	range of 7.5 to 10	.0 at all times
		Spent Baths - NSF	
Pollutant	or	Maximum for	Maximum:for
Pollutant			
Pollutant pollutant	or property	Maximum for any one day	Maximum for monthly average
Pollutant pollutant	or property	Maximum for any one day	Maximum:for
Pollutant pollutant mg/off-kg	or property	Maximum for any one day	Maximum for monthly average
Pollutant pollutant mg/off-kg treated Cadmium	or property	Maximum for any one day off-lbs) of preci	Maximum for monthly average ous metals surface
Pollutant pollutant mg/off-kg treated Cadmium Copper	or property	Maximum for any one day off-lbs) of preci 0.033	Maximum for monthly average ous metals surface 0.015
Pollutant pollutant mg/off-kg treated Cadmium Copper Cyanide	or property	Maximum for any one day off-lbs) of preci 0.033 0.183	Maximum for monthly average ous metals surface 0.015 0.097
Pollutant pollutant mg/off-kg treated Cadmium Copper Cyanide Silver	or property (lb/million	Maximum for any one day off-lbs) of preci 0.033 0.183 0.028	Maximum for monthly average ous metals surface 0.015 0.097 0.012
Pollutant pollutant mg/off-kg treated	or property (lb/million	Maximum for any one day off-1bs) of preci 0.033 0.183 0.028 0.040	Maximum for monthly average ous metals surface 0.015 0.097 0.012 0.017

(o) Surface Treatment Rinse - NSPS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg treated	(lb/million c	off-lbs) of precious	metals surface
Cadmium Copper Cyanide Silver Oil & Grea TSS		0.210 1.17 0.179 0.253 12.3 25.3	0.093 0.616 0.074 0.105 7.39 12.0
рH	Within the ra	inge of 7.5 to 10.0	at all times

Pollutant	or	Maximum for	Maximum for
	property	any one day	monthly average
porracane	propercy	any one day	monenty average
			1
ma/off-ka	(lb/million	off-lbs) of precio	ous metals alkaline
cleaned	(,	····, ··· ·····	
	•		
Cadmium		0.021	0.009
Copper		0.114	0.060
Cyanide		0.018	0.007
Silver		0.025	0.010
Oil & Grea	ase	1.20	0.720
TSS		2.46	1.17
pH	Within the	ange of 7.5 to 10.	
T			
			······································
(g) Alkal:	ine Cleaning	Rinse - NSPS	• • • • • • • • • • • • • • • • • • •
. 17	5		
Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
-			
		· · ·	
mg/off-kg	(lb/million	off-lbs) of precio	ous metals alkaline
cleaned		_	• .
Cadmium		0.381	0.168
Copper		2.13	1.12
Cyanide		0.325	0.135
Silver		0.459	0.191
Oil & Grea	ase	22.4	13.5
TSS		45.9	21.9
pH	Within the m	ange of 7.5 to 10.	0 at all times
-		-	
<u></u>			
(r) Alkal:	ine Cleaning	Pre-Bonding Wastew	ater - NSPS
			s i grag e d
Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
			1
		off-lbs) of precio	us metal and base
metal clea	aned prior to	bonding	· *
_			
Cadmium		0.400	0.174
Copper		2.21	1.16
Cyanide		0.337	0.139
Silver		0.476	0.197
Oil & Grea	ase	23.2	13.9
TSS		47.6	22.6
pН	Within the 1	ange of 7.5 to 10.	
-		-	1 · · · · · · · · · · · · · · · · · · ·

(p) Alkaline Cleaning Spent Baths - NSPS

(s) Tumbling or Burnishing Wastewater - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
malaff ha (lb/million	: off=lbg\ of progi	our motole tumbled
mg/off-kg (lb/million	orrens) or preer	ous metals tumbled
or burnished		
Cadmium	0.412	0.182
Copper	2.30	1.21
Cyanide	0.351	0.145
Silver	0.496	0.206
Oil & Grease	24.2	14.5
TSS Within the	49.6	23.6
pH Within the	range of 7.5 to 10	0.0 at all times
<u></u>		
(t) Sawing or Grindi	ng Spent Neat Oils	5 - NSPS
There shall be	no discharge of	process wastewater
pollutants.		
porracanco.		
· · · · ·		
(u) Sawing or Grindin	a Spent Emulsions	- NSPS
(u) buwing of drindin	g bpene hausions	NDI D
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million		ous metals sawed
or ground with emulsi	ons	
Cadmium	0.032	0.014
	0.032	0.014
Copper	0.178	0.094
Copper Cyanide	0.178 0.027	0.094 0.011
Copper Cyanide Silver	0.178 0.027 0.038	0.094 0.011 0.016
Copper Cyanide Silver Oil & Grease	0.178 0.027 0.038 1.87	0.094 0.011 0.016 1.12
Copper Cyanide Silver Oil & Grease TSS	0.178 0.027 0.038 1.87 3.83	0.094 0.011 0.016 1.12 1.82
Copper Cyanide Silver Oil & Grease TSS	0.178 0.027 0.038 1.87	0.094 0.011 0.016 1.12 1.82
Copper Cyanide Silver Oil & Grease TSS	0.178 0.027 0.038 1.87 3.83	0.094 0.011 0.016 1.12 1.82
Copper Cyanide Silver Oil & Grease TSS	0.178 0.027 0.038 1.87 3.83	0.094 0.011 0.016 1.12 1.82
Copper Cyanide Silver Oil & Grease TSS pH Within the	0.178 0.027 0.038 1.87 3.83 range of 7.5 to 10	0.094 0.011 0.016 1.12 1.82
Copper Cyanide Silver Oil & Grease TSS pH Within the	0.178 0.027 0.038 1.87 3.83	0.094 0.011 0.016 1.12 1.82
Copper Cyanide Silver Oil & Grease TSS pH Within the	0.178 0.027 0.038 1.87 3.83 range of 7.5 to 10	0.094 0.011 0.016 1.12 1.82
Copper Cyanide Silver Oil & Grease TSS pH Within the (v) Degreasing Spent	0.178 0.027 0.038 1.87 3.83 range of 7.5 to 10 Solvents - NSPS	0.094 0.011 0.016 1.12 1.82 0.0 at all times
Copper Cyanide Silver Oil & Grease TSS pH Within the (v) Degreasing Spent	0.178 0.027 0.038 1.87 3.83 range of 7.5 to 10 Solvents - NSPS	0.094 0.011 0.016 1.12 1.82
Copper Cyanide Silver Oil & Grease TSS pH Within the (v) Degreasing Spent There shall be	0.178 0.027 0.038 1.87 3.83 range of 7.5 to 10 Solvents - NSPS	0.094 0.011 0.016 1.12 1.82 0.0 at all times
Oil & Grease TSS pH Within the (v) Degreasing Spent	0.178 0.027 0.038 1.87 3.83 range of 7.5 to 10 Solvents - NSPS	0.094 0.011 0.016 1.12 1.82 0.0 at all times

SUBPART E: NEW SOURCE PERFORMANCE STANDARDS FOR THE REFRACTORY METALS FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils and Graphite Based Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - NSPS

pollutant property any one day monthly average	Pollutant	or	Maximum	for	Maximum	for
	pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of refractory metals
rolled with emulsions

Copper	0.549	0.262
Nickel	0.236	0.159
Fluoride	25.5	11.3
Molybdenum	2.16	0.957
Oil & Grease	4.29	4.29
TSS	6.44	5.15
pH Within the	range of 7.5 to 10.0 at	all times

(c) Drawing Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(e) Extrusion Press Hydraulic Fluid Leakage - NSPS

Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
ng/off-kg extruded	(lb/millior	n off-lbs) of refra	ctory metals
Copper		1.53	0.726
Nickel	4	0.655	0.441
Fluoride		70.8	31.4
Molybdenum		5.99 11.9	2.66 11.9
Dil & Grea FSS	ase	17.9	14.3
	Within the	range of 7.5 to 10	
, 			
			:
(f) Forgir	ng Spent Lub	oricants - NSPS	
. *	• · · ·		
Thore	chall ha	no dicabargo of	progod woatowator
There	e shall be	no discharge of	process wastewater
		no discharge of	process wastewater
There		no discharge of	process wastewater
pollutants	5.		
pollutants	5.	no discharge of Cooling Water - NSP	
oollutants (g) Forgir	3. Ng Contact C	Cooling Water - NSP	'S
oollutants (g) Forgir Pollutant	3. Ng Contact C		S Maximum for
oollutants (g) Forgir Pollutant	ng Contact C	Cooling Water - NSP Maximum for	'S
ollutants (g) Forgir Pollutant pollutant	ng Contact C or property	Cooling Water - NSP Maximum for any one day	S Maximum for monthly average
ollutants (g) Forgin Pollutant pollutant	ng Contact C or property (lb/million	Cooling Water - NSP Maximum for any one day	S Maximum for
oollutants (g) Forgin Pollutant pollutant ng/off-kg	ng Contact C or property (lb/million	Cooling Water - NSP Maximum for any one day	S Maximum for monthly average
ollutants (g) Forgin Pollutant pollutant ng/off-kg cooled wit	ng Contact C or property (lb/million	Cooling Water - NSP Maximum for any one day	S Maximum for monthly average
ollutants (g) Forgir Pollutant pollutant ag/off-kg cooled wit Copper Nickel	ng Contact C or property (lb/million	Cooling Water - NSP Maximum for any one day n off-1bs) of forge	S Maximum for monthly average d refractory metals
oollutants (g) Forgir Pollutant pollutant ng/off-kg cooled wit Copper Nickel Fluoride	ng Contact C or property (lb/million th water	Cooling Water - NSP Maximum for any one day 1 off-1bs) of forge 0.041 0.018 1.92	Maximum for monthly average d refractory metals 0.020 0.012 0.853
oollutants (g) Forgir Pollutant pollutant ng/off-kg cooled wit Copper Nickel Fluoride Molybdenum	ng Contact C or property (lb/million th water	Cooling Water - NSP Maximum for any one day 0.041 0.018 1.92 0.163	Maximum for monthly average d refractory metals 0.020 0.012 0.853 0.072
oollutants (g) Forgir Pollutant oollutant ag/off-kg cooled wit Copper Nickel Fluoride Molybdenum Dil & Grea	ng Contact C or property (lb/million th water	Cooling Water - NSP Maximum for any one day 0.041 0.041 0.018 1.92 0.163 0.323	Maximum for monthly average d refractory metals 0.020 0.012 0.853 0.072 0.323
pollutants (g) Forgir Pollutant pollutant	ng Contact C or property (lb/million th water	Cooling Water - NSP Maximum for any one day 0.041 0.018 1.92 0.163	Maximum for monthly average d refractory metals 0.020 0.012 0.853 0.072 0.323 0.388

Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of refractory metals formed Copper 0.174 0.083 Nickel 0.075 0.051 Fluoride 8.09 3.59 Molybdenum 0.684 0.303 1.36 Oil & Grease 1.36 TSS 2.04 1.63 Within the range of 7.5 to 10.0 at all times pH

(i) Metal Powder Production Wastewater - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg produced	(lb/million	off-lbs) of refrac	ctory metals powder
Copper	ase	0.360	0.172
Nickel		0.155	0.104
Fluoride		16.7	7.42
Molybdenum		1.42	0.627
Oil & Grea		2.81	2.81
TSS		4.22	3.37
pH		cange of 7.5 to 10.	0 at all times

(j) Metal Powder Production Floor Wash Wastewater - NSPS

There shall be no discharge of process wastewater pollutants.

(k) Metal Powder Pressing Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(h) Equipment Cleaning Wastewater - NSPS

pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of refractory metals surface treated Copper 0.498 0.237 0.214 0.144 Nickel Fluoride 23.2 10.3 Molybdenum 1.96 0.868 Oil & Grease 3.89 3.89 5.84 TSS 4.67 Within the range of 7.5 to 10.0 at all times pН (m) Surface Treatment Rinse - NSPS Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of refractory metals surface treated Copper 15.5 7.38 Nickel 6.66 4.48 Fluoride 720 320 60.9 27.0 Molybdenum Oil & Grease 121 121 182 145 TSS Within the range of 7.5 to 10.0 at all times pН (n) Alkaline Cleaning Spent Baths - NSPS Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of refractory metals alkaline cleaned 0.204 0.428 Copper 0.184 0.124 Nickel 19.9 Fluoride 8.82 1.68 0.745 Molybdenum 3.34 3.34 Oil & Grease 5.01 4.01 TSS Within the range of 7.5 to 10.0 at all times pH.

Maximum for

Maximum for

(1) Surface Treatment Spent Baths - NSPS

Pollutant or

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millic alkaline cleaned	on off-lbs) of refra	ctory metals
Copper	10.5	4.98
Nickel	4.49	3.02
Fluoride	486	216
Molybdenum	41.1 81.6	18.2 81.6
Oil & Grease TSS	123	97.9
	range of 7.5 to 10	
~		
(p) Molten Salt Rins	e - NSPS	
	e - NSPS Maximum for	Maximum for
(p) Molten Salt Rins	Maximum for	Maximum for monthly average
(p) Molten Salt Rins Pollutant or	Maximum for any one day on off-lbs) of refra	monthly average
(p) Molten Salt Rins Pollutant or pollutant property mg/off-kg (lb/millio treated with molten Copper	Maximum for any one day on off-lbs) of refra salt 0.810	monthly average ctory metals 0.386
(p) Molten Salt Rins Pollutant or pollutant property mg/off-kg (lb/millio treated with molten Copper Nickel	Maximum for any one day on off-1bs) of refra salt 0.810 0.348	monthly average ctory metals 0.386 0.234
(p) Molten Salt Rins Pollutant or pollutant property mg/off-kg (lb/millio treated with molten Copper Nickel Fluoride	Maximum for any one day on off-lbs) of refra salt 0.810 0.348 37.7	monthly average ctory metals 0.386 0.234 16.7
(p) Molten Salt Rins Pollutant or pollutant property mg/off-kg (lb/millio treated with molten Copper Nickel Fluoride Molybdenum	Maximum for any one day on off-lbs) of refra salt 0.810 0.348 37.7 3.19	monthly average ctory metals 0.386 0.234 16.7 1.41
(p) Molten Salt Rins Pollutant or pollutant property mg/off-kg (lb/millio treated with molten Copper Nickel Fluoride Molybdenum Oil & Grease	Maximum for any one day on off-lbs) of refra salt 0.810 0.348 37.7 3.19 6.33	monthly average ctory metals 0.386 0.234 16.7 1.41 6.33
(p) Molten Salt Rins Pollutant or pollutant property mg/off-kg (lb/millio treated with molten Copper Nickel Fluoride Molybdenum Oil & Grease TSS	Maximum for any one day on off-lbs) of refra salt 0.810 0.348 37.7 3.19	monthly average .ctory metals 0.386 0.234 16.7 1.41 6.33 7.6

(o) Alkaline Cleaning Rinse - NSPS

(q) Tumbling or Burnishing Wastewater - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million o burnished	ff-lbs) of refracto	ry metals
Copper	se	1.60	0.763
Nickel		0.688	0.463
Fluoride		74.4	33.0
Molybdenum		6.29	2.79
Oil & Grea		12.5	12.5
TSS		18.8	15.0
pH		nge of 7.5 to 10.0	at all times

(r) Sawing or Grinding Spent Neat Oils - NSPS

There shall be no discharge of process wastewater pollutants.

(s) Sawing or Grinding Spent Emulsions - NSPS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average
-					

mg/off-kg (lb/million off-lbs) of refractory metals sawed
or ground with emulsions

Copper	6			0.380)			0.18	31
Nickel	-			0.164	1			0.11	LO
Fluoride				17.7				7.84	1
Molybdenu	n			1.5				0.66	53
Oil & Grea	ase			2.97				2.97	7
TSS				4.46				3.57	7
pH	Within	the	range	of 7.5	to	10.0	at	a11	times

(t) Sawing or Grinding Contact Cooling Water - NSPS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million of ground with contact		ory metals sawed
Copper Nickel Fluoride Molybdenum Oil & Grease TSS pH Within the ra	3.11 1.34 $145.$ 12.2 24.3 36.5 ange of 7.5 to 10.0	1.48 0.899 64.2 5.42 24.3 29.2 at all times

(u) Sawing or Grinding Rinse - NSPS

mg/off-kg (lb/million off-lbs) of sawed or ground refractory metals rinsedCopper0.0180.009 0.008Nickel0.0080.005 0.005Fluoride0.8030.357 0.068Molybdenum0.0680.030 0.135Oil & Grease0.1350.135 0.203TSS0.2030.162 pHWithin the range of 7.5 to 10.0 at all times	Pollutant or	Maximum for	Maximum for
	pollutant property	any one day	monthly average
Nickel0.0080.005'Fluoride0.8030.357Molybdenum0.0680.030Oil & Grease0.1350.135TSS0.2030.162			or ground
	Nickel	0.008	0.005
	'Fluoride	0.803	0.357
	Molybdenum	0.068	0.030
	Oil & Grease	0.135	0.135
	TSS	0.203	0.162

(v) Wet Air Pollution Control Scrubber Blowdown - NSPS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of refractory metals sawed, ground, surface coated or surface treated

Copper	1.01	0.480
Nickel	0.433	0.291
Fluoride	46.8	20.8
Molybdenum	3.96	1.76
Oil & Grease	7.87	7.87
TSS	11.8	9.45
pH Withi	n the range of 7.5 to 10.0) at all times

(w) Miscellaneous Wastewater Sources - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million	off-lbs) of refra	ctory metals formed
Copper	0.442	0.211
Nickel	0.190	0.128
Fluoride	20.6	9.11
Molybdenum	1.74	0.770
Oil & Grease	3.45	3.45
TSS	5.18	4.14
pH Within the rar	nge of 7.5 to 10.0	at all times

(x) Dye Penetrant Testing Wastewater - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million product tested	off-lbs) of refrac	ctory metals
Copper	0.100	0.048
Nickel	0.043	0.029
Fluoride	4.62	2.05
Molybdenum	0.391	0.173
Oil & Grease	0.776	0.776
TSS	1.17	0.931
pH Within the r	range of 7.5 to 10	.0 at all times

(y) Degreasing Spent Solvents - NSPS

There shall be no discharge of process wastewater pollutants.

SUBPART F: NEW SOURCE PERFORMANCE STANDARDS FOR THE TITANIUM FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - NSPS

There shall be no discharge of process wastewater pollutants.

		2		
Pollutant of	r.	Maximum for	Maximu	m for
pollutant p		any one day		y average
Forgenere F.				1
<u></u>			~~ <u>~~~~~~~~~~~~~~~~~~~~~~~~~~</u> ~~~~~~~~~	
ma/off-ka ()	lb/million of	f-lbs) of tit	tanium rolled	with
contact cool		,		
	5			
Cyanide		0.142	0.0	59
Lead		0.205	0.0	98
Zinc		0.713	0.2	98
Ammonia		65.1	28.6	•
Fluoride		29.1	12.9	
Oil & Grease	2	9.76	5.8	6
TSS		20.0	9.5	2
	ithin the ran	ge of 7.5 to	10.0 at all	times
-		5		
(c) Drawing	Spent Neat C	ils - NSPS		
	.		_	
There	shall be n	o discharge	of process	wastewater
.				
pollutants.				
				x
				1
(d) Extrusio	on Spent Neat	Oils - NSPS		· .
m 1			- C	
There	snall be n	o discharge	of process	wastewater
nollutonta				· ·
pollutants.				
				T '
				1. A
(a) Extrucio	on Spent Emul	sions - NCDS		
(e) Exclusion	m ppene mar	STOUS NOLD		
Pollutant or	*	Maximum for	Maximu	n for
pollutant pr		any one day		y average
Forragano Fr	, of ot ot			2
	······································			
mg/off-kg (]	b/million of	f-lbs) of tit	tanium extrud	ed
		•		• 2.
Cyanide		0.021	0.	009
Lead		0.030	0.	015
Zinc		0.105	0.	044
Ammonia		9.59	4.	22
Fluoride		4.28	1.	9
Oil & Grease	2	1.44	0.3	863
TSS		2.95	1.	
pH Wi	thin the ran	ge of 7.5 to	10.0 at all	times

(b) Rolling Contact Cooling Water - NSPS

(f) Extrusion Press Hydraulic Fluid Leakage - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titani	um extruded
Cyanide		0.052	0.022
Lead		0.075	0.036
Zinc		0.260	0.109
Ammonia		23.7	10.5
Fluoride		10.6	4.70
Oil & Grea		3.56	2.14
TSS		7.30	3.47
pH		range of 7.5 to 10.	0 at all times

(g) Forging Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(h) Forging Contact Cooling Water - NSPS

	·	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
porrucane propercy	any one day	monenty average
	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
mg/off-kg (lb/million	off-1bs) of forged	titanium cooled
with water		
Cyanide	0.029	0.012
Lead		0.020
Zinc	0.146	0.061
Ammonia	13.3	5.86
Fluoride	5.95	2.64
Oil & Grease	2.00	1.20
TSS	4.10	1.95
pH Within the ra	nge of 7.5 to 10.0	at all times
· · · · · · · · · · · · · · · · · · ·	5	

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Pollutant pollutant		Maximum fo any one da		
mg/off-kg	(lb/million	off-lbs) of	titanium forged	
Cyanide Lead Zinc Ammonia Fluoride Oil & Grea TSS pH		0.012 0.017 0.059 5.33 2.38 0.800 1.64 range of 7.5	0.005 0.008 0.025 2.35 1.06 0.480 0.780 to 10.0 at all times	

(i) Forging Equipment Cleaning Wastewater - NSPS

(j) Forging Press Hydraulic Fluid Leakage - NSPS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million o	off-lbs) of titanium	forged
Cyanide		0.293	0.121
Lead		0.424	0.202
Zinc		1.48	0.616
Ammonia		135	59.2
Fluoride		60.1	26.7
Oil & Grea		20.2	12.1
TSS		41.4	19.7
pH		ange of 7.5 to 10.0	at all times

(k) Tube Reducing Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(1) Heat Treatment Contact Cooling Water - NSPS

There shall be no discharge allowance for the discharge of process wastewater pollutants.

(m) Surface Treatment Spent Baths - NSPS

Pollutant pollutant	÷	Maximum for any one day	Maximum for monthly average
••• •		· · ·	· • • •
mg/off-kg	(lb/million	off-lbs) of titani	um surface treated
Cyanide		0.061	0.025
Lead	۰	0.088	0.042
Zinc		0.304	0.127
Ammonia		27.7	12.2
Fluoride		12.4	5.49
Oil & Grea	ase	4.16	2.50
TSS		8.53	4.06
pН	Within the	range of 7.5 to 10.	0 at all times

Pollutant pollutant		Maximum for any one day	Maximum monthly	
mg/off-kg	(lb/million	off-lbs) of titan	ium surface	treated
Cyanide Lead Zinc Ammonia Fluoride Oil & Grea TSS pH		$\begin{array}{r} 0.847\\ 1.23\\ 4.27\\ 389\\ 174\\ 58.4\\ 120\\ range of 7.5 to 10\end{array}$	0.351 0.584 1.78 171 77.1 35.1 57.0 .0 at all ti	mes

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			. · · · · ·	
Pollutant	or	Maximum for	Maximum	for
pollutant	property	any one day	monthly	average
	<u> </u>			
mg/off-kg or forged	(lb/million	off-lbs) of titan	nium surface	treated
Cyanide		0.062	0.02	6
Lead		0.090	0.04	
Zinc		0.313	0.13	
Ammonia		28.5	12.6	<u></u>
Fluoride		12.8	5.65	
Oil & Grea	966	4.28	2.57	
TSS		8.78	4.18	
pH	Within the	ange of 7.5 to 10		mea
5	Ma Girani Circ .			
<u></u>				······································
(p) Alkali	ine Cleaning	Spent Baths - NSP	S	
Pollutant		Maximum for	Maximum	
pollutant	property	any one day	monthly	average
		·		
mg/off-kg cleaned	(lb/million	off-lbs) of titan	ium alkaline	r
Guanida		0.070	0.03	n
Cyanide Lead		0.101		
Leau		0.101	0.04	D

0.351

32.0

14.3

4.80

9.84

Within the range of 7.5 to 10.0 at all times

0.147

14.1

6.34

2.88

4.68

Zinc

TSS

 $\mathbf{p}\mathbf{H}$

Ammonia

Fluoride

Oil & Grease

(o) Wet Air Pollution Control Scrubber Blowdown - NSPS

(q) Alkaline Cleaning Rinse - NSPS

Oil & Grease

TSS

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Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
ng/off-kg (lb/million o	of-lbs) of titani	ium alkaline cleaned
Cyanide	0.080	0.033
Lead	0.116	0.055
Zinc	0.403	0.169
Ammonia	36.8	16.2
Fluoride	16.4	7.29
Oil & Grease	5.52	3.31
TSS	11.3	5.38
pH Within the ra	ange of 7.5 to 10	0.0 at all times
(r) Molten Salt Rinse -	- NSPS	
Pollutant or	- NSPS Maximum for	Maximum for
		Maximum for monthly average
<pre>(r) Molten Salt Rinse - Pollutant or pollutant property mg/off-kg (lb/million molten salt</pre>	Maximum for any one day	monthly average
Pollutant or pollutant property mg/off-kg (lb/million molten salt	Maximum for any one day	monthly average
Pollutant or pollutant property mg/off-kg (lb/million molten salt Cyanide	Maximum for any one day of-lbs) of ti	monthly average
Pollutant or pollutant property mg/off-kg (lb/million	Maximum for any one day of-lbs) of ti 0.277	monthly average itanium treated with 0.115
Pollutant or pollutant property mg/off-kg (lb/million molten salt Cyanide Lead Zinc Ammonia	Maximum for any one day of-lbs) of ti 0.277 0.401 1.40 128	monthly average itanium treated with 0.115 0.191 0.583 56.0
Pollutant or pollutant property mg/off-kg (lb/million molten salt Cyanide Lead Zinc	Maximum for any one day of-1bs) of ti 0.277 0.401 1.40	monthly average Itanium treated with 0.115 0.191 0.583

19.1

39.2 18.6 Within the range of 7.5 to 10.0 at all times

11.5

(s) Tumbling Wastewater - NSPS

Pollutant pollutant	or property	Maximum for any one day	Maximum for monthly average	<u>.</u>
mg/off-kg	(lb/million	off-lbs) of titan	ium tumbled	
Cyanide Lead Zinc Ammonia Fluoride Oil & Gre TSS pH		0.023 0.033 0.116 10.6 4.70 1.58 3.24 range of 7.5 to 10	0.010 0.016 0.048 4.63 2.09 0.948 1.54 .0 at all times	• • •

(t) Sawing or Grinding Spent Neat Oils - NSPS

There shall be no discharge of process wastewater pollutants.

(u) Sawing or Grinding Spent Emulsions - NSPS

Pollutant pollutant	Maximum for any one day	Maximum for monthly average	
mg/off-kg with emuls	off-lbs) of titanium	a sawed or ground	
Cyanide Lead Zinc Ammonia Fluoride Oil & Grea TSS pH	0.053 0.077 0.267 24.4 10.9 3.66 7.51 cange of 7.5 to 10.0	0.022 0.037 0.112 10.7 4.83 2.20 3.57 at all times	•

(v) Sawing or Grinding Contact Cooling Water - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
ng/off-kg (lb/millic	on of-lbs) of titan	ium sawed or ground
with contact cooling		
Cyanide	0.138	0.057
Lead	0.200	0.095
Zinc	0.695	0.291
Ammonia	63.5	27.9
Fluoride	28.3	12.6
Dil & Grease	9.52	5.71
rss Within the	19.5	9.28 0 at all times
pH Within the	Tange of 7.5 to 10	• V at all times
(w) Dye Penetrant Tes	sting Wastewater -	NSPS
(w) Dye Penetrant Tes Pollutant or	sting Wastewater - Maximum for	NSPS Maximum for
	- · · · · · · · · · · · · · · · · · · ·	
Pollutant or pollutant property	Maximum for any one day	Maximum for
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
Pollutant or pollutant property mg/off-kg (lb/millic pentrant methods	Maximum for any one day on of-lbs) of titan	Maximum for monthly average ium tested using dye
Pollutant or pollutant property mg/off-kg (lb/millic pentrant methods Cyanide	Maximum for any one day on of-lbs) of titan 0.325	Maximum for monthly average ium tested using dye 0.135
Pollutant or pollutant property mg/off-kg (lb/millic pentrant methods Cyanide Lead	Maximum for any one day on of-lbs) of titan	Maximum for monthly average ium tested using dye 0.135 0.224
Pollutant or pollutant property mg/off-kg (lb/millic pentrant methods Cyanide	Maximum for any one day on of-lbs) of titan 0.325 0.471	Maximum for monthly average ium tested using dye 0.135 0.224 0.683
Pollutant or pollutant property mg/off-kg (lb/millic pentrant methods Cyanide Lead Zinc	Maximum for any one day on of-lbs) of titan 0.325 0.471 1.64	Maximum for monthly average ium tested using dye 0.135 0.224
Pollutant or pollutant property mg/off-kg (lb/millic pentrant methods Cyanide Lead Zinc Ammonia Fluoride	Maximum for any one day on of-lbs) of titan 0.325 0.471 1.64 149	Maximum for monthly average ium tested using dye 0.135 0.224 0.683 65.7
Pollutant or pollutant property mg/off-kg (lb/millic pentrant methods Cyanide Lead Zinc Ammonia Fluoride Oil & Grease TSS	Maximum for any one day on of-lbs) of titan 0.325 0.471 1.64 149 66.7	Maximum for monthly average ium tested using dye 0.135 0.224 0.683 65.7 29.6 13.5 21.9

(x) Hydrotesting Wastewater - NSPS

There	shall	be	no	discharge	of	process	wastewater
pollutants.	an an an Arrange			14	• •		

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	formed
Cyanide		0.010	0.004
Lead		0.014	0.007
Zinc		0.048	0.020
Ammonia		4.32	1.90
Fluoride		1.93	0.856
Oil & Grea		0.648	0.389
TSS		1.33	0.632
pH		ange of 7.5 to 10.0 a	at all times

(y) Miscellaneous Wastewater Sources - NSPS

(z) Degreasing Spent Solvents - NSPS

There shall be no discharge of process wastewater pollutants.

SUBPART G: NEW SOURCE PERFORMANCE STANDARDS FOR THE URANIUM FORMING SUBCATEGORY

(a) Extrusion Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(b) Extrusion Tool Contact Cooling Water - NSPS

Pollutant pollutant		Maximu any on		Maximum monthly	for average
mg/off-kg	(lb/million	off-lbs)	of uranium	extruded	
Cadmium		1	0.007	0	.003
Chromium			0.013		.005
Copper	. *		0.044	0	.021
Lead	• •		0.010	0	.005
Nickel	· · · · · · · · · · · · · · · · · · ·	÷.,	0.019	0	.013
Fluoride	- -		2.05	0	.908
Molybdenu	m		0.173	0	.077
Oil & Grea	ase		0.344	0	.344
TSS	н т	1	0.516	0	.413
pH	Within the r	ange of	7.5 to 10.0	at all t	imes

(c) Heat Treatment Contact Cooling Water - NSPS

Pollutant pollutant		Maximum any one		Maximum for monthly average
mg/off-kg heat trea	• •.	off-lbs)	of extruded	or forged uranium
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum Oil & Gre TSS pH		· · · · · · · · · · · · · · · · · · ·	0.006 0.012 0.040 0.009 0.017 1.86 0.158 0.313 0.470 7.5 to 10.0 a	0.003 0.005 0.019 0.004 0.012 0.827 0.070 0.313 0.376 at all times

(d) Forging Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of uraniu	um surface treated
Cadmium	ase	0.006	0.002
Chromium		0.010	0.004
Copper		0.035	0.017
Lead		0.008	0.004
Nickel		0.015	0.010
Fluoride		1.62	0.718
Molybdenur		0.137	0.061
Oil & Grea		0.272	0.272
TSS		0.408	0.327
pH		ange of 7.5 to 10.	0 at all times

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(e) Surface Treatment Spent Baths - NSPS

(f) Surface Treatment Rinse - NSPS

Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
-			- •
			·
mg/off-kg	(lb/million	off-lbs) of uranium	n surface treated
Cadmium		0.068	0.027
Chromium		0.125	0.051
Copper		0.432	0.206
Lead		0.095	0.044
Nickel		0.186	0.125
Fluoride		20.1	8.90
Molybdenur	n	1.70	0.752
Oil & Grea			
	ase	3.37	3.37
TSS		5.06	4.05
рH	Within the r	ange of 7.5 to 10.0) at all times
			× ×

(g) Wet Air Pollution Control Scrubber Blowdown - NSPS

Pollutant pollutant		Maximum any one		Maximum for monthly av	
mg/off-kg	(lb/million	off-lbs)	of uranium	surface tro	eated
Cadmium			0.0007	0.0	003
Chromium			0.001	0.0	005
Copper			0.005	0.0	02
Lead			0.001	0.0	005
Nickel			0.002	0.0	01
Fluoride			0.208	0.0	92
Molybdenum	1		0.018	0.0	08
Oil & Grea			0.035	0.0	35
TSS		i.	0.053	0.0	
рH	Within the	range of 7	,		

(h) Sawing or Grinding Spent Emulsions - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million with emulsions	off-lbs) of uranium	sawed or ground
Cadmium	0.001	0.0005
Chromium	0.002	0.0009
Copper	0.007	0.004
Lead	0.002	0.0008
Nickel	0.003	0.002
Fluoride	0.338	0.150
Molybdenum	0.029	0.013
Oil & Grease	0.057	0.057
TSS	0.085	0.068
pH Within the r	cange of 7.5 to 10.0	at all times

Pollutant pollutant	or property	Maximum for any one day	Maximum for monthly average
	(lb/million c act cooling wa		m sawed or ground
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum Oil & Grea TSS pH	ase	0.033 0.061 0.211 0.046 0.091 9.82 0.830 1.65 2.48 .nge of 7.5 to 10.	0.013 0.025 0.101 0.022 0.061 4.36 0.368 1.65 1.98 0 at all times
Pollutant	g or Grinding or property	Maximum for	Maximum for monthly average
mg/off-kg rinsed	(lb/million o	ff-lbs) of sawed	or ground uranium
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum Oil & Grea TSS		$\begin{array}{c} 0.001 \\ 0.002 \\ 0.006 \\ 0.002 \\ 0.003 \\ 0.277 \\ 0.024 \\ 0.047 \\ 0.070 \end{array}$	0.0004 0.0007 0.003 0.0006 0.002 0.123 0.011 0.047 0.056

(i) Sawing or Grinding Contact Cooling Water - NSPS

(k) Area Cleaning Rinse - NSPS

Pollutant pollutant		Maximum fo any one da		Maximu monthl	um for y average
mg/off-kg	(lb/million	off-lbs) of	uranium	formed	
Cadmium	· .		0.009		0.004
Chromium			0.016		0.007
Copper			0.055		0.026
Lead			0.012		0.006
Nickel		, i	0.024		0.016
Fluoride	: :		2.56		1.14
Molybdenum	n		0.216		0.096
Oil [®] Grea	ase	1	0.429		0.429
TSS	i	r •	0.644		0.515
рH	Within the r	ange of 7.5	to 10.0	at all	times

(1) Drum Washwater - NSPS

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Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/milli	on off-lbs) of uranium	formed
Cadmium	0.009	0.004
Chromium	0.017	0.007
Copper	0.057	0.027
Lead	0.013	0.006
Nickel	0.025	0.017
Fluoride	2.64	1.17
Molybdenum	0.223	0.099
Oil & Grease	0.443	0.443
TSS	0.665	0.532
pH Within th	e range of 7.5 to 10.0	at all times

(m) Laundry Washwater - NSPS

Pollutant pollutant	-	Maximum for any one day	Maximum for monthly average
mg/employ	ee - day		
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum Oil & Grea	ase	5.24 9.70 33.6 7.34 14.4 1,560 132 262 393	2.10 3.93 16.0 3.41 9.70 692 58.4 262 315
pH	Within the	range of 7.5 to 10	0.0 at all times

(n) Degreasing Spent Solvents - NSPS

There shall be no discharge of process waster

pollutants.

SUBPART H: NEW SOURCE PERFORMANCE STANDARDS FOR THE ZINC FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - NSPS

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - NSPS Maximum for Pollutant or Maximum for any one day pollutant property monthly average mg/off-kg (lb/million off-lbs) of zinc rolled with emulsions 0.0005 0.0002 Chromium 0.002 0.0009 Copper 0.0003 0.0001 Cyanide 0.0006 0.002 Zinc Oil & Grease 0.014 0.014 TSS 0.021 0.017 Within the range of 7.5 to 10.0 at all times. рН (c) Rolling Contact Cooling Water - NSPS Pollutant or Maximum for Maximum for any one day pollutant property monthly average mg/off-kg (lb/million off-lbs) of zinc rolled with contact cooling water 0.020 0.009 * Chromium Copper 0.069 0.033 0.011 0.004 Cyanide 0.055 0.023 Zinc 0.536 Oil & Grease 0.536 0.804 TSS 0.643 Within the range of 7.5 to 10.0 at all times. pН (d) Drawing Spent Emulsions - NSPS Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of zinc drawn with emulsions Chromium 0.002 0.0009 Copper 0.008 0.004 0.001 Cyanide 0.0005 Zinc 0.006 0.003 Oil & Grease 0.058 0.058 0.087 0.070 TSS Within the range of 7.5 to 10.0 at all times. рН

Pollutant pollutant	Maximum for any one day	Maximum monthly	
mg/off-kg chill met	off-lbs) of zinc	cast by the	direct
Chromium Copper Cyanide Zinc Oil & Grea TSS pH Wi	 0.019 0.065 0.010 0.052 0.505 0.758 nge of 7.5 to 10.0	0.008 0.031 0.004 0.021 0.505 0.606 0 at all time	25.

(e) Direct Chill Casting Contact Cooling Water - NSPS

(f) Stationary Casting Contact Cooling Water - NSPS

There shall be no discharge of process wastewater pollutants.

(g) Heat Treatment Contact Cooling Water - NSPS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million	off-lbs) of zinc	heat treated
Chromium	0.029	0.012
Copper	0.098	0.047
Cyanide	0.016	0.006
Zinc	0.078	0.032
Oil & Grease	0.763	0.763
TSS	1.15	0.916
pH Within the rar	nge of 7.5 to 10.() at all times.

(h) Surface Treatment Spent Baths - NSPS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million	off-lbs) of zinc	surface treated
Chromium Copper Cyanide Zinc Oil & Grease TSS pH Within the ran	0.033 0.114 0.018 0.091 0.887 1.33 nge of 7.5 to 10.0	0.014 0.054 0.007 0.038 0.887 1.07 0 at all times.

(i) Surface Treatment Rinse - NSPS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of zinc surface treated

Chromium	0.133	0.054	
Copper	0.459	0.219	
Cyanide	0.072	0.029	
Zinc	0.365	0.151	
Oil & Grease	3.58	3.58	
TSS	5.37	4.30	
pH Within the	range of 7.5 to 10.0	at all times.	

(j) Alkaline Cleaning Spent Baths - NSPS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average	
mg/off-kg	(lb/million	off-lbs) of zin	c alkaline cleaned	
Chromium Copper Cyanide Zinc Oil & Grea TSS pH W		0.002 0.005 0.0007 0.004 0.036 0.054 nge of 7.5 to 10	0.0006 0.002 0.0003 0.002 0.036 0.043 .0 at all times.	

(k) Alkaline Cleaning Rinse - NSPS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million	off-lbg) of ging	alkaline glaanad
Chromium	0.626	0.254
Copper	2.17	1.03
Cyanide	0.338	0.135
Zinc	1.73	0.710
Oil & Grease	16.9	16.9
TSS	25.4	20.3
pH Within the ra	nge of 7.5 to 10.	0 at all times.

(1) Sawing or Grinding Spent Emulsions - NSPS

Pollutant	Maximum for	Maximum for
pollutant	any one day	monthly average
mg/off-kg with emuls	off-lbs) of zinc	sawed or ground
Chromium	0.009	0.004
Copper	0.031	0.015
Cyanide	0.005	0.002
Zinc	0.025	0.010
Oil & Grea	0.238	0.238
TSS	0.357	0.286
pH Wi	nge of 7.5 to 10.0	0 at all times.

(m) Electrocoating Rinse - NSPS

Pollutant pollutant		Maximum any one		Maximum monthly	
mg/off-kg	(lb/million	off-lbs) o	of zinc	electrocoate	ed

-21 J.

Chromium		0.085	0.035
Copper		0.293	0.140
Cyanide		0.046	0.019
Zinc		0.234	0.096
Oil & Grea	ise	2.29	2.29
TSS		3.44	2.75
pH Wi	thin the rai	nge of 7.5 to 1	0.0 at all times.

(n) Degreasing Spent Solvents - NSPS

There shall be no discharge of process wastewater pollutants.

SUBPART I: NEW SOURCE PERFORMANCE STANDARDS FOR THE ZIRCONIUM-HAFNIUM FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - NSPS

There shall be no discharge of process wastewater pollutants.

(b) Drawing Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(c) Extrusion Spent Emulsions - NSPS

There shall be no discharge of process wastewater pollutants.

Dell'Indend	No.	Nassimum Cau
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
ng/off-kg (lb/million extruded	off-lbs) of zirco	nium-hafnium
Chromium Cyanide Nickel Ammonia Fluoride Oil & Grease TSS pH Within the ra	0.104 0.069 0.455 31.6 14.1 4.74 9.72 nge of 7.5 to 10.0	0.043 0.029 0.301 13.9 6.26 2.85 4.62 at all times.
(e) Swaging Spent Ne There shall be		process wastewater
pollutants.		p
(f) Heat Treatment Co	ntact Cooling Wate	r – NSPS states and
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million heat treated	off-lbs) of zirco	nium-hafnium.g

(d) Extrusion Press Hydraulic Fluid Leakage - NSPS

(g) Tube Reducing Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(h) Surface Treatment Spent Baths - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of zirconium-hafnium
surface treated

Chromium	0.150	0.061
Cyanide	0.099	0.041
Nickel	0.653	0.432
Ammonia	45.3	20.0
Fluoride	20.3	8.98
Oil & Grease	6.80	4.08
TSS	14.0	6.63
pH Within t	ne range of 7.5 to 10.0) at all times.

(i) Surface Treatment Rinse - NSPS

Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
		,	
		off-lbs) of zirco	onium-hafnium
surface t	reated		**
Chromium		0.391	0.160
Cyanide	· ·	0.258	0.107
Nickel		1.71	1.13
Ammonia		119	52.1
Fluoride		52.9	23.5
Oil & Grea	ase	17.8	10.7
TSS	· · ·	36.4	17.3
pH W	ithin the ran	ge of 7.5 to 10.0	0 at all times.

(j) Alkaline Cleaning Spent Baths - NSPS

Pollutant or	Maximum for	Maximum f	or
pollutant property	any one day	monthly a	
ng/off-kg (lb/million	n off-lbs) of zirc	onium-hafnium	<u> </u>
alkaline cleaned		:	
Chromium	0.704	0.288	
Cyanide	0.464	0.192	
Nickel	3.07	2.03	
Ammonia	214	93.8	
Fluoride	95.2	42.3	
Dil & Grease	32.0	19.2	
rss	65.6	31.2	
oH Within the ra	inge of 7.5 to 10.	0 at all times	•
(k) Alkaline Cleaning	Rinse - NSPS		
		Maximum f	or
(k) Alkaline Cleaning Pollutant or pollutant property	Maximum for	Maximum f monthly a	
Pollutant or	Maximum for any one day	monthly a	
Pollutant or pollutant property ng/off-kg (lb/million alkaline cleaned	Maximum for any one day off-lbs) of zirc	monthly a conium-hafnium	
Pollutant or pollutant property mg/off-kg (lb/million alkaline cleaned Chromium	Maximum for any one day off-lbs) of zirc 1.38	monthly a conium-hafnium 0.565	
Pollutant or pollutant property mg/off-kg (lb/million alkaline cleaned Chromium Cyanide	Maximum for any one day off-lbs) of zirc 1.38 0.911	monthly a conium-hafnium 0.565 0.377	
Pollutant or pollutant property ng/off-kg (lb/million alkaline cleaned Chromium Cyanide Nickel	Maximum for any one day off-lbs) of zirc 1.38 0.911 6.03	monthly a conium-hafnium 0.565	
Pollutant or pollutant property alkaline cleaned Chromium Cyanide Nickel	Maximum for any one day off-lbs) of zirc 1.38 0.911 6.03 419	monthly a conium-hafnium 0.565 0.377 3.99 184	
Pollutant or pollutant property alkaline cleaned Chromium Cyanide Nickel Ammonia Fluoride	Maximum for any one day off-lbs) of zirc 1.38 0.911 6.03 419 187	monthly a conium-hafnium 0.565 0.377 3.99 184 82.9	
Pollutant or pollutant property alkaline cleaned Chromium Cyanide Nickel	Maximum for any one day off-lbs) of zirc 1.38 0.911 6.03 419	monthly a conium-hafnium 0.565 0.377 3.99 184	

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(1) Sawing or Grinding Spent Emulsions - NSPS

Pollutant or Maximum for Maximum for pollutant property monthly average any one day mg/off-kg (lb/million off-lbs) of zirconium-hafnium sawed or ground with emulsions 0.051 Chromium 0.124 Cyanide 0.082 0.034 Nickel 0.540 0.357 Ammonia 37.5 16.50 Fluoride 16.7 7.42 Oil & Grease 5.62 3.37 5.48 TSS 11.5 Within the range of 7.5 to 10.0 at all times. pH

(m) Wet Air Pollution Control Scrubber Blowdown - NSPS

There shall be no allowance for the discharge of process wastewater pollutants.

2.5

(n) Degreasing Spent Solvents - NSPS

There shall be no discharge of process wastewater pollutants.

(o) Degreasing Rinse - NSPS

There shall be no discharge of process wastewater pollutants

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(p) Molten Salt Rinse - NSPS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million rinsed following molt		nium-hafnium
Chromium	0.333	0.136
Cyanide	0.220	0.091
Nickel	1.45	0.960
Ammonia	101	44.3
Fluoride	45.0	20.0
Oil & Grease	15.1	9.07
TSS	31.0	14.8
pH Within the ra	ange of 7.5 to 10.0	at all times.
	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
(q) Sawing or Grindin	ng Contact Cooling N	Water - NSPS
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average

mg/off-kg (lb/million off-lbs) of zirconium-hafnium sawed or ground with contact cooling water

Chromium	0.142	0.058
Cyanide	0.093	0.039
Nickel	0.617	0.408
Ammonia	42.8	18.8
Fluoride	19.1	8.48
Oil & Grease	6.42	3.85
TSS	13.2	6.26
pH Within	the range of 7.5 to 10.0	at all times.

(r) Sawing or Grinding Rinse - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/milli hafnium rinsed	ion off-lbs) of sawed	or ground zirconium-
Chromium Cyanide Nickel Ammonia Fluoride Oil & Grease TSS pH Within the	$\begin{array}{r} 0.079\\ 0.052\\ 0.346\\ 24.0\\ 10.7\\ 3.60\\ 7.38\\ range of 7.5 to 10.0\end{array}$	0.033 0.022 0.229 10.6 4.75 2.16 3.51 at all times.
	nding Spent Neat Oils be no discharge of	· · · · · · · · · · · · · · · · · · ·
pollutants.		n ann an a
(t) Inspection and	Testing Wastewater -	NSPS
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/milli tested	ion off-lbs) of zircor	nium-hafnium
Chromium Cyanide Nickel Ammonia Fluoride Oil & Grease TSS	0.007 0.005 0.030 2.06 0.917 0.308 0.632	0.003 0.002 0.020 0.903 0.407 0.185 0.301
	range of 7.5 to 10.0	

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SUBPART J: NEW SOURCE PERFORMANCE STANDARDS FOR THE METAL POWDERS SUBCATEGORY

(a) Metal Powder Production Atomization Wastewater - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millic	on off-lbs) of powde	r wet atomized
Copper	9.58 1.46	5.04 0.605
Cyanide Lead	2.12	1.01
Oil & Grease	101	60.5
TSS	207	98.3
pH Within the ra		at all times.
······		· · · · · · · · · · · · · · · · · · ·
(b) Sizing Spent Nea	t Oils - NSPS	
There shall	be no discharge	of process wastewat
pollutants.		•
(c) Sizing Spent Emu	lsions - NSPS	
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/millic	n off-1bs) of powde	r sized
0	0.000	0.015
Copper Cyanide	0.028 0.004	0.015 0.002
Lead	0.004	0.002
Oil & Grease	0.292	0.175
TSS	0.599	0.285
pH Within the ra	nge of 7.5 to 10.0	

(d) Oil-Resin Impregnation Wastewater - NSPS

There shall be no discharge of process wastewater pollutants.

(e) Steam Treatment Wet Air Pollution Control Scrubber Blowdown - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million steam treated	off-lbs) of powder	metallurgy parts
Copper	0.151	0.079
Cyanide	0.023	0.010
Lead	0.033	0.016
Oil & Grease	1.59	0.951
TSS	3.25	1.55
pH Within the rang	ge of 7.5 to 10.0 a	at all times.

(f) Tumbling, Burnishing and Cleaning Wastewater - NSPS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of powder metallurgy parts
tumbled, burnished, or cleaned

Copper	0.836	0.440
Cyanide	0.128	0.053
Lead	0.185	0.088
Oil & Grease	8.80	5.28
TSS	18.1	8.58
pH Within the	range of 7.5 to 10.0	at all times.

(g) Sawing or Grinding Spent Neat Oils - NSPS

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There shall be no discharge of process wastewater pollutants.

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Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/mill sawed or ground wi	ion off-lbs) of powder th emulsions	metallurgy parts
Copper	0.035	0.018
Cyanide	0.005	0.002
Lead	0.008	0.004
Oil & Grease	0.362	0.217
TSS	0.742	0.353
pH Within the	range of 7.5 to 10.0 a	at all times.

(h) Sawing or Grinding Spent Emulsions - NSPS

(i) Sawing or Grinding Contact Cooling Water - NSPS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of powder sawed
or ground with contact cooling water

Copper	3.08	1.62
Cyanide	0.470	0.195
Lead	0.681	0.324
Oil & Grease	32.4	19.5
TSS	66.4	31.6
pH Within t	he range of 7.5 to 10.0	at all times.

(j) Hot Pressing Contact Cooling Water - NSPS

Pollutant	or	Maximum	for	Maximum for
pollutant	property	any one	day	monthly average

mg/off-kg (lb/million off-lbs) of powder cooled after
pressing

Copper	1.67	0,880
Cyanide	0.255	0.106
Lead	0.370	0.176
Oil & Grease	17.6	10.6
TSS	36.1	17.2
pH Within	the range of 7.5 to 10.0	at all times.

k) Mixing Wet Air Pollution Control Scrubber Blowdown - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millic	on off-lbs) of powde	er mixed
Copper	15.0	7.90
Cyanide	2.29	0.948
Lead	3.32	1.58
Oil & Grease	158	94.8
TSS	324	154
pH Within the ra	inge of 7.5 to 10.0	at all times.

(1) Degreasing Spent Solvents - NSPS

There shall be no discharge of process wastewater pollutants.

is being promulgated based on the model 5. PSES treatment of flow equalization, oil skimming, technology chemical precipitation, sedimentation, and filtration (lime, settle, and technology, filter) and in-process flow reduction control methods, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide precipitation for the nickel-cobalt forming subcategory. PSES is being promulgated based on the model treatment technology of equalization, oil skimming, chemical precipitation flow and sedimentation (lime and settle) technology, and in-process flow reduction control methods, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and lead-tin-bismuth, cyanide precipitation for the magnesium, precious metals, refractory metals, titanium, and zirconiumhafnium forming subcategories. Iron coprecipitation is included in this model treatment technology for removal of the pollutant molybdenum from wastewaters in the refractory metals forming PSES is being promulgated based on the model subcategory. treatment technology of flow equalization, oil skimming, and precipitation and sedimentation (lime chemical and settle) technology, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide The Agency is precipitation for the metal powders subcategory. not regulating the uranium and zinc forming subcategories under PSES. The following pretreatment standards are being promulgated for existing sources:

6. PSNS is being promulgated based on the model treatment technology of flow equalization, oil skimming, chemical precipitation, sedimentation, and filtration (lime, settle, and filter) technology, and in-process flow reduction control methods, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide precipitation for the magnesium, nickel-cobalt, refractory metals, uranium, and zinc forming subcategories. Iron coprecipitation is included in this model treatment technology for removal of the pollutant molybdenum from wastewaters in the refractory metals and uranium forming subcategories. PSNS is being promulgated based on the model treatment technology of flow equalization, oil skimming, chemical precipitation and sedimentation (lime and settle) technology, and in-process flow reduction control methods, and where appropriate, ammonia steam stripping, chemical emulsion breaking, chromium reduction, and cyanide precipitation for the lead-tin-bismuth, precious metals, titanium and zirconium-hafnium forming subcategories and the metals powders subcategory. The following pretreatment standards are being promulgated for new sources:

SUBPART A: PRETREATMENT STANDARDS FOR EXISTING SOURCES AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE LEAD-TIN-BISMUTH FORMING SUBCATEGORY

(a)	Rolling	Spent	Emulsions	-	PSES

Pollutant or	Maximum for	Maximum for
pollutant property	y any one day	monthly average
mg/off-kg (lb/mil) rolled with emuls	lion off-lbs) of lead- ions	-tin-bismuth
Antimony	0.067	0.030
Lead	0.010	0.005

(b) Rolling Spent Soap Solutions - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million ch soap solut	off-lbs) of lead- ions	-tin-bismuth
Antimony		0.124	0.055
Lead		0.018	0.009

(c) Drawing Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(d) Drawing Spent Emulsions - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million drawn with emulsions	off-lbs) of lead	-tin-bismuth
Antimony	0.076	0.034
Lead	0.011	0.005

(e) Drawing Spent Soap Solutions - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million n soap solut	n off-lbs) of lead	-tin-bismuth
Antimony	3	0.022	0.010
Lead		0.003	0.002

(f)	Extrusion Press	and Solution	Heat Treatment Contact
	Cooling Water -	PSES	

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg heat treat		off-lbs) of lead-	tin-bismuth
Antimony	•	0.414	0.185
Lead		0.061	0.029

(g) Extrusion Press Hydraulic Fluid Leakage - PSES

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Pollutant pollutant		Maximum for any one day		
mg/off-kg extruded	(lb/million	off-lbs) of l	ead-tin-bismuth	· · · ·
Antimony Lead		0.158 0.023	0.071 0.011	

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millic	on off-lbs) of lead- ous strip method	tin-bismuth
Antimony Lead	0.003 0.0004	0.001 0.0002
(i) Semi-Continuous Water - PSES	Ingot Casting Conta	ct Cooling
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/millic		tin-bismuth
mg/off-kg (lb/millic cast by the semi-cor Antimony		tin-bismuth 0.004 0.0006
mg/off-kg (lb/millic cast by the semi-cor Antimony	ntinuous method 0.009 0.001	0.004 0.0006
mg/off-kg (lb/millic cast by the semi-cor Antimony Lead (j) Shot Casting Cor Pollutant or	ntinuous method 0.009 0.001 ntact Cooling Water Maximum for	0.004 0.0006
mg/off-kg (lb/millic cast by the semi-cor Antimony Lead	ntinuous method 0.009 0.001 ntact Cooling Water Maximum for any one day	0.004 0.0006 - PSES Maximum for monthly average

(h) Continuous Strip Casting Contact Cooling Water - PSES

(k) Shot-Forming Wet Air Pollution Control Scrubber Blowdown - PSES

Pollutant pollutant	Maximum for any one day	Maximum for monthly average	9
mg/off-kg shot forme	off-lbs) of lead	l-tin-bismuth	
Antimony Lead	0.169 0.025	0.076 0.012	

(1) Alkaline Cleaning Spent Baths - PSES

Pollutant c pollutant p	Maximum for any one day	Maximum for monthly average
		·
mg/off-kg (alkaline cl	off-lbs) of lead	-tin-bismuth
	off-lbs) of lead	-tin-bismuth 0.154

(m) Alkaline Cleaning Rinse - PSES

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million alkaline cleaned	off-lbs) of lead-	tin-bismuth
Antimony Lead	0.678	0.302 0.047

(n) Swaging S	pent Emuls	ions - PSES		
Pollutant or		Maximum for	Maximum	for
pollutant pro	perty	any one day		average
		• • •		
mg/off-kg (lb, swaged with en		off-lbs) of le	ad-tin-bismuth	
Antimony		0.005	0.002	
Lead		0.0008	0.000	4
				· ·
(o) Degreasing	g Spent Sc	lvents - PSES		2
There sl	nall be	no discharge	of process	wastewater
pollutants.				
-				:
				2
(a) Rolling Sp	pent Emuls	ions - PSNS		
Pollutant or		Maximum for	Maximum	for
pollutant prop	perty	any one day	monthly	average
mg/off-kg (lb, rolled with en	million o nulsions	ff-lbs) of le	ad-tin-bismuth	1
Antimony		0.067	0.030	
Lead	¹ C	0.010	0.005	
ـــــــــــــــــــــــــــــــــــــ	1		· · ·	<u></u>
(b) Rolling Sp	pent Soap	Solutions - Pa	SNS	
Pollutant or		Maximum for	Maximum	
pollutant prop	perty	any one day	monthly	average
mg/off-kg (lb, rolled with so			ad-tin-bismuth	
Antimony		0.124	0.055	
Lead		0.018	0.009	
	4			÷

(c) Drawing Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(d) Drawing Spent Emulsions - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of lead-tin-bismuth
drawn with emulsions

Antimony	0.076	0.034
Lead	0.011	0.005

(e) Drawing Spent Soap Solutions - PSNS

Pollutant or	Maximum	for	Maximum	for
pollutant prope	rty any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of lead-tin-bismuth
drawn with soap solutions

Antimony	0.022	0.010
Lead	0.003	0.002

(f) Extrusion Press and Solution Heat Treatment Contact Cooling Water - PSNS

Pollutant or pollutant prop	Maximum for erty any one day	Maximum for monthly average
mg/off-kg (lb/ heat treated	million off-lbs) of lea	id-tin-bismuth
Antimony Lead	0.414 0.061	0.185 0.029

(g) Extrusion Press Hydraulic Fluid Leakage - PSNS

Pollutant pollutant		Maximum for any one day		
mg/off-kg extruded	(lb/million	off-lbs) of l	ead-tin-bismuth	
Antimony Lead		0.158 0.023	0.071 0.011	

(h) Continuous Strip Casting Contact Cooling Water - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of lead-tin-bismuth
cast by the continuous strip method

Antimony	0.003	0.001
Lead	0.0004	0.0002

(i) Semi-Continuous Ingot Casting Contact Cooling Water - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant		any one		monthly	
	•				

mg/off-kg (lb/million off-lbs) of lead-tin-bismuth
ingot cast by the semi-continuous method

Antimony	0.009	0.004
Lead	0.001	0.0006

(j) Shot Casting Contact Cooling Water - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg shot cast	(lb/million	off-lbs) of lead	-tin-bismuth
Antimony		0.107	0.048
Lead		0.016	0.008

(k) Shot-Forming Wet Air Pollution Control Scrubber Blowdown - PSNS

Pollutant or	Maximum for	Maximum	for
pollutant property	any one day	monthly	average
mg/off-kg (lb/million shot formed	off-lbs) of lead	-tin-bismuth	·
Antimony Lead	0.169 0.025	0.076 0.012	
	 		
(1) Alkaline Cleaning	Spent Baths - PSI	NS	
Pollutant or pollutant property	Maximum for any one day	Maximum monthly	for average
mg/off-kg (lb/million alkaline cleaned	off-lbs) of lead	-tin-bismuth	
Antimony Lead	0.345 0.051	0.154 0.024	
(m) Alkaline Cleaning	Rinse - PSNS		
Pollutant or pollutant property	Maximum for any one day	Maximum monthly	for average
mg/off-kg (lb/million alkaline cleaned	off-lbs) of lead	-tin-bismuth	
Antimony Lead	0.678 0.099	0.302 0.047	
	······································	F	

(n) Swaging Spent Emulsions - PSNS Pollutant or Maximum for Maximum for any one day pollutant property monthly average mg/off-kg (lb/million off-lbs) of lead-tin-bismuth swaged with emulsion Antimony 0.005 0.003 0.0004 Lead 0.0008 (o) Degreasing Spent Solvents - PSNS There shall be no discharge of process wastewater pollutants. SUBPART B: PRETREATMENT STANDARDS FOR EXISTING AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE MAGNESIUM FORMING SUBCATEGORY (a) Rolling Spent Emulsions - PSES Pollutant or Maximum for Maximum for pollutant property any one day monthly average (lb/million off-lbs) of magnesium rolled with mg/off-kg emulsions Chromium 0.014 0.033 Zinc 0.109 0.046 Ammonia 9.95 4.37 Fluoride 4.44 1.97 (b) Forging Spent Lubricants - PSES There shall be no discharge of process wastewater

pollutants.

(c) Forging Contact Cooling Water - PSES

		1		1	
Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of forged magnesium cooled
with water

Chromium	0.127	0.052
Zinc	0.422	0.177
Ammonia	38.5	17.0
Fluoride	17.2	7.63

(d) Forging Equipment Cleaning Wastewater - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly averge
mg/off-kg	(lb/million	off-lbs) of mag	nesium forged
Chromium		0.002	0.0007
Zinc		0.006	0:003
Ammonia		0.532	0:234
Fluoride		0.238	0.106
			La litta

(e) Direct Chill Casting Contact Cooling Water - PSES

					,
Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	averge
			_, . *		

mg/off-kg (lb/million off-lbs) of magnesium cast with direct chill methods

Fluoride 235 105	Chromium Zinc Ammonia Fluoride	1.74 5.77 527 235	0.711 2.41 232 105	
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(f) Surface Treatment Spent Baths - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg treated	(lb/million	off-lbs) of mag	nesium surface
Chromium		0.205	0.084
Zinc		0.681	0.285
Ammonia		62.1	27.3
Fluoride		27.8	12.3

(g) Surface Treatment Rinse - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg treated	(lb/million o	off-lbs) of mag	nesium surface
Chromium		0.832	0.340
Zinc		2.76	1.16
Ammonia		252	111
Fluoride		113	49.9

(h) Sawing or Grinding Spent Emulsions - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg ground	(lb/million	off-lbs) of magn	nesium sawed or
Chromium		0.009	0.004
Zinc		0.029	0.012
Ammonia		2.60	1.15
Fluoride		1.16	0.515

(i) Degreasing Spent Solvents - PSES

There shall be no discharge of process wastewater pollutants.

(j) Wet Air Pollution Control Scrubber Blowdown - PSES

	•		م الأربي المركز الم المركز المركز	· .
Fluoride		4.44	1.97	· · ·
Ammonia	•	9.95	4.37	*****
Zinc		0.076	-0.032	4
Chromium		0.028	0.011	С
mg/off-kg emulsions	(lb/million	off-lbs) of magn	esium rolled	with
pollutant	property	any one day	monthly	average
Pollutant	1	Maximum for	Maximum	
(a) Rollin	ng Spent Emu	lsions - PSNS		
Fluoride		36.9	16.4	
Ammonia		82.5	36.3	
Chromium Zinc		0.273 0.904	0.112	
mg/off-kg repaired o		off-lbs) of magn	esium sanded	and
pollutant	propetty	any one day	monthly	average
	or	Maximum for	Maximum	· ·

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(b) Forging Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(c) Forging Contact Cooling Water - PSNS

Pollutant pollutant	Maximum fo any one da		Maximum monthly	for average
mg/off-kg with water	off-lbs) of	forged	magnesium	cooled
Chromium Zinc	0.107 0.295		0.044	
Ammonia Fluoride	38.5 17.2		17.0 7.63	

(d) Forging Equipment Cleaning Wastewater - PSNS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg	(lb/million	off-lbs) of magne	esium forged
Chromium Zinc Ammonia Fluoride	×	0.002 0.004 0.532 0.238	0.0006 0.002 0.234 0.106

(e) Direct Chill Casting Contact Cooling Water - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day .	monthly	average

mg/off-kg (lb/million off-lbs) of magnesium cast with direct chill methods

Chromium Zinc	1.46 4.03	0.593 1.66
Ammonia	527	232
Fluoride	235	105

(f) Surface Treatment Spent Baths - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of magnesium surface
treated

0.173 0.476 62.1 27.8	0.070 0.196 27.3 12.3
2, • •	2200
	0.476 62.1

(g) Surface Treatment Rinse - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg treated	(lb/million	off-lbs) of mag	nesium surface
Chromium	:	0.700	0.284
Zinc		1.93	0.794
Ammonia		252	111
Fluoride		113	49.9

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg or ground	(lb/million	off-lbs) of magn	esium sawed
Chromium		0.007	0.003
Zinc		0.020	0.008
Ammonia		2.60	1.15
Fluoride		1.16	0.515

(h) Sawing or Grinding Spent Emulsions - PSNS

(i) Degreasing Spent Solvents - PSES

There shall be no discharge of process wastewater pollutants.

(j) Wet Air Pollution Control Scrubber Blowdown - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million repaired or forged	off-lbs) of	magnesium sanded and
Chromium	0.229	0.093
Zinc	0.632	0.260
Ammonia	82.5	36.3
Fluoride	36.9	16.4

SUBPART C: PRETREATMENT STANDARDS FOR EXISTING SOURCES AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE NICKEL-COBALT FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - PSES

Pollutant pollutant		Maximum any one		Maximum monthly	for average
mg/off-kg with emuls	(lb/million sions	off-lbs) o	of nickel-c	obalt ro	lled

Chromium	0.063	0.026
Nickel	0.094	0.063
Fluoride	10.1	4.49

(c) Rolling Contact Cooling Water - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of nickel-cobalt rolled
with water

0.028 1.99

(d) Tube Reducing Spent Lubricants - PSES

There shall be no discharge of process wastewater pollutants.

(e) Drawing Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(f) Drawing Spent Emulsions - PSES

Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of nickel-cobalt drawn
with emulsions

Chromium	0.036	0.014
Nickel	0.053	0.036
Fluoride	5.68	2.52

(g) Extrusion Spent Lubricants - PSES

There shall be no discharge of process wastewater pollutants.

(h) Extrusion Press or Solution Heat Treatment Contact Cooling Water - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of extruded nickel-cobalt
heat treated

Chromium	0.031	0.013
Nickel	0.046	0.031
Fluoride	4.95	2.20

(i) Extrusion Press Hydraulic Fluid Leakage - PSES

Pollutant pollutant		Maximum f any one d		num for 11y average
mg/off-kg	(lb/million	off-lbs) of	nickel-cobalt	extruded
Chromium Nickel Fluoride		0.086 0.128 13.8	0.0 0.0 6.1	86

(j) Forging Equipment Cleaning Wastewater - PSES

Pollutant pollutant		Maximum any one		Maximum monthly	
mg/off-kg	(lb/million	off-lbs) d	of nic	kel-cobalt for	

Chromium	0.002	0.0006
Nickel	0.002	0.002
Fluoride	0.238	0.106
	•	

(k) Forging Contact Cooling Water - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million cooled with water	off-lbs) of	forged nickel-cobalt
Chromium	0.018	0.007
Nickel	0.026	0.018
Fluoride	2.82	1.25

(1) Forging Press Hydraulic Fluid Leakage - PSES

Pollutant pollutant		Maximum any one		Maximum monthly	for average
mg/off-kg	(lb/million	off-lbs)	of nicke	el-cobalt for	rged

Chromium		0.069	0.028	
Nickel Fluoride	1	0.103	°0.069 4.94	,
riuoriae		11.	4.74	_#*-

(m) Forging Spent Lubricants - PSES

There shall be no discharge of process wastewater pollutants.

(n) Stationary Casting Contact Cooling Water - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million stationary methods	off-lbs) of nic	kel-cobalt cast with
Chromium	0.448	0.182
Nickel	0.666	0.448
Fluoride	72.0	32.0

(o) Vacuum Melting Steam Condensate - PSES

There shall be no allowance for the discharge of wastewater pollutants.

(p) Metal Powder Production Atomization Wastewater - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg powder ato		off-lbs) of nic	ckel-cobalt metal
Chromium	· · · ·	0.970	0.393
Nickel		1.44	0.970
Fluoride		156	69.2

(q) Annealing and Solution Heat Treatment Contact Cooling Water - PSE3

There shall be no allowance for the discharge of wastewater pollutants.

(r) Wet Air Pollution Control Scrubber Blowdown - PSES

Pollutant		Maximum for	Maximum	
pollutant	property	any one day	monthly	average
ng/off-kg	(lb/million	off-lbs) of nickel	l-cobalt for	med
Chromium		0.300	0.122	
Nickel		0.446	0.300	
Fluoride		48.2	21.4	
	:	-	······································	
(s) Surfa	ce Treatment	Spent Baths - PSES	3	·
Pollutant		Maximum for	Maximum	
pollutant	property	any one day	monthly	average
mg/off-kg treated	(lb/million	off-lbs) of nickel	l-cobalt su	face
Chromium		0.346	0.141	
Nickel		0.514	0.346	
Fluoride		55.7	24.7	· .
	· · · · · · · · · · · · · · · · · · ·			
(t) Surfa	ce Treatment	Rinse - PSES	, · · ·	
Pollutant	or	Maximum for	Maximum	for
pollutant	property	any one day	monthly	average
mg/off-kg treated	(lb/million	off-lbs) of nickel	l-cobalt sur	face
Chromium		0.873	0.354	
Nickel		1.30	0.873	
Fluoride		141	62.3	
		· · · ·	•	
	:			

(u) Alkaline Cleaning Spent Baths - PSES

Pollutant pollutant		Maximum fo any one da		
mg/off-kg cleaned	(lb/million	off-lbs) of	nickel-cobalt alkaline	****
Chromium Nickel Fluoride		0.013 0.019 2.02	0.005 0.013 0.895	

(v) Alkaline Cleaning Rinse - PSES

Pollutant pollutant	Maximum any one	_	Maximum monthly	
	 ·······		······	

mg/off-kg (lb/million off-lbs) of nickel-cobalt alkaline
cleaned

Chromium Nickel	0.086 0.128	0.035
Fluoride	13.9	6.15

(w) Molten Salt Rinse - PSES

Pollutant pollutant		Maximum any one				num for nl <u>y</u> average
mg/off-kg with molte	(lb/million en salt	off-lbs)	of n	ickel-c	obalt	treated

Chromium	0.312	0.127
Nickel	0.464	0.312
Fluoride	50.2	22.3

(x) Ammonia Rinse - PSES

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Pollutant	or	Maximum for	Maximum	for
pollutant	property	any one day	monthly	average
	(lb/millior nia solutior	n off-lbs) of nicke N	el-cobalt tre	eated
Chromium	• •	0.006	0.002	
Nickel		0.008	0.006	
Fluoride		0.881	0.391	
(y) Sawing	g or Grindir	ng Spent Emulsions	- PSES	
Pollutant		Maximum for	Maximum	
pollutant	property	any one day	monthly	average
or ground Chromium Nickel Fluoride	with emulsi	0.015 0.022 2.35	0.006 0.015 1.04	
Pollutant	بير 1 	ng Rinsewater - PSE Maximum for any one day	Maximum	for average
nickel-cob	(lb/millior palt rinsed	n off-lbs) of sawed	-	· · ·
Chromium		0.067	0.027	- .
Nickel Fluoride		0.100 10.8	0.067 4.78	
· ·			····· <u></u>	
		!		

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Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of nick	el-cobalt steam
Chromium		0.011	0.005
Nickel		0.017	0.011
Fluoride		1.79	0.795

(aa) Steam Cleaning Condensate - PSES

(ab) Hydrostatic Tube Testing and Ultrasonic Testing Wastewater - PSES

There shall be no allowance for the discharge of

process wastewater pollutants.

(ac) Degreasing Spent Solvents - PSES

There shall be no discharge of process wastewater pollutants.

(ad) Dye Penetrant Testing Wastewater - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million rant method	off-lbs) of nicke	el-cobalt tested with
Chromium		0.079	0.032
Nickel		0.117	0.079
Fluoride		12.7	5.63

(ae) Electrocoating Rinse - PSES

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (1b/m electrocoated	illion off-lbs)	of nickel-cobalt
Chromium Nickel	1.25 1.86	0.506 1.25
Fluoride	201	89.0
		<u> </u>
(af) Miscellaneous W Pollutant or	Wastewater Sources - Maximum for any one day	Maximum for
(af) Miscellaneous W Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
(af) Miscellaneous W Pollutant or	Maximum for any one day	Maximum for monthly average

Spent Neat PSNS (a) ROTTING

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions- PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of nickel-cobalt rolled
with emulsions

Chromium	0.063	0.026	
		0.020	
Nickel	0.094	0.063	
Fluoride	10.1	4.49	
,			

(c) Rolling Contact Cooling Water - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million with water	n off-lbs) of nicke	el-cobalt rolled
Chromium	0.028	0.012
Nickel	0.042	0.028
Fluoride	4.49	1.99
(d) Tube Reducing St	pent Lubricant - PS	INC

(d) Tube Reducing Spent Lubricant - PSNS

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There shall be no discharge of process wastewater pollutants.

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(e) Drawing Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(f) Drawing Spent Emulsions - PSNS

Pollutant pollutant		Maximum any one	Maximum monthly	
	s			
ma loff-la	(1h/m;]]; on	off_lbal	ol-acholt dr	

mg/off-kg (lb/million off-lbs) of nickel-cobalt drawn
with emulsions

Chromium	0.036	0.015
Nickel	 0.053	0.036
Fluoride	5.68	2.52

(g) Extrusion Spent Lubricants - PSNS

(h) Extrusion Press or Solution Heat Treatment Contact Cooling Water - PSNS

Pollutant pollutant		Maximum any one		Maximum monthly	
ma/off-ka	(1b/million	off-lbs) (of extruded	nickel-o	cobalt

mg/off-kg (lb/million off-lbs) of extruded nickel-cobalt heat treated

Chromium		0.031	0.013
Nickel		0.046	0.031
Fluoride	1	4.95	2.20

(i) Extrusion Press Hydraulic Fluid Leakage - NSPS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million of-lbs) of nickel-cobalt extruded

	6		
Chromium		0.086	0.034
Nickel		0.128	0.086
Fluoride	· ·	13.8	6.13

(j) Forging Equipment Cleaning Wastewater - PSNS

Pollutant pollutant		Maximum fo any one da	
mg/off-kg	(lb/million	off-lbs) of	nickel-cobalt forged
Chromium Nickel Fluoride		0.002 0.002 0.238	0.0006 0.002 0.106

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(k) Forging Contact Cooling Water - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million cooled with water	off-lbs) of	forged nickel-cobalt
Chromium	0.018	0.007
Nickel	0.026	0.018
Fluoride	2.82	1.25

(1) Forging Press Hydraulic Fluid Leakage - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of nickel-cobalt forged

(m) Forging Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(n) Stationary Casting Contact Cooling Water - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million stationary methods	off-lbs) of nicke	l-cobalt cast with
Chromium	0.448	0.182
Nickel	0.666	0.448
Fluoride	72.0	32.0

(o) Vacuum Melting Steam Condensate - PSNS

There shall be no allowance for the discharge of process wastewater pollutants.

(p) Metal Powder Production Atomization Wastewater - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of nickel-cobalt metal
powder atomized

7 4 4	
1.44	0.970
156	69.2

(q) Annealing and Solution Heat Treatment Contact Cooling Water - PSNS

There shall be no allowance for the discharge of process wastewater pollutant.

(r) Wet Air Pollution Control Scrubber Blowdown - PSNS

Pollutant pollutant		Maximum for any one day	
mg/off-kg	(lb/million	off-lbs) of n	ickel-cobalt formed
Chromium Nickel Fluoride	- : •	0.300 0.450 48.2	0.122 0.300 21.4

(s) Surface Treatment Spent Baths- PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg treated	(lb/million	off-lbs) of nic	kel-cobalt surface
Chromium		0.346	0.141
Nickel		0.515	0.346
Fluoride		55.7	24.7

(t) Surface Treatment Rinse - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg treated	(lb/million	off-lbs) of nick	cel-cobalt surface
Chromium		0.874	0.354
Nickel		1.30	0.873
Fluoride		141	62.3

(u) Alkaline Cleaning Spent Baths - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of nick	el-cobalt alkaline
Chromium		0.013	0.005
Nickel		0.019	0.013
Fluoride		2.02	0.895

Pollutant or	Maximum for	Maximum for	
pollutant property	any one day	monthly aver	age
mg/off-kg (lb/millior cleaned	n off-lbs) of nicke	l-cobalt alkalin	5
Chromium	0.086	0.035	
Nickel	0.128	0.086	
Fluoride	13.9	6.15	
(w) Molten Salt Rinse	e - PSNS		
Pollutant or	Maximum for	Maximum for	<u></u>
pollutant property	any one day	monthly aver	age
	. ·		
mg/off-kg (lb/million with molten salt	n off-lbs) of nicke	l-cobalt treated	
with molten salt Chromium	0.312	0.127	
with molten salt Chromium Nickel	0.312 0.464	0.127 0.312	
with molten salt Chromium Nickel	0.312	0.127	
with molten salt Chromium Nickel	0.312 0.464	0.127 0.312	
with molten salt Chromium Nickel	0.312 0.464 50.2	0.127 0.312	
with molten salt Chromium Nickel Fluoride (x) Ammonia Rinse - H	0.312 0.464 50.2	0.127 0.312	
with molten salt Chromium Nickel Fluoride (x) Ammonia Rinse - I Pollutant or	0.312 0.464 50.2	0.127 0.312 22.3	
with molten salt Chromium Nickel Fluoride (x) Ammonia Rinse - H Pollutant or	0.312 0.464 50.2 PSNS Maximum for	0.127 0.312 22.3 Maximum for	
mg/off-kg (lb/million with molten salt Chromium Nickel Fluoride (x) Ammonia Rinse - H Pollutant or pollutant property mg/off-kg (lb/million with ammonia solution	0.312 0.464 50.2 PSNS Maximum for any one day n off-1bs) of nicke	0.127 0.312 22.3 Maximum for monthly aver	age
with molten salt Chromium Nickel Fluoride (x) Ammonia Rinse - H Pollutant or pollutant property mg/off-kg (lb/millior	0.312 0.464 50.2 PSNS Maximum for any one day n off-1bs) of nicke	0.127 0.312 22.3 Maximum for monthly aver	age
with molten salt Chromium Nickel Fluoride (x) Ammonia Rinse - H Pollutant or pollutant property mg/off-kg (lb/million with ammonia solution	0.312 0.464 50.2 PSNS Maximum for any one day h off-lbs) of nicken	0.127 0.312 22.3 Maximum for monthly aver 1-cobalt treated	age

(y) Sawing or Grinding Spent Emulsions - PSNS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
	(lb/million with emulsion	off-lbs) of nick ons	el-cobalt sawed
Chromium Nickel		0.015 0.022 2.35	0.006 0.015 1.04

(z) Sawing or Grinding Rinse - PSNS

Pollutant o pollutant p	Maxim any o		Maximum monthly	
	 	 ······································		

mg/off-kg (lb/million off-lbs) of sawed or ground nickel-cobalt rinsed

Chromium	0.067	0.027
Nickel	0.100	0.067
Fluoride	10.8	4.78

(aa) Steam Cleaning Condensate - PSNS

Pollutant pollutant		Maximur any one		Maximum monthly	for average
mg/off-kg cleaned	(lb/million	off-lbs)	of nickel-	cobalt ste	eam

Chromium	0.011	0.005
Nickel	0.017	0.011
Fluoride	1.79	0.795

(ab) Hydrostatic Tube Testing and Ultrasonic Testing Wastewater - PSNS

(ac) Degreasing Spent Solvents - PSNS

There shall be no discharge of process wastewater pollutants.

(ad) Dye Penetrant Testing Wastewater - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of nickel-cobalt tested
with dye penetrant method

Chromium	0.079	0.032
Nickel	0.117	0.079
Fluoride	12.7	5.63

(ae) Electrocoating Rinse - PSNS

Pollutant or pollutant prop	Maximum for perty any one day	Maximum for monthly average
mg/off-kg electrocoated	(lb/million off-lbs)	of nickel-cobalt
Chromium Nickel Fluoride	1.25 1.86 201	0.506 0.125 89.0

(af) Miscellaneous Wastewater Sources - PSNS

Pollutant pollutant		Maximum for any one day	
mg/off-kg	(lb/million	off-lbs) of r	lickel-cobalt formed
Chromium Nickel Fluoride		0.091 0.136 14.7	0.037 0.091 6.50

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SUBPART D: PRETREATMENT STANDARDS FOR EXISTING SOURCES AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE PRECIOUS METALS FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of precious metals rolled with emulsions

Cadmium Copper	0.026 0.147	0.012
Cyanide	0.023	0.010
Silver	0.032	0.013

(c) Drawing Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(d) Drawing Spent Emulsions - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of precious metals drawn
with emulsions

Cadmium 0.016 Copper 0.091 Cyanide 0.014 Silver 0.020	0.048 0.006
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(e) Drawing Spent Soap Solutions - PSES

Pollutant or pollutant property	Maximum for any one day	
		······································

mg/off-kg (lb/million off-lbs) of precious metals drawn
with soap solutions

Cadmium	0.001	0.0005
Copper	0.006	0.003
Cyanide	0.0009	0.0004
Silver	0.002	0.0006

(f) Metal Powder Production Atomization Wastewater - PSES

	and the second		1		
Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of precious metals powder wet atomized

Cadmium Copper	2.27 12.7	1.00
Cyanide	1.94	0.802
Silver	2.74	1.14

(g) Heat Treatment Contact Cooling Water - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg heat treat	(lb/million ted	off-lbs) of preci	ous metals
Cadmium	· · ·	0.142	0.063
Copper		0.793	0.417
Cyanide		0.121	0.050
Silver		0.171	0.071

(h)	Semi-Continuous	and Continuous Casting	Contact
	Cooling Water -	PSES	

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million c	off-lbs) of precious	s metals cast by
the semi-c	continuous or	continuous method	
Cadmium		0.350	0.155
Copper		1.96	1.03
Cyanide		0.299	0.124
Silver		0.423	0.175

(i) Stationary Casting Contact Cooling Water - PSES

There shall be no discharge of process wastewater

pollutants.

(j) Direct Chill Casting Contact Cooling Water - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million o by the direct chill met		metals cast
Cadmium	0.367	0.162
Copper	2.05	1.08
Cyanide	0.313	0.130
Silver	0.443	0.184

(k) Shot Casting Contact Cooling Water - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cast	(lbmillion	off-lbs) of precious	s metals shot
Cadmium		0.125	0.055
Copper		0.698	0.367
Cyanide		0.107	0.044
Silver		0.151	0.063

(1) Wet Air Pollution Control Scrubber Blowdown - PSES

There shall be no discharge of process wastewater pollutants.

(m) Pressure Bonding Contact Cooling Water - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of precious metal and base
metal pressure bonded

Cadmium	1		0.029	0.013
Copper			0.159	0.084
Cyanide			0.024	0.010
Silver		1.	0.034	0.014

(n) Surface Treatment Spent Baths - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of precious metals
surface treated

0.015 0.097 0.012 0.017	
	0.012

(o) Surface Treatment Rinse - PSES

Pollutant	,	Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg treated	(lb/million	off-lbs) of precious	s metals surface
Cadmium		0.210	0.093
Copper		1.17	0.616
Cyanide		0.179	0.074
Silver		0.253	0.105

Pollutant or Maximum for Maximum for monthly average pollutant property any one day mg/off-kg (lb/million off-lbs) of precious metals alkaline cleaned Cadmium 0.021 0.009 Copper 0.114 0.060 Cyanide 0.018 0.007 Silver 0.025 0.010

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(q) Alkaline Cleaning Rinse - PSES

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(p) Alkaline Cleaning Spent Baths - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of precious	metals alkaline
Cadmium		0.381	0.168
Copper		2.13	1.12
Cyanide		0.325	0.135
Silver		0.459	0.191

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(r) Alkaline Cleaning Prebonding Wastewater - PSES

Pollutant pollutant		Maximum any one	Maximum monthly	
	(1h/million		 	

mg/off-kg (lb/million off-lbs) of precious metal and base metal cleaned prior to bonding

Cadmium		0.400	0.174
Copper		2.210	1.16
Cyanide		0.337	0.139
Silver	·	0.476	0.197

(s) Tumbling or Burnishing Wastewater - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of precious metals tumbled
or burnished

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(t) Sawing or Grinding Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(u) Sawing or Grinding Spent Emulsions - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million with emulsio	off-lbs) of preci ns	ous metals sawed
Cadmium		0.032	0.014
Copper		0.178	0.094
Cyanide		0.027	0.011
Silver		0.038	0.016

(v) Degreasing Spent Solvents - PSNS

There shall be no discharge of process wastewater pollutants.

(a) Rolling Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg with emuls	(lb/million sions	off-lbs) of precious	s metals rolled
Cadmium		0.026	0.012
Copper		0.147	0.077
Cyanide		0.023	0.010
Silver		0.032	0.013

(c) Drawing Spent Neat Oils - PSNS

(d) Drawing Spent Emulsions - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of precious metals drawn
with emulsions

Cadmium	0.016	0.007
Copper	0.091	0.048
Cyanide	0.014	0.006
Silver	0.020	0.008

(e) Drawing Spent Soap Solutions - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
	<u> </u>	

mg/off-kg (lb/million off-lbs) of precious metals drawn
with soap solutions

Cadmium Copper Cyanide Silver	0.00 0.00 0.00 0.00	6 0.003 09 0.0004	,
DIIVCI	0.00	2 0.0000	

(f) Metal Powder Production Wet Atomization Wastewater - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg atomized	(lb/million	off-lbs) of precious	metals powder wet
Cadmium		2.27	1.00
Copper		12.7	6.68
Cyanide		1.94	0.802
Silver		2.74	1.14

(g) Heat Treatment Contact Cooling Water - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million metals heat treated	off-lbs) of extruded	precious
Cadmium	0.142	0.063
Copper	0.793	0.417
Cyanide	0.121	0.050
Silver	0.171	0.071

(h) Semi-Continuous and Continuous Casting Contact Cooling Water - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant j	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of precious metals cast by the semi-continuous or continuous method

Cadmium	0.350	0.155
Copper	1.96	1.03
Cyanide	0.299	0.124
Silver	0.423	0.175

(i) Stationary Casting Contact Cooling Water - PSNS

(j) Direct Chill Casting Contact Cooling Water - PSNS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg the direc	(lb/million t chill metho	off-lbs) of preciou od	is metals cast by
Cadmium		0.367	0.162
Copper		2.05	1.08
Cyanide		0.313	0.130
Silver		0.443	0.184

(k) Shot Casting Contact Cooling Water - PSNS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg cast	(lb/million	off-lbs) of preciou	us metals shot
Cadmium		0.125	0.055
Copper	· · · ·	0.698	0.367
Cyanide		0.107	0.044
Silver		0.151	0.0631

(1) Wet Air Pollution Control Scrubber Blowdown - PSNS

There shall be no discharge of process wastewater

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pollutants.

(m) Pressure Bonding Contact Cooling Water - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million metal pressure bonded	off-lbs) of preciou	s metal and base
Cadmium	0.029	0.013
Copper	0.159	0.084
Cyanide	0.024	0.010
Silver	0.034	. 0.014

(n) Surface Treatment Spent Baths - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg treated	(lb/million	off-lbs) of precio	ous metals surface
Cadmium		0.033	0.015
Copper		0.183	0.097
Cyanide		0.028	0.012
Silver		0.040	0.017

(o) Surface Treatment Rinse - PSNS

Pollutant pollutant		Maximum any one		Maximum monthly	for average
mg/off-kg treated	(lb/million	off-lbs)	of precious	metals	surface

Cadmium	0.210	0.093
Copper	1.17	0.616
Cyanide	0.179	0.074
Silver	0.253	0.105

(p) Alkaline Cleaning Spent Baths - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of preciou	s metals alkaline
Cadmium		0.021	0.009
Copper		0.114	0.060
Cyanide		0.018	0.007
Silver		0.025	0.010

(q) Alkaline Cleaning Rinse - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg cleaned	(lb/million	off-lbs) of precious	s metals alkaline
Cadmium		0.381	0.168
Copper		2.13	1.12
Cyanide		0.325	0.135
Silver		0.459	0.191

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(r) Alkaline Cleaning Pre-Bonding Wastewater - PSNS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average	ge
mg/off-kg (lb/millio metal cleaned prior	on off-lbs) of precio to bonding	ous metal and base	2 // ~
Cadmium	0.400	0.174	
Copper	2.21	1.16	*
Cyanide	0.337	0.139	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
Silver	0.476	0.197	· ·
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(s) Tumbling or Burnishing Wastewater - PSNS

			· · · · · · · · · · · · · · · · · · ·
Pollutant	or	Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg or burnisl		off-lbs) of preci	ious metals tumbled
Cadmium		0.412	0.182
Copper		2.30	1.21
Cyanide		0.351	0.145
Silver		0.496	0.206
	,		

(t) Sawing or Grinding Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(u) Sawing or Grinding Spent Emulsions - PSNS

Pollutant	or	Maximum fo	or Maximum	for
pollutant	property	any one da	ay monthly	average

mg/off-kg (lb/million off-lbs) of precious metals sawed
or ground with emulsions

0.032	$0.014 \\ 0.094$
0.027	0.011
0.038	0.016
	0.178 0.027

(v) Degreasing Spent Solvents - PSNS

There shall be no discharge of process wastewater

pollutants.

SUBPART E: PRETREATMENT STANDARDS FOR EXISTING SOURCES AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE REFRACTORY METALS FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils and Graphite Based Lubricants - PSES

(b) Rolling Spent Emulsions - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million with emulsions	off-lbs) of refra	ctory metals rolled
Copper	0.815	0.429
Nickel	0.824	0.545
Fluoride	25.5	11.4
Molybdenum	2.84	1.47

(c) Drawing Spent Lubricants - PSES

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Spent Lubricants - PSES

There shall be no discharge of process wastewater pollutants.

(e) Extrusion Press Hydraulic Fluid Leakage - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg extruded	(lb/million	off-lbs) of refr	actory metals
Copper	1	2.26	1.19
Nickel		2.29	1.51
Fluoride		70.8	31.4
Molybdenum		7.87	4.07

(f) Forging Spent Lubricants - PSES

There shall be no discharge of process wastewater pollutants.

(g) Forging Contact Cooling Water - PSES

Pollutant	or	Maximum for	Maximum	for
pollutant	property	any one day	monthly	average

mg/off-kg (lb/million off-lbs) of forged refractory metals cooled with water

Copper Nickel		0.062	0.033 0.041
Fluoride	* 1 *	1.92	0.853
Molybdenum	••	0.214	0.111

(h) Equipment Cleaning Wastewater - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of refractory metals formed

Copper	са	0.259	0.136
Nickel		0.261	0.173
Fluoride		8.09	3.59
Molybdenum		0.899	0.465
-			

(i) Metal Powder Production Wastewater - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg produced	(lb/million	off-lbs) of refra	actory metals powder
Copper	a	0.534	0.281
Nickel		0.540	0.357
Fluoride		16.7	7.42
Molybdenum		1.86	0.961

(j) Metal Powder Production Floor Wash Wastewater - PSES

There shall be no discharge of process wastewater pollutants.

(k) Metal Powder Pressing Spent Lubricants - PSES

There shall be no discharge of process wastewater pollutants.

(1) Surface Treatment Spent Baths - PSES

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million surface treated	off-lbs) of refra	ctory metals
Copper Nickel Fluoride Molybdenum	0.739 0.747 23.2 2.57	0.389 0.494 10.3 1.33

(m) Surface Treatment Rinsewater - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg treated	(lb/million	off-lbs) of refr	actory metals surface
Copper	a	23.0	12.1
Nickel		23.3	15.4
Fluoride		720	320
Molybdenum		80.0	41.4

(n) Alkaline Cleaning Spent Baths - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million alkaline cleaned	off-lbs) of refra	ctory metals
Copper	0.635	0.334
Nickel	0.642	0.424
Fluoride	19.9	8.82
Molybdenum	2.21	1.14

(o) Alkaline Cleaning Rinse - PSES

Pollutant or	Maximum	for Maximum	for
pollutant prope	ty any one	day monthly	average

mg/off-kg (lb/million off-lbs) of refractory metals
alkaline cleaned

Copper		15.5	8.16
Nickel	at i .	15.7	10.4
Fluoride		486	216.0
Molybdenum	• • •	54.0	27.9

(p) Molten Salt Rinse - PSES

Pollutant c pollutant p		Maximum for any one day	Maximum for monthly average
	lb/million h molten sa	off-lbs) of refra lt	actory metals
Copper Nickel	. E	1.20	0.633 0.804
Fluoride Molybdenum		37.7 4.19	16.7 2.17

(q) Tumbling or Burnishing Wastewater - PSES

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
ng/off-kg (lb/millio or burnished	n off-lbs) of refra	actory metals tumbled
Copper	2.38	1.25
Nickel	2.40	1.59
Fluoride	74.4	33.0
Molybdenum	0.27	4.20
(r) Sawing or Grindi	ng Sport Nest Oils	
(I) Sawing of Grindi	ng spent heat offs	
There shall be	no discharge of	process wastewater
pollutants.		· •
		•
(s) Sawing or Grindi	ng Spent Emulsions	- PSES
Pollutant or	Maximum for	Maximum for
pollutant property	1	monthly average
or ground with emuls Copper Nickel	0.565 0.570	0.297 0.377
Fluoride Molybdenum	17.7 1.97	7.84 1.02
(t) Sawing or Grindi	ng Contact Cooling	Water - PSES
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millic		actory metals sawed
or ground with conta	ct cooling water	
Copper	4.62	2.43
Nickel	4.67	3.09
Fluoride Molybdenum	145 16.1	64.2 8.31
	+U • T	U•J1
		· · · ·
	269	

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg metals rir		off-lbs) of sawed or	ground refractory
Copper	n	0.026	0.014
Nickel		0.026	0.017
Fluoride		0.804	0.357
Molybdenum		0.089	0.046

(u) Sawing or Grinding Rinse - PSES

(v) Wet Air Pollution Control Blowdown - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of refractory metals sawed, surface coated or surface treated

Copper	1.50	0.787
Nickel	1.51	1.00
Fluoride	46.9	20.8
Molybdenum	5.20	2.69

(w) Miscellaneous Wastewater Sources - PSES

Pollutant pollutant		Maximum any one		Maximum for monthly average
mg/off-kg	(lb/milion	off-lbs) o	of re	efractory metals formed
Copper Nickel Fluoride Molybdenum	ı	0.656 0.663 20.6 2.28		0.345 0.438 9.11 1.18

(x) Dye Penetrant Testing Wastewater - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg tested	(lb/million	off-lbs) of refrac	ctory metals product
Copper	1	0.148	0.078
Nickel		0.149	0.099
Fluoride		4.62	2.05
Molybdenum		0.513	0.266

(y) Degreasing Spent Solvents - PSES

There shall be no discharge of process wastewater pollutants.

(a) Rolling Spent Neat Oils and Graphite Based Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - PSNS

N	1	•
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of refractory metals
rolled with emulsions

Copper	0.549	0.262	
Nickel	0.236	0.159	
Fluoride	25.5	11.3	
Molybdenum	2.16	0.957	
-			

(c) Drawing Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Spent Lubricants - NSPS

There shall be no discharge of process wastewater pollutants.

(e) Extrusion Press Hydraulic Fluid Leakage - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg extruded	(lb/million	off-lbs) of refr	actory metals
Copper	a	1.53	0.726
Nickel		0.655	0.441
Fluoride		70.8	31.4
Molybdenum		5.99	2.66

(f) Forging Spent Lubricants - PSNS

(g) Forging Contact Cooling Water - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of forged refractory metals cooled with water

Copper Nickel	0.041 0.018	0.020
Fluoride	1.92	0.853
Molybdenum	0.163	0.072

(h) Equipment Cleaning Wastewater - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of refra	actory metals formed
Copper	1	0.174	0.083
Nickel		0.075	0.051
Fluoride		8.09	3.59
Molybdenum		0.684	0.303

(i) Metal Powder Production Wastewater - PSNS

Pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg produced	(lb/million	off-lbs) of refrac	ctory metals powder
Copper Nickel Fluoride Molybdenum	a	0.360 0.155 16.7 1.42	0.172 0.104 7.42 0.627

(j) Metal Powder Production Floor Wash Wastewater - PSNS

(k) Metal Powder Pressing Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(1) Surface Treatment Spent Baths - PSNS

Pollutant	or	Maximum f	or	Maximum	for
pollutant	property	any one d	lay	monthly	average

mg/off-kg (lb/million off-lbs) of refractory metals
surface treated

Copper Nickel	0.498 0.214	0.237 0.144
Fluoride	23.2	10.3
Molybdenum	1.96	0.868

(m) Surface Treatment Rinse - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of refractory metals
surface treated

Copper	15.5	7.38
Nickel	6.66	4.48
Fluoride	720	320
Molybdenum	60.9	27.0

(n) Alkaline Cleaning Spent Baths - PSNS

Pollutant	or	Maximum	for	Maximum	for
			-		
pollutant	property	any one	dav	monthly	average
E	E E 7		1		a.e=a.ge

mg/off-kg (lb/million off-lbs) of refractory metals
alkaline cleaned

Copper Nickel	0.428 0.184	0.204 0.124	
Fluoride	19.9	8.82	
Molybdenum	1.68	0.745	

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millior alkaline cleaned	n off-lbs) of refra	ctory metals
	·	
Copper	10.5	4.98
Nickel	4.49	3.02
Fluoride	486	216
Molybdenum	41.1	18.2
(p) Molten Salt Rinse	e - PSNS	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millior treated with molten s Copper	0.810	0.386
treated with molten s	salt	-
treated with molten s Copper Nickel Fluoride	0.810 0.348 37.7	0.386 0.234 16.7
treated with molten s Copper Nickel Fluoride	salt 0.810 0.348 37.7 3.19	0.386 0.234 16.7 1.41
treated with molten s Copper Nickel Fluoride Molybdenum (q) Tumbling or Burni Pollutant or	salt 0.810 0.348 37.7 3.19	0.386 0.234 16.7 1.41
treated with molten s Copper Nickel Fluoride Molybdenum	0.810 0.348 37.7 3.19 ishing Wastewater -	0.386 0.234 16.7 1.41 PSNS
treated with molten s Copper Nickel Fluoride Molybdenum (q) Tumbling or Burni Pollutant or	0.810 0.348 37.7 3.19 ishing Wastewater - Maximum for any one day	0.386 0.234 16.7 1.41 PSNS Maximum for monthly average
treated with molten s Copper Nickel Fluoride Molybdenum (q) Tumbling or Burni Pollutant or pollutant property mg/off-kg (lb/millior tumbled or burnished	0.810 0.348 37.7 3.19 ishing Wastewater - Maximum for any one day n off-lbs) of refra	0.386 0.234 16.7 1.41 PSNS Maximum for monthly average ctory metals
treated with molten s Copper Nickel Fluoride Molybdenum (q) Tumbling or Burni Pollutant or pollutant property mg/off-kg (lb/millior tumbled or burnished Copper	alt 0.810 0.348 37.7 3.19 ishing Wastewater - Maximum for any one day n off-lbs) of refra 1.60	0.386 0.234 16.7 1.41 PSNS Maximum for monthly average ctory metals 0.763
treated with molten s Copper Nickel Fluoride Molybdenum (q) Tumbling or Burni Pollutant or pollutant property mg/off-kg (lb/millior tumbled or burnished Copper Nickel	0.810 0.348 37.7 3.19 ishing Wastewater - Maximum for any one day n off-lbs) of refra 1.60 0.688	0.386 0.234 16.7 1.41 PSNS Maximum for monthly average ctory metals 0.763 0.463
treated with molten s Copper Nickel Fluoride Molybdenum (q) Tumbling or Burni Pollutant or pollutant property mg/off-kg (lb/millior tumbled or burnished Copper	alt 0.810 0.348 37.7 3.19 ishing Wastewater - Maximum for any one day n off-lbs) of refra 1.60	0.386 0.234 16.7 1.41 PSNS Maximum for monthly average ctory metals 0.763

(o) Alkaline Cleaning Rinse - PSNS

(r) Sawing or Grinding Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(s) Sawing or Grinding Spent Emulsions - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of refractory metals sawed or ground with emulsions

Copper			0.380	0.181
Nickel			0.164	0.110
Fluoride			17.7	7.84
Molybdenum	124	-	1.50	0.663

(t) Sawing or Grinding Contact Cooling Water - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of refractory metals sawed or ground with contact cooling water

Copper	3.11	1.48
Nickel	1.34	0.899
Fluoride	145	64.2
Molybdenum	12.2	5.42
MOTADGeunum	12.2	5.42

(u) Sawing or Grinding Rinse - PSNS

Pollutant	or ,	Maximum for	Maximum for
pollutant	property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of sawed or ground refractory metals rinsed

Copper	0.018	0.009
Nickel Fluoride	0.008 0.803	0.005 0.357
Molybdenum	0.068	0.030

(v) Wet Air Pollution Control Blowdown - PSNS

		· · ·	·	
Pollutant	or	Maximum for	Maximum for	
pollutant	property	any one day	monthly average	
		· .	·	
ma/off-ka	(lb/million	off-lbs) of refra	ctory metals sawed,	
ground, su	irface coate	d or surface treat	ed	
Copper		1.01	0.480	
Nickel	•	0.433	0.291	
Fluoride	·	46.8	20.8	

3.96

1.76

(w) Miscellaneous Wastewater Source - PSNS

Molybdenum

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Pollutant pollutant		Maximum f any one d		Maximum nonthly	for average	·····
mg/off-kg	(lb/million	off-lbs) of	refractor	y metals	s formed	1
Copper		0.442		0.211		

Copper	0.442	U.ZII
Nickel	0.190	0.128
Fluoride	20.6	9.11
Molybdenum	1.74	0.770

(x) Dye Penetrant Testing Wastewater - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of refractory metals
product tested

Copper	0.100	0.048
Nickel	0.043	0.029
Fluoride	4.62	2.05
Molybdenum	0.391	0.173

(y) Degreasing Spent Solvents - PSNS

SUBPART F: PRETREATMENT STANDARDS FOR EXISTING SOURCES AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE TITANIUM FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(b) Rolling Contact Cooling Water - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million with contact cooling		rolled
Cyanide	0.142	0.059
Lead	0.205	0.098
Zinc	0.713	0.298
Ammonia	65.1	28.6
Fluoride	29.1	12.9

(c) Drawing Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Spent Neat Oils - PSES

(e) Extrusion Spent Emulsions - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titani	um extruded
Cyanide		0.021	0.009
Lead		0.030	0.015
Zinc		0.105	0.044
Ammonia		9.59	4.22
Fluoride		4.28	1.90

(f) Extrusion Press Hydraulic Fluid Leakage - PSES

Pollutant	or	Maxim	ານກາ	for	Maximum	for
pollutant	property	any o	ne	dav	monthly	average
porracane	Propercy	uny c	110	aay	monenty	average
	•			· · · · ·		

mg/off-kg (lb/million off-lbs) of titanium extruded

Cyanide Lead	0.052 0.075	0.022 0.036
Zinc Ammonia	0.260	0.109
Fluoride	10.6	4.70

(g) Forging Spent Lubricants - PSES

There shall be no discharge of process wastewater pollutants.

(h) Forging Contact Cooling Water - PSES

Pollutant	Maximum for	Maximum for
pollutant	any one day	monthly average
mg/off-kg with water	off-lbs) of	forged titanium cooled
Cyanide	0.029	0.012
Lead	0.042	0.020
Zinc	0.146	0.061
Ammonia	13.3	5.86
Fluoride	5.95	2.64

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(i) Forging Equipment Cleaning Wastewater - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	forged
Cyanide		0.012	0.005
Lead		0.017	0.008
Zinc		0.059	0.025
Ammonia		5.33	2.35
Fluoride		2.38	1.06

(j) Forging Press Hydraulic Fluid Leakage - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	forged
Cyanide		0.293	0.121
Lead		0.424	0.202
Zinc		1.48	0.616
Ammonia		135	59.2
Fluoride		60.1	26.7

(k) Tube Reducing Spent Lubricants - PSES

There shall be no discharge of process wastewater pollutants.

(1) Heat Treatment Contact Cooling Water - PSES

There shall be no allowance for the discharge of process wastewater pollutants.

(m) Surface Treatment Spent Baths - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	surface treated
Cyanide		0.061	0.025
Lead		0.088	0.042
Zinc		0.304	0.127
Ammonia		27.7	12.2
Fluoride		12.4	5.49

(n) Surface Treatment Rinse - PSES

Pollutant pollutant		Maximum for any one day	Maximum monthly	for average
mg/off-kg	(lb/million	off-lbs) of titanium	surface	treated
Cyanide Lead Zinc Ammonia Fluoride		0.847 1.23 4.27 389 174	0.351 0.584 1.78 171 77.1	

(o) Wet Air Pollution Control Scrubber Blowdown - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg or forged	(lb/million	off-lbs) of titanium	surface treated
Cyanide		0.062	0.026
Lead		0.090	0.043
Zinc		0.313	0.131
Ammonia		28.5	12.6
Fluoride		12.8	5.65

Pollutant	or	Maximum for	Maximum for
pollutant	property	any one day	monthly average
E	T T T		1 5
	<u></u>		
ma/off-ka	(lb/million	off-lbs) ot titanium	alkaline
cleaned	、 · · · /		
Cyanide		0.070	0.029
Lead		0.101	0.048
Zinc		0.351	0.147
Ammonia		32.0	14.1
Fluoride		14.3	6.34
r ruot rue			0.54

(p) Alkaline Cleaning Spent Baths - PSES

(q) Alkaline Cleaning Rinse - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	alkaline cleaned
Cyanide		0.080	0.033
Lead		0.116	0.055
Zinc		0.403	0.169
Ammonia		36.8	16.2
Fluoride		16.4	7.29

(r) Molten Salt Rinse - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million molten salt	off-lbs) of	titanium treated with
Cyanide	0.277	0.115
Lead	0.401	0.191
Zinc	1.40	0.583
Ammonia	128	56.0
Fluoride	56.8	25.2

(s) Tumbling Wastewater - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	tumbled
Cyanide		0.023	0.010
Lead		0.033	0.016
Zinc		0.116	0.048
Ammonia		10.6	4.63
Fluoride		4.70	2.09

(t) Sawing or Grinding Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(u) Sawing or Grinding Spent Emulsions - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average
	1				

mg/off-kg (lb/million off-lbs) of titanium sawed or ground with emulsions

Cyanide Lead Zinc	N	0.053 0.077 0.267	0.022 0.037 0.112	
Ammonia Fluoride		24.4 10.9	10.7 4.83	

(v) Sawing or Grinding Contact Cooling Water - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million with contact cooling wa		um sawed or ground
Cyanide	0.138	0.057
Lead	0.200	0.095
Zinc	0.695	0.291
Ammonia	63.5	27.9
Fluoride	28.3	12.6

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million dye penetrant methods	off-lbs) of	titanium tested using
Cyanide	0.325	0.135
Lead	0.471	0.224
Zinc	1.64	0.683
Ammonia	149	65.7
Fluoride	66.7	29.6

(w) Dye Pentrant Testing Wastewater - PSES

(x) Hydrotesting Wastewater - PSES

There shall be no discharge of process wastewater pollutants.

(y) Miscellaneous Wastewater Sources - PSES

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	formed
Cyanide Lead Zinc Ammonia		0.010 0.014 0.048 4.32	0.004 0.007 0.020
Fluoride		4.32	1.90 0.856

(z) Degreasing Spent Solvents - PSES

(a) Rolling Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(b) Rolling Contact Cooling Water - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
	1	

mg/off-kg (lb/million off-lbs) of titanium rolled
with contact cooling water

Cyanide	0.142	0.059
Lead	0.205	0.098
Zinc	0.713	0.298
Ammonia	65.1	28.6
Fluoride	29.1	12.9

(c) Drawing Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(e) Extrusion Spent Emulsions - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titan	ium extruded
Cyanide		0.021	0.009
Lead		0.030	0.015
Zinc		0.105	0.044
Ammonia		9.59	4.22
Fluoride		4.28	1.90

(f) Extrusion Press Hydraulic Fluid Leakage - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titar	nium extruded
Curnide		0.052	0.022
Lead		0.075	0.036
Zinc		0.260	0.109
Ammonia		23.7	10.5
Fluoride		10.6	4.70

(g) Forging Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(h) Forging Contact Cooling Water - PSNS

Pollutant	· · · · · · · · · · · · · · · · · · ·	Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg with water		off-lbs) of	forged titanium cooled
Cyanide		0.029	0.012
Lead		0.042	0.020
Zinc		0.146	0.061
Ammonia		13.3	5.86
Fluoride		5.95	2.64

(i) Forging Equipment Cleaning Wastewater - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	forged
Cyanide		0.012	0.005
Lead		0.017	0.008
Zinc		0.059	0.025
Ammonia		5.33	2.35
Fluoride		2.38	1.06

(j) Forging Press Hydraulic Fluid Leakage - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	forged
Cyanide		0.293	0.121
Lead		0.424	0.202
Zinc		1.48	0.616
Ammonia		135	59.2
Fluoride		60.1	26.7

(k) Tube Reducing Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(1) Heat Treatment Contact Cooling Water - PSNS

There shall be no allowance for the discharge of process wastewater pollutants.

(m) Surface Treatment Spent Baths - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of tit	anium surface treated
Cyanide		0.061	0.025
Lead		0.088	0.042
Zinc		0.304	0.127
Ammonia		27.7	12.2
Fluoride		12.4	5.49

(n) Surface Treatment Rinse - PSNS

Pollutant pollutant		Maximum any one		Maximum monthly	for average	
ma/off-ka	(lb/million	off-lbs) of	of titanium	surface	treated	

Cyanide	0.847	0.351
Lead	1.23	0.584
Zinc	4.27	1.78
Ammonia	389.	171.
Fluoride	174.	77.1

(o) Wet Air Pollution Control Scrubber Blowdown - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg or forged	(lb/million	off-lbs) of titanium	surface treated
Cyanide	•	0.062	0.026
Lead		0.090	0.043
Zinc		0.313	0.131
Ammonia		28.5	12.6
Fluoride		12.8	5.65

(p) Alkaline Cleaning Spent Baths - PSNS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg cleaned	(lb/million	off-lbs) ot titanium	alkaline
Cyanide Lead Zinc Ammonia Fluoride	· • ·	0.070 0.101 0.351 32.0 14.3	0.029 0.048 0.147 14.1 6.34

(q) Alkaline Cleaning Rinse - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titani	um alkaline cleaned
Cyanide		0.080	0.033
Lead		0.116	0.055
Zinc		0.403	0.169
Ammonia		36.8	16.2
Fluoride		16.4	7.29

(r) Molten Salt Rinse - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million molten salt	off-lbs) of t	titanium treated with
Cyanide	0.277	0.115
Lead	0.401	0.191
Zinc	1.40	0.583
Ammonia	128	56.0
Fluoride	56.8	25.2

(s) Tumbling Wastewater - PSNS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg	(lb/million	off-lbs) of titaniu	n tumbled
Cyanide Lead Zinc Ammonia Fluoride		0.023 0.033 0.116 10.6 4.70	0.010 0.016 0.048 4.63 2.09

(t) Sawing or Grinding Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(u) Sawing or Grinding Spent Emulsions - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of titanium sawed or ground
with emulsions

Cyanide	0.053	0.022
Lead	0.077	0.037
Zinc	0.267	0.112
Ammonia	24.4	10.7
Fluoride	10.9	4.83

(v) Sawing or Grinding Contact Cooling Water - PSNS

Pollutant pollutant		Maximum any one	_	Maximum fo monthly av	
	(lb/million act cooling wa		of titaniu	m sawed pr	ground
Cyanide Lead Zinc Ammonia Fluoride		0		0.057 0.095 0.291 27.9 12.6	· ·

(w) Dye Pentrant Testing Wastewater - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million ant methods	off-lbs) of	titanium treated using
Cyanide		0.325	0.135
Lead		0.471	0.224
Zinc		1.64	0.683
Ammonia		149	65.7
Fluoride		66.7	29.6

(x) Hydrotesting Wastewater - PSNS

There shall be no discharge of process wastewater pollutants.

(y) Miscellaneous Wastewater Sources - PSNS

Pollutant	-	Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of titanium	formed
Cyanide		0.010	0.004
Lead		0.014	0.007
Zinc		0.048	0.020
Ammonia		4.32	1.90
Fluoride		1.93	0.856

(z) Degreasing Spent Solvents - PSNS

SUBPART G: PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE URANIUM FORMING SUBCATEGORY

(a) Extrusion Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(b) Extrusion Tool Contact Cooling Water - PSNS

Pollutant pollutant		Maximur any one		Maximum monthly	for average
mg/off-kg	(lb/million	off-lbs)	of uranium	extruded	
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum	n		0.007 0.013 0.044 0.010 0.019 2.05 0.173	0 0 0 0	.003 .005 .021 .005 .013 .908 .077

(c) Heat Treatment Contact Cooling Water - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of extruded or forged uranium
heat treated

Cadmium 0.006 Chromium 0.012 Copper 0.040 Lead 0.009 Nickel 0.017	
Molybdenum 0.158	

(d) Forging Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(e) Surface Treatment Spent Baths - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of uranium surface treated

Cadmium	0.006	0.002
Chromium	0.010	0.004
Copper	0.035	0.017
Lead	0.008	0.004
Nickel	0.015	0.010
Fluoride	1.62	0.718
Molybdenum	0.137	0.061
-		

(f) Surface Treatment Rinse - PSNS

Pollutant pollutant		Maximum any one		Maximum for monthly average	
mg/off-kg	(lb/million	off-lbs)	of uranium	surface treated	· · · ·
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum	1		0.068 0.125 0.432 0.095 0.186 20.1 1.70	0.027 0.051 0.206 0.044 0.125 8.90 0.752	· · · · · · · · · · · · · · · · · · ·

(g) Wet Air Pollution Control Scrubber Blowdown - PSNS

Pollutant pollutant		Maximur any one		Maximum for monthly average	
mg/off-kg	(lb/million	off-lbs)	of uranium	surface treated	
Cadmium Chromium Copper Lead Nickel Fluoride Molybdenum	1		0.0007 0.001 0.005 0.001 0.002 0.208 0.018	0.0003 0.0005 0.002 0.0005 0.001 0.092 0.008	

(h) Sawing or Grinding Spent Emulsions - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average

mg/off-kg (lb/million off-lbs) of uranium sawer or ground with emulsions

Cadmium	0.001	0.0005
Chromium	0.002	0.0009
Copper	0.007	0.004
Lead	0.002	0.0008
Nickel	0.003	0.002
Fluoride	0.338	0.150
Molybdenum	0.338 0.029	0.150

(i) Sawing or Grinding Contact Cooling Water - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of uranium sawed or ground with contact cooling water

Cadmium	0.033	0.013
Chromium	0.061	0.025
Copper	0.211	0.101
Lead	0.046	0.022
Nickel	0.091	0.061
Fluoride	9.82	4.36
Molybdenum	0.830	0.368
_		

Maximum for Pollutant or Maximum for any one day pollutant property monthly average mg/off-kg (lb/million off-lbs) of sawed or ground uranium rinsed Cadmium 0.001 0.0004 Chromium 0.002 0.0007 0.006 0.003 Copper 0.002 0.0006 Lead Nickel 0.003 0.002 Fluoride 0.277 0.123 Molybdenum 0.024 0.011 (k) Area Cleaning Rinse - PSNS Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of uranium formed Cadmium 0.009 0.004 Chromium 0.016 0.007 0.055 Copper 0.026 Lead 0.012 0.006 Nickel 0.024 0.016 Fluoride 2.56 1.14 Molybdenum 0.216 0.096 (1) Drum Washwater - PSNS Pollutant or Maximum for Maximum for pollutant property any one day monthly average Di L mg/off-kg (lb/million off-lbs) of uranium formed Cadmium 0.009 0.004 Chromium 0.017 0.007 Copper 0.057 0.027

(j) Sawing or Grinding Rinse - PSNS

Lead

Nickel

Fluoride

Molybdenum

295

0.013

0.025

2.64

0.223

0.006

0.017

0.099

1.17

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/employee - day		
Cadmium	5.24	2.10
Chromium	9.70	3.93
Copper	33.6	16.0
Lead	7.34	3.41
Nickel	14.4	9.70
Fluoride	1,560	692
Molybdenum	132	58.4

(n) Degreasing Spent Solvents - PSNS

(m) Laundry Washwater - PSNS

There shall be no discharge of process wastewater pollutants.

SUBPART H: PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE ZINC FORMING SUBCATEGORY

(a) Rolling Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(b) Rolling Spent Emulsions - PSNS

Pollutant pollutant		Maximum for any one day	Maximum monthly	for average
mg/off-kg emulsions	(lb/million	off-lbs) of zinc	rolled with	
Chromium Copper Cyanide Zinc		0.0005 0.002 0.0003 0.002	0.0002 0.0009 0.0001 0.0006	

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(c) Rolling Contact Cooling Water - PSNS

Pollutant pollutant	Maximum for any one day	Maximum monthly	
mg/off-kg cooling wa	off-lbs) of zinc	rolled with	contact
Chromium Copper Cyanide	0.020 0.069 0.011	0.008 0.033 0.004	

0.023

0.055

(d) Drawing Spent Emulsions - PSNS

Zinc

Pollutant pollutant		Maximum any one		Maximum for monthly average
mg/off-kg	(lb/million	off-lbs)	of zinc	drawn with emulsions
Chromium Copper Cyanide Zinc	4 9 	0.002 0.008 0.001 0.006		0.0009 0.004 0.0005 0.003

(e) Direct Chill Casting Contact Cooling Water - PSNS

Pollutant	ór	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of zinc cast by the direct chill method

Chromium	0.019	0008
Copper	0.065	0.031
Cyanide	0.010	0.004
Zinc	0.052	0.021

(f) Stationary Casting Contact Cooling Water - PSNS

(g) Heat	Treatment Co	ntact Cooling V	later - PSNS	
Pollutant	or	Maximum for	Maximum for	
	property	any one day		
-				
mg/off-kg	(lb/million	off-lbs) of zi	nc heat treated	
Chromium	i i	0.029	0.012	
Copper	· · · · · ·	0.098	0.047	
Cyanide		0.016	0.006	
Zinc		0.078	0.032	
			1	
(h) Surfa	ce Treatment	Spent Baths -	PSNS	
Pollutant	or	Maximum for	Maximum for	
pollutant	property	any one day	monthly average	
	_ ·		-	
mg/off-kg	(lb/million	off-lbs) of zi	nc surface treated	
Chromium	-	0.033	0.014	
Copper	, • t	0.114	0.054	
Cyanide		0.018	0.007	
Zinc	3	0.091	0.038	
4110	. #	0.091	0.000	
······································		· · · · · · · · · · · · · · · · · · ·		
(i) Surfac	ce Treatment	Rinse - PSNS		
Pollutant	or	Maximum for	Maximum for	
	property			
*	±− ±− ± ∴ν ss	+ · · · · · · · · · · · · · · · · · · ·		
mg/off-kg	(lb/million	off-lbs) of zi	nc surfact treated	
Chromium		0.133	0.054	
Copper		0.459	0.219	
Cyanide	*	0.072	0.029	
Zinc	•	0.365	0.151	

pollutant propertyany one daymonthly averagemg/off-kg (lb/million off-lbs) of zinc alkaline cleanedChromium0.0020.0006Copper0.0050.002Cyanide0.00070.0003Zinc0.0040.002(k) Alkaline Cleaning Rinse - PSNSPollutant orMaximum for any one dayMaximum for monthly averagemg/off-kg (lb/million off-lbs) of zinc alkaline cleanedChromium0.6260.254Copper2.171.03Cyanide0.3380.135Zinc1.730.710		~	Maximum for	Marrimer	for
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Chromium 0.002 0.0006 Copper 0.005 0.002 Cyanide 0.0007 0.0003 Zinc 0.004 0.002 (k) Alkaline Cleaning Rinse - PSNS Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of zinc alkaline cleaned Chromium 0.626 0.254 Copper 2.17 1.03 Cyanide 0.338 0.135 Zinc 1.73 0.710 (1) Sawing or Grinding Spent Emulsions - PSNS Pollutant or Maximum for Maximum for pollutant property any one day monthly average (1) Sawing or Grinding Spent Emulsions - PSNS Pollutant or Maximum for Maximum for pollutant property any one day monthly average mg/off-kg (lb/million off-lbs) of zinc sawed or ground with emulsions Chromium 0.009 0.004 Copper 0.031 0.015 Cyanide 0.005 0.002			any one day	momenty	
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Cyanide Zinc0.0007 0.0040.0003 0.002(k) Alkaline Cleaning Rinse - PSNSPollutant or pollutant property mg/off-kg (lb/million off-lbs) of zinc alkaline cleanedChromium Copper 2.17 2.17 2.17 2.138 2.16(l) Sawing or Grinding Spent Emulsions - PSNSPollutant or pollutant property Maximum for 0.338 0.135 2.17 0.710(l) Sawing or Grinding Spent Emulsions - PSNSPollutant or pollutant property mg/off-kg (lb/million off-lbs) of zinc sawed or ground with emulsions(chromium copper 0.031 Copper 0.031 0.0050.002	Chromium				
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Pollutant or pollutant propertyMaximum for any one dayMaximum for monthly averagemg/off-kg (lb/million off-lbs) of zinc sawed or ground with emulsions0.0090.004Chromium0.0090.004Copper0.0310.015Cyanide0.0050.002					
pollutant propertyany one daymonthly averagemg/off-kg (lb/million off-lbs) of zinc sawed or groundwith emulsionsChromium0.0090.004Copper0.0310.015Cyanide0.0050.002	i -				
mg/off-kg (lb/million off-lbs) of zinc sawed or ground with emulsions Chromium 0.009 0.004 Copper 0.031 0.015 Cyanide 0.005 0.002	(l) Sawing	or Grinding	g Spent Emulsions	5 – PSNS	
with emulsions Chromium 0.009 0.004 Copper 0.031 0.015 Cyanide 0.005 0.002	Pollutant o	r	Maximum for	Maximum	
Chromium0.0090.004Copper0.0310.015Cyanide0.0050.002	Pollutant o	r	Maximum for	Maximum	
Copper 0.031 0.015 Cyanide 0.005 0.002	Pollutant o pollutant p mg/off-kg (or property lb/million	Maximum for any one day	Maximum monthly	average
Copper 0.031 0.015 Cyanide 0.005 0.002	Pollutant o pollutant p mg/off-kg (or property lb/million	Maximum for any one day	Maximum monthly	average
	Pollutant o pollutant p mg/off-kg (with emulsi	or property lb/million	Maximum for any one day off-lbs) of zind 0.009	Maximum monthly c sawed or gro	average
Zinc 0.025 0.010	Pollutant o pollutant p mg/off-kg (with emulsi Chromium Copper	or property lb/million	Maximum for any one day off-lbs) of zind 0.009 0.031	Maximum monthly c sawed or gro 0.004 0.015	average
	Pollutant o pollutant p mg/off-kg (with emulsi Chromium Copper Cyanide	or property lb/million	Maximum for any one day off-1bs) of zind 0.009 0.031 0.005	Maximum monthly c sawed or gro 0.004 0.015 0.002	average
	Pollutant o pollutant p mg/off-kg (with emulsi Chromium Copper Cyanide	or property lb/million	Maximum for any one day off-1bs) of zind 0.009 0.031 0.005	Maximum monthly c sawed or gro 0.004 0.015 0.002	average
	Pollutant o pollutant p mg/off-kg (with emulsi Chromium Copper Cyanide	or property lb/million	Maximum for any one day off-1bs) of zind 0.009 0.031 0.005	Maximum monthly c sawed or gro 0.004 0.015 0.002	average
	Pollutant o pollutant p mg/off-kg (or property lb/million	Maximum for any one day off-1bs) of zind 0.009 0.031 0.005	Maximum monthly c sawed or gro 0.004 0.015 0.002	average
	Pollutant o pollutant p mg/off-kg (with emulsi Chromium Copper Cyanide	or property lb/million	Maximum for any one day off-1bs) of zind 0.009 0.031 0.005	Maximum monthly c sawed or gro 0.004 0.015 0.002	average
	Pollutant o pollutant p mg/off-kg (with emulsi Chromium Copper Cyanide	or property lb/million	Maximum for any one day off-1bs) of zind 0.009 0.031 0.005	Maximum monthly c sawed or gro 0.004 0.015 0.002	average
	Pollutant o pollutant p ng/off-kg (with emulsi Chromium Copper Cyanide	or property lb/million	Maximum for any one day off-1bs) of zind 0.009 0.031 0.005	Maximum monthly c sawed or gro 0.004 0.015 0.002	averag

(m) Electrocoating Rinse - PSNS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly ave	
mg/off-kg (lb/milli	on off-lbs) of zinc	electrocoated	
Chromium Copper Cyanide Zinc	0.085 0.293 0.046 0.234	0.035 0.140 0.019 0.096	
(n) Degreasing Spe	nt Solvents - PSNS		
There shall	be no discharge	of process	wastewater
pollutants.			
PRETREAT	IMENT STANDARDS FOR IMENT STANDARDS FOR JM-HAFNIUM FORMING S	NEW SOURCES FOR	
			· .
(a) Rolling Spent 1	Neat Oils - PSES		
There shall b	be no discharge of	process wast	ewater
pollutants.			
(b) Drawing Spent Lu	bricants - PSES		
There shall h	oe no discharge o	f process wast	ewater
pollutants.		• • • • •	
(c) Extrusion Spent	Emulsions - PSES		
There shall be	no discharge of pro	cess wastewater	
pollutants.			

· .

(d) Extrusion Press Hydraulic Fluid Leakage - PSES

Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
ma/off-ka	(lh/million	off-lbs) of zirco	nium-hafnium
extruded	(10)	011 100, 01 21100	
Chromium		0.104	0.043
Cyanide		0.069	0.029
Nickel Ammonia	4	0.455 31.6	0.301 13.9
Fluoride		14.1	6.26
		1 7 • 1	
(e) Swag	ing Spent Nea	at Oils - PSES	
	- <u>F</u>		
Ther	e shall be	no discharge of	process wastewater
pollutant	s.	анан сайтаан ал	
	i ,		
			- DADA
(f) Heat '	Treatment Con	ntact Cooling Wate	r - PSES
(f) Heat	Treatment Con	ntact Cooling Wate	r - PSES
· · ·	·,		na Na ang ang ang ang ang ang ang ang ang an
Pollutant	or	Maximum for	Maximum for
Pollutant	·,		na Na ang ang ang ang ang ang ang ang ang an
Pollutant pollutant	or property	Maximum for any one day	Maximum for monthly average
Pollutant pollutant	or property	Maximum for	Maximum for monthly average
Pollutant pollutant mg/off-kg treated	or property	Maximum for any one day off-lbs) of zirco	Maximum for monthly average
Pollutant pollutant mg/off-kg treated Chromium	or property	Maximum for any one day off-lbs) of zirco 0.015	Maximum for monthly average onium-hafnium heat 0.006
Pollutant pollutant mg/off-kg treated Chromium Cyanide	or property	Maximum for any one day off-lbs) of zirco 0.015 0.010	Maximum for monthly average onium-hafnium heat 0.006 0.004
Pollutant pollutant mg/off-kg treated Chromium Cyanide Nickel	or property	Maximum for any one day off-lbs) of zirco 0.015 0.010 0.066	Maximum for monthly average onium-hafnium heat 0.006 0.004 0.044
Pollutant pollutant mg/off-kg treated Chromium Cyanide Nickel Ammonia	or property	Maximum for any one day off-lbs) of zirco 0.015 0.010 0.066 4.57	Maximum for monthly average onium-hafnium heat 0.006 0.004 0.044 2.01
Pollutant pollutant mg/off-kg treated Chromium Cyanide Nickel	or property	Maximum for any one day off-lbs) of zirco 0.015 0.010 0.066	Maximum for monthly average onium-hafnium heat 0.006 0.004 0.044
Pollutant pollutant mg/off-kg treated Chromium Cyanide Nickel Ammonia	or property	Maximum for any one day off-lbs) of zirco 0.015 0.010 0.066 4.57	Maximum for monthly average onium-hafnium heat 0.006 0.004 0.044 2.01
Pollutant pollutant mg/off-kg treated Chromium Cyanide Nickel Ammonia	or property	Maximum for any one day off-lbs) of zirco 0.015 0.010 0.066 4.57	Maximum for monthly average onium-hafnium heat 0.006 0.004 0.044 2.01
Pollutant pollutant mg/off-kg treated Chromium Cyanide Nickel Ammonia Fluoride	or property (lb/million	Maximum for any one day off-lbs) of zirco 0.015 0.010 0.066 4.57	Maximum for monthly average onium-hafnium heat 0.006 0.004 0.044 2.01 0.906

(h) Surface Treatment Spent Baths - PSES

pollutant property any one day mg/off-kg (lb/million off-lbs) of zird surface treated Chromium 0.150 Cyanide 0.099 Nickel 0.653 Ammonia 45.3	monthly average conium-hafnium 0.061 0.041 0.432
surface treated Chromium 0.150 Cyanide 0.099 Nickel 0.653	0.061 0.041
Cyanide0.099Nickel0.653	0.041
Nickel 0.653	
	0 132
Ammonia 45.3	0.432
	20.0
Fluoride 20.3	8.98
(i) Surface Treatment Rinse - PSES	
Pollutant or Maximum for	Maximum for
pollutant property any one day	monthly average
mg/off-kg (lb/million off-lbs) of zird surface treated Chromium 0.391 Cyanide 0.258	conium-hafnium 0.160 0.107

Chromium	0.391	0.160
Cyanide	0.258	0.107
Nickel	1.71	1.13
Ammonia	119	52.1
Fluoride	52.9	23.5

(j) Alkaline Cleaning Spent Baths - PSES

Pollutant	or	Maxi	mum for	Maximum	for
pollutant	property	any	one day	monthly	average

mg/off-kg (lb/million off-lbs) of zirconium-hafnium
alkaline cleaned

Cyanide 0.464 0.192 Nickel 3.07 2.03 Ammonia 214 93.8 Fluoride 95.2 42.3	Ammonia	214	93.8	
--	---------	-----	------	--

(k) Alkaline Cleaning Rinse - PSES

Pollutant or pollutant propert	Maximum for y any one day	Maximum for monthly average
mg/off-kg (lb/mil alkaline cleaned	lion off-lbs) of zirc	conium-hafnium
Chromium	1.38	0.565
Cyanide	0.911	0.377
Nickel	6.03	3.99
Ammonia	419	184
Fluoride	187	82.9

(1) Sawing or Grinding Spent Emulsions - PSES

Pollutant pollutant		Maximum any one		<u>.</u>	Maximum monthly	
	(lb/million		of zi	irconiu	m-hafniur	n sawed

OL	ground	WICH	emuisions			
Cy Ni Am	romium anide ckel monia uoride	•		0.124 0.082 0.540 37.5 16.7	0.051 0.034 0.357 16.50 7.42	

(m) Wet Air Pollution Control Scrubber Blowdown - PSES

There shall be no allowance for the discharge of process wastewater pollutants.

(n) Degreasing Spent Solvents - PSES

(o) Degreasing Rinse - PSES

There shall be no discharge of process wastewater pollutants.

(p) Molten Salt Rinse - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/milli following molten sa		onium-hafnium rinsed
Chromium	0.333	0.136
Cyanide	0.220	0.091
Nickel	1.45	0.960
Ammonia	101	44.3
Fluoride	45.0	20.0
	<u></u>	
(q) Sawing or Grind	ing Contact Cooling	Water - PSES
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/milli ground with contact		onium-hafnium sawed or
Chromium	0 142	0 058

Chromium	0.142	0.058
Cyanide	0.093	0.039
Nickel	0.617	0.408
Ammonia	42.8	18.8
Fluoride	19.1	8.48

(r) Sawing or Grinding Rinse - PSES

Pollutant pollutant	Maximum for any one day	Maximum for monthly average
mg/off-kg hafnium r	off-lbs) of sawed	or ground zirconium-
Chromium	0.079	0.033
Cyanide	0.052	0.022
Nickel	0.346	0.229
	04 0	7 0 C
Ammonia	24.0	10.6

(s) Sawing or Grinding Spent Neat Oils - PSES

There shall be no discharge of process wastewater pollutants.

(t) Inspection and Testing Wastewater - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of zirconium-hafnium tested

Cyanide0.0050.002Nickel0.0300.020Ammonia2.060.903Fluoride0.9170.407	Ammonia	· · · ·	2.06	0.903
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(a) Rolling Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(b) Drawing Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(c) Extrusion Spent Emulsions - PSNS

There shall be no discharge of process wastewater pollutants.

(d) Extrusion Press Hydraulic Fluid Leakage - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg extruded	(lb/million	off-lbs) of zire	conium-hafnium
Chromium	,	0.104	0.043
Cyanide		0.069	0.029
Nickel		0.455	0.301
Ammonia		31.6	13.9
Fluoride		14.1	6.26

(e) Swaging Spent Neat Oils - PSNS

(f) Heat Treatment Contact Cooling Water - PSNS

Pollutant pollutant		Maximum for any one day	Maximum for monthly average
mg/off-kg treated	(lb/million	off-lbs) of zi	rconium-hafnium heat
Chromium Cyanide Nickel Ammonia Fluoride	- 	0.015 0.010 0.066 4.57 2.04	0.006 0.004 0.044 2.01 0.906

(g) Tube Reducing Spent Lubricants - PSNS

There shall be no discharge of process wastewater pollutants.

(h) Surface Treatment Spent Baths - PSNS

Pollutant or pollutant propert	Maximum for y any one day	Maximum for monthly average	
propert			
mg/off-kg (lb/mi] surface treated	llion off-lbs) of zirco	onium-hafnium	
Chromium	0.150	0.061	
Cyanide	0.099	0.041	
Nickel	0.653	0.432	
Ammonia	45.3	20.0	
Fluoride	20.3	8.98	

(i)	Surface	Treatment	Rinse	-	PSNS
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(i) Surface Treatmen	t Rinse - PSNS	
Pollutant or	Maximum for	Maximum for
pollutant property		monthly average
mg/off-kg (lb/millic surface treated	on off-lbs) of zirco	onium-hafnium
Chromium	0.391	0.160
Cyanide	0.258	0.107
Nickel	1.71	1.13
Ammonia	119	52.1
Fluoride	52.9	23.5
	<u>, , , , , , , , , , , , , , , , , , , </u>	an a dala ana an anna a dan an anna an anna an anna an anna an an
(j) Alkaline Cleanin	g Spent Baths - PSN	IS
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millio alkaline cleaned	n off-lbs) of zirco	onium-hafnium
Chromium	0.704	0.288
Cyanide	0.464	0.192
Nickel	3.07	2.03
Ammonia	214	93.8
Fluoride	95.2	42.3
(k) Alkaline Cleanin	a Pince - DENG	· · · • •
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millio alkaline cleaned	n off-lbs) of zirco	onium-hafnium Act th
Chromium	1.38	0.565
CHIOMITAM	T.30 -	U.303

Chromium	1.38	0.565
Cyanide Nickel	0.911 6.03	0.377 3.99
Ammonia	419	184
Fluoride	187	82.9

(1) Sawing or Grinding Spent Emulsions - PSNS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million or ground with emulsi		nium-hafnium sawed
Chromium	0.124	0.051
Cyanide	0.082	0.034
Nickel	0.540	0.357
Ammonia Fluoride	37.5 16.7	16.50 7.42
(m) Wet Air Pollution	Control Scrubber	Blowdown - PSNS
There shall	be no allowanc	e for the discharge
process wastewater po	llutants.	
(n) Degreasing Spent	Solvents - PSNS	
There shall be	no discharge of	process wastewater
pollutants.	· ·	
(o) Degreasing Rinse	- PSNS	
There shall be n	o discharge of pro	cess wastewater
pollutants.	•	,
, 		en en en en
(p) Molten Salt Rinse	- PSNS	
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million		nium-hafnium rinsed
following molten salt	treatment	
Chromium	0.333	0.136
Cyanide '	0.220	0.091 0.960
		11 . MOU
Nickel Ammonia	1.45 101	44.3

309

Pollutant or pollutant pr		aximum for ny one day	Maximum for monthly average
	lb/million off contact cooli	-lbs) of zirconium ng water	n-hafnium sawed or
Chromium		0.142	0.058
Cyanide		0.093	0.039
Nickel		0.617	0.408
Ammonia		42.8	18.8
Fluoride		19.1	8.48
			- -

(q) Sawing or Grinding Contact Cooling Water - PSNS

(r) Sawing or Grinding Rinse - PSNS

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of sawed or ground zirconiumhafnium rinsed

Chromium	0.079	0.033
Cyanide	0.052	0.022
Nickel	0.346	0.229
Ammonia	24.0	10.6
Fluoride	10.7	4.75

(s) Sawing or Grinding Spent Neat Oils - PSNS

(t) Inspection and Testing Wastewater - PSNS

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
·		
ng/off-kg (lb/million	off-lbs) of zirco	onium-hafnium tested
Chromium	0.007	0.003
Cyanide	0.005	0.002
Nickel	0.030	0.020
Ammonia	2.06	0.903
Fluoride	0.917	0.407
	NT STANDARDS FOR N	ISTING SOURCES AND NEW SOURCES FOR THE
METAL POWD	ERS SUBCATEGORY	
(a) Metal Powder Prod	uction Atomization	Wastewater - PSES
Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
ng/off-kg (lb/million Copper Cyanide	9.58 1.46	5.040 0.605
	2.12	1,01
Lead	,	1,01
Lead (b) Sizing Spent Neat	,	
Lead (b) Sizing Spent Neat There shall	Oils - PSES	
Lead (b) Sizing Spent Neat There shall	Oils - PSES	
Lead (b) Sizing Spent Neat There shall pollutants.	Oils - PSES be no discharge	
Lead (b) Sizing Spent Neat There shall pollutants. (c) Sizing Spent Emul	Oils - PSES be no discharge	
Lead (b) Sizing Spent Neat There shall pollutants. (c) Sizing Spent Emul Pollutant or	Oils - PSES be no discharge sions - PSES	of process wastewat
Lead (b) Sizing Spent Neat There shall pollutants. (c) Sizing Spent Emul Pollutant or pollutant property	Oils - PSES be no discharge sions - PSES Maximum for any one day	of process wastewat Maximum for monthly average
Lead (b) Sizing Spent Neat There shall pollutants. (c) Sizing Spent Emul Pollutant or pollutant property mg/off-kg (lb/million	Oils - PSES be no discharge sions - PSES Maximum for any one day	of process wastewat Maximum for monthly average er sized
Lead (b) Sizing Spent Neat There shall pollutants. (c) Sizing Spent Emul Pollutant or pollutant property mg/off-kg (lb/million Copper	Oils - PSES be no discharge sions - PSES Maximum for any one day off-1bs) of powde 0.028	of process wastewat Maximum for monthly average er sized 0.015
Lead (b) Sizing Spent Neat There shall pollutants. (c) Sizing Spent Emul Pollutant or pollutant property mg/off-kg (lb/million	Oils - PSES be no discharge sions - PSES Maximum for any one day	of process wastewat Maximum for monthly average er sized

(d) Oil-Resin Impregnation Wastewater - PSES

There shall be no discharge of process wastewater

pollutants.

(e) Steam Treatment Wet Air Pollution Control Scrubber Blowdown - PSES

Pollutant	or	Maximum	for	Maximum	for
pollutant	property	any one	day	monthly	average

mg/off-kg (lb/million off-lbs) of powder metallurgy parts
steam treated

Copper 1.51 Cyanide 0.230 Lead 0.333	0.792 0.095 0.159
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(f) Tumbling, Burnishing and Cleaning Wastewater - PSES

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
mg/off-kg	(lb/million o	ff-lbs) of powder	metallurgy parts
tumbled, 1	burnished, or	cleaned	
Copper		8.36	4.40
Cyanide		1.28	0.528
Lead		1.85	0.880

(g) Sawing or Grinding Spent Neat Oils - PSES

(h) Sawing or Grinding Spent Emulsions - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/millior sawed or ground with		er metallurgy parts
Copper	0.035	0.018
Cyanide	0.005	0.002
Lead	0.008	0.004
(i) Sawing or Grindi	ng Contact Cooling	Water - PSES
Pollutant or	Maximum for	Maximum for
pollutant property		monthly average
mg/off-kg (lb/millior		
mg/off-kg (lb/millior with contact cooling Copper Cyanide	water 3.08 0.470	er sawed or ground 1.62 0.195
mg/off-kg (lb/millior with contact cooling Copper Cyanide Lead	water 3.08	er sawed or ground
mg/off-kg (lb/millior with contact cooling Copper Cyanide	water 3.08 0.470	er sawed or ground 1.62 0.195
mg/off-kg (lb/millior with contact cooling Copper Cyanide Lead	water 3.08 0.470 0.681	er sawed or ground 1.62 0.195 0.324
mg/off-kg (lb/millior with contact cooling Copper Cyanide Lead (j) Hot Pressing Cont Pollutant or	water 3.08 0.470 0.681 cact Cooling Water Maximum for	er sawed or ground 1.62 0.195 0.324 - PSES Maximum for
mg/off-kg (lb/millior with contact cooling Copper Cyanide Lead (j) Hot Pressing Cont Pollutant or	water 3.08 0.470 0.681 act Cooling Water	er sawed or ground 1.62 0.195 0.324 - PSES
mg/off-kg (lb/millior with contact cooling Copper Cyanide Lead (j) Hot Pressing Cont Pollutant or pollutant property	water 3.08 0.470 0.681 act Cooling Water Maximum for any one day	er sawed or ground 1.62 0.195 0.324 - PSES Maximum for
mg/off-kg (lb/millior with contact cooling Copper Cyanide Lead (j) Hot Pressing Cont Pollutant or pollutant property mg/off-kg (lb/millior Copper	water 3.08 0.470 0.681 act Cooling Water Maximum for any one day n off-lbs) of powder 16.7	er sawed or ground 1.62 0.195 0.324 - PSES Maximum for monthly average er cooled after pressin 8.80
mg/off-kg (lb/millior with contact cooling Copper Cyanide Lead (j) Hot Pressing Cont Pollutant or pollutant property	water 3.08 0.470 0.681 act Cooling Water Maximum for any one day n off-lbs) of powde	er sawed or ground 1.62 0.195 0.324 - PSES Maximum for monthly average er cooled after pressin

(k) Mixing Wet Air Pollution Control Scrubber Blowdown - PSES

Pollutant or	Maximum for	Maximum for
pollutant property	any one day	monthly average
mg/off-kg (lb/million	off-lbs) of powde	er mixed
Copper Cyanide Lead	15.0 2.29 3.32	7.90 0.948 1.58
(1) Degreasing Spent	Solvents - PSES	:
There shall be pollutants.	no discharge of	process wastewater
(a) Metal Powder Prod	uction Atomization	Wastewater - PSNS
Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/million	off-lbs) of powde	er wet atomized
Copper Cyanide	9.58 1.46	5.04 0.605

(b) Sizing Spent Neat Oils - PSNS

Lead

be no discharge of process There shall wastewater pollutants.

1.01

2.12

(c) Sizing Spent Emulsions - PSNS

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Pollutant or		Maximum for	Maximum for
pollutant pr	operty	any one day	monthly average
mg/off-kg (]	b/million	off-lbs) of powe	der sized
Copper		0.028	0.015
Cyanide		0.004	0.002
Lead		0.006	0.003
		nation Wastewate	
There a			rocess wastewater
There a			
There s pollutants. (e) Steam 1	shall be n	o discharge of p	
There s pollutants. (e) Steam 1	shall be n Freatment vn - PSNS	o discharge of p	rocess wastewater

mg/off-kg (lb/million off-lbs) of powder metallurgy parts
steam treated

Copper	0.151	0.079
Cyanide	0.023	0.010
Lead	0.033	0.016

(f) Tumbling, Burnishing and Cleaning Wastewater - PSNS

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Pollutant or		ximum for	Maximum for
pollutant p		y one day	monthly average
mg/off-kg ()	lb/million off-	lbs) of powder me	etallurgy parts
tumbled, bu	rnished, or cle	aned	
Copper Cyanide Lead		0.836 0.128 0.185	0.440 0.053 0.088

(g) Sawing or Grinding Spent Neat Oils - PSNS

There shall be no discharge of process wastewater pollutants.

(h) Sawing or Grinding Spent Emulsions - PSNS

Pollutant or pollutant property	Maximum for any one day	Maximum for monthly average
mg/off-kg (lb/milli sawed or ground wit	ion off-lbs) of powder ch emulsions	metallurgy parts
Copper	0.035	0.018

Copper	0.035	0.018
Cyanide	0.005	0.002
Lead	0.008	0.004

(i) Sawing or Grinding Contact Cooling Water - PSNS

Pollutant		Maximum for	Maximum for
pollutant		any one day	monthly average
	(lb/million act cooling		der sawed or ground
Copper		3.08	1.620
Cyanide		0.470	0.195
Lead		0.681	0.324

(j) Hot Pressing Contact Cooling Water - PSNS

Pollutant		Maximum for	Maximum for
pollutant	property	any one day	monthly average
mg/off-kg	(lb/million	off-lbs) of powde	er cooled after pressing
Copper		1.67	0.880
Cyanide		0.255	0.106
Lead		0.370	0.176
	-		crubber Blowdown - PSNS
Pollutant	-	llution Control So Maximum for any one day	crubber Blowdown - PSNS Maximum for monthly average
Pollutant pollutant	or property	Maximum for	Maximum for monthly average
Pollutant pollutant mg/off-kg	or property (lb/million	Maximum for any one day off-lbs) of powde	Maximum for monthly average er mixed
Pollutant pollutant	or property (lb/million	Maximum for any one day	Maximum for monthly average
Pollutant pollutant mg/off-kg	or property (lb/million	Maximum for any one day off-lbs) of powde	Maximum for monthly average er mixed

(1) Degreasing Spent Solvents - PSNS

There shall be no discharge of process wastewater pollutants.

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SECTION III

INTRODUCTION

LEGAL AUTHORITY

The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive program to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters," under Section 101(a). By July 1, 1977, existing industrial dischargers were required to achieve "effluent limitations requiring the application of the best practicable control technology currently available" (BPT), under Section 301(b)(1)(A); and by July 1, 1983, these dischargers were required to achieve "effluent limitations requiring the application of the best available technology economically achievable . . . which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants" (BAT), under Section 301(b)(2)(A). New industrial direct dischargers were required to comply with Section 306 new source performance standards (NSPS), based on best available demonstrated technology; existing and new dischargers to publicly owned treatment works (POTW) were subject to pretreatment standards under Sections 307(b) (PSES) and (C) While the requirements for (PSNS), respectively, of the Act. direct dischargers were to be incorporated into National Pollutant Discharge Elimination System (NPDES) permits issued under Section 402 of the Act, pretreatment standards were made enforceable directly against discharges to a POTW (indirect dischargers).

Although Section 402(a)(1) of the 1972 Act authorized the setting of NPDES permit requirements for direct dischargers on a case-bycase basis, Congress intended that, for the most part, control requirements would be based on regulations promulgated by the Administrator of EPA. Section 304(b) of the Act required the Administrator to promulgate regulations providing guidelines for effluent limitations setting forth the degree of effluent reduction attainable through the application of BPT and BAT. Moreover, Sections 304(c) and 306 of the Act required promulgation of regulations for new sources (NSPS); and Sections 304(f), 307(b), and 307(c) required promulgation of regulations for pretreatment standards. In addition to these regulations for designated industry categories, Section 307(a) of the Act required the Administrator to promulgate effluent standards applicable to all dischargers of toxic pollutants. Finally, Section 301(a) of the Act authorized the Administrator to prescribe any additional regulations "necessary to carry out his functions" under the Act.

EPA was unable to promulgate many of these regulations by the dates contained in the Act. In 1976, EPA was sued by several environmental groups and in settlement of this lawsuit, EPA and the plaintiffs executed a "Settlement Agreement," which was approved by the Court. This Agreement required EPA to develop a program and adhere to a schedule for promulgating 21 major industries' BAT effluent limitations guidelines, pretreatment standards, and new source performance standards for 65 "priority" pollutants and classes of pollutants. See Settlement Agreement in Natural Resources Defense Council, Inc. v. Train, 8 ERC 2120 (D.D.C. 1976), modified 12 ERC 1833 (D.D.C. 1979), and modified by October 26, 1982, August 2, 1983, and January 6, 1984.

On December 27, 1977, the President signed into law amendments to the Federal Water Pollution Control Act (P.L. 95-217). The Act, as amended, is commonly referred to as the Clean Water Act. Although this Act makes several important changes in the federal water pollution control program, its most significant feature is its incorporation of several of the basic elements of the Settlement Agreement program for toxic pollution control. Sections 301(b)(2)(A) and 301(b)(2)(C) of the Act now require the achievement, by July 1, 1984, of effluent limitations requiring application of BAT for toxic pollutants, including the 65 priority pollutants and classes of pollutants (the same priority pollutants as listed in Natural Resources Defense Council v. Train), which Congress declared toxic under Section 307(a) of the Act. Likewise, EPA's programs for new source performance standards and pretreatment standards are now aimed principally at control of these toxic pollutants. Moreover, to strengthen the toxics control program, Congress added Section 304(e) to the Act, authorizing the Administrator to prescribe "best management practices" (BMPs) to prevent the release of toxic and hazardous pollutants from plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage associated with, or ancillary to, the manufacturing or treatment process.

The 1977 Amendments added Section 301(b)(2)(E) to the Act establishing "best conventional pollutant control technology" (BCT) for discharges of conventional pollutants from existing industrial point sources. Conventional pollutants are those mentioned specifically in Section 304(a)(4) (biochemical oxygen demanding pollutants (BOD5), total suspended solids (TSS), fecal coliform, and pH), and any additional pollutants defined by the Administrator as "conventional." (To date, the Agency has added one such pollutant, oil and grease, 44 FR 44501, July 30, 1979.)

DATA COLLECTION AND UTILIZATION

EPA gathered and evaluated technical data in the course of developing these guidelines in order to perform the following tasks:

- 1. To profile the category with regard to the production, manufacturing processes, geographical distribution, potential wastewater streams, and discharge mode of nonferrous metals forming plants.
- 2. To subcategorize, if necessary, in order to permit regulation of the nonferrous metals forming category in an equitable and manageable way. This was done by

taking all of the factors mentioned above plus others into account.

- 3. To characterize wastewater, detailing water use, wastewater discharge, and the occurrence of toxic, conventional, and nonconventional pollutants, in waste streams from nonferrous metals forming processes.
- 4. To select pollutant parameters--those toxic, conventional, and nonconventional pollutants present at significant concentrations in wastewater streams--that should be considered for regulation.
- 5. To consider control and treatment technologies and select alternative methods for reducing pollutant discharges in this category.
- 6. To consider the costs of implementing the alternative control and treatment technologies.
- 7. To present possible regulatory alternatives.

Sources of Industry Data

Prior to proposal, data on the nonferrous metals forming category were gathered from previous EPA studies, literature studies, federal and state environmental agencies, raw material manufacturers and suppliers, trade association contacts, wastewater treatment equipment manufacturers, and the nonferrous metals forming companies themselves. All known nonferrous metals forming companies were sent a data collection portfolio (dcp) requesting specific information concerning each facility. Finally, a sampling program was carried out at 17 plants. The sampling program consisted of screen sampling, performed under authority provided by Section 308 of the Clean Water Act, and and analysis to determine the presence of a broad range of pollutants and quantification of the pollutants present in nonferrous metals forming wastewater. Specific details of the sampling program and information from the above data sources are presented in Section v.

large number of public comments were received on the regula-Α tion, after its proposal on March 5, 1984. Many of the comments contained additional data about the category. Also, after proposal, the Agency visited and sampled nine additional nonferrous forming plants to characterize raw wastewater and treatment effectiveness. Dcps were received from 41 additional plants that had not responded before proposal or that were identified after proposal. In addition, 29 plants which submitted dcps before proposal were recontacted to clarify information supplied in the dcps. On February 4, 1985, a notice was published in the Federal Register (50 FR 4872) announcing the availability of additional data for review and comment. After publication of the notice of availability, EPA received a number of public comments and information from two plants identified after publication of the notice. The Agency requested data to support comments on the proposed regulation and notice of availability from 10 companies. In addition, 49 plants were requested to submit analytical data on specific raw waste streams. All additional information obtained since proposal which arrived in a timely manner and all comments on the proposed regulation were considered in preparing the final regulation.

Data collection efforts prior to proposal are discussed in detail below. Following these discussions, data collection since proposal is described.

Literature Review. EPA reviewed and evaluated existing literature for background information to clarify and define various aspects of the nonferrous metals forming category and to determine general characteristics and trends in production processes and wastewater treatment technology. Review of current literature continued throughout the development of these guidelines.

Existing Data Review. Information related to nonferrous metals forming processes, wastewater, and wastewater treatment technology was compiled from a number of sources. Technical data gathered for development of guidelines for related categories, such as the aluminum forming, copper forming, metal finishing, nonferrous metals manufacturing, electroplating, and battery manufacturing categories, were reviewed and incorporated into this guideline, where applicable.

Frequent contact has been maintained with industry personnel. Contributions from these sources were particularly useful for clarifying differences in production processes.

<u>Plant</u> Survey and Evaluation. The nonferrous metals forming plants were surveyed to gather information regarding plant size, age and production, the production processes used, and the quantity, treatment, and disposal of wastewater generated at these plants.

A listing of plants believed to be in the nonferrous metals forming category was compiled from a Dun and Bradstreet computer listing, publications and telephone contacts with various trade associations believed to represent parts of the industry, the Thomas Register, and telephone contacts with commodity specialists at the Bureau of Mines. These sources resulted in the identification of approximately 1,000 plants as being possibly engaged in nonferrous metals forming activities. The SIC codes used were: (1) 3356: Rolling, Drawing, Extruding of Nonferrous Metals; (2) 3357: Drawing and Insulating Nonferrous Wire; (3) 3463: Nonferrous Forgings; and (4) 3497: Metal, Foil, and Leaf.

A comprehensive telephone survey was undertaken in order to determine which plants should comprise a final mailing list, i.e., whether or not nonferrous metals forming operations were present at each of the plants on the original list. During the telephone survey, questions were asked concerning what metals are formed at a particular plant, the type of forming operations utilized on the metal, i.e., rolling, drawing, extruding, forging, casting, cladding, or powder metallurgy and their associated water usage, discharge, and treatment-in-place. Respondents also were asked what surface treatment, cleaning, washing, and rinsing operations are utilized and their associated water usage, discharge, and treatment-in-place. At the conclusion of the telephone survey, many of the plants on the original list were determined not to be within the scope of the nonferrous metals forming category.

A list of those plants believed to be a part of the category was then compiled in preparation for dcp distribution. The results of the telephone survey are documented in the administrative record for this rulemaking.

The Agency mailed 377 data collection portfolios to companies believed to be in the nonferrous metals forming category. These 377 dcps were sent out under the authority of Section 308 of the Clean Water Act to companies on the mailing list. The dcps were sent to the corporate office of each company and addressed to the highest ranking corporate official which could be identified. The dcp instructions clearly stated that the portfolio was to be completed for each facility operated by that company which had operations which are defined in the instructions to be nonferrous metals forming.

Approximately 95 percent of the companies responded to the survey. In many cases, companies contacted did not conduct operations covered by the nonferrous metals forming category as it is defined by the Agency. Where firms had nonferrous metals forming operations at more than one location, a dcp was returned for each plant. A total of 294 dcps applicable to the nonferrous metals forming category were returned. In cases where the dcp responses were incomplete or unclear, additional information was requested by telephone or letter.

The dcp responses were interpreted individually, and the following data were recorded for future reference and evaluation:

- Company name, plant address, and name of the contact listed in the dcp.
- Metal types formed at the plant.
- Plant discharge status as direct (to surface water), indirect (to POTW), or zero discharge by metal type.
- Production process streams present at the plant, as well as associated flow rates; production rates; operating hours; wastewater treatment, reuse, or disposal methods; and the quantity and nature of process chemicals used.

- Plant age and number of employees.

Availability of pollutant monitoring data provided by the plant.

The summary listing of this information provided a consistent, systematic method of evaluating and summarizing the dcp responses. In addition, procedures were developed to simplify subsequent analyses. The procedures developed had the following capabilities:

- Selection and listing of plants containing specific production process streams or treatment technologies.
- Summation of the number of plants containing specific process streams and treatment combinations.
- Calculation of the percent recycle present for specific streams and summation of the number of plants recycling this stream within various percent recycle ranges.
- Calculation of annual production values associated with each process stream and summation of the number of plants with these process streams having production values within various ranges.
- Calculation of water use and blowdown from individual process streams.

The calculated information and summaries were important and frequently used in the development of this guideline. Summaries were used in the category profile, evaluation of subcategorization, and analysis of in-place treatment and control technologies. Calculated information was used in the determination of water use and discharge values for the conversion of pollutant concentrations to mass loadings.

After proposal, additional data were provided in dcps received from 41 plants that had not responded before proposal or that were identified after proposal. Twenty-nine plants which submitted dcps before proposal were recontacted to clarify information supplied in the dcps. Two plants were identified after publication of the notice of availability. Process and wastewater treatment data for these two plants were obtained by telephone conversations and follow-up letters.

Discharge Monitoring Reports. To supplement existing data regarding treatment-in-place and the long-term performance of that treatment, the Agency collected discharge monitoring report (DMR) data from state and EPA Regional offices for direct dischargers. DMR data are self-monitoring data supplied by permit holders to meet state or EPA permit requirements. These data were available from 17 nonferrous metals forming plants; however, the data vary widely in character and nature due to the dissimilar nature of the monitoring and reporting requirements placed on nonferrous metals forming plants by the NPDES permit issuing authority. DMR data from plants with lime and settle treatment were used as a check on the achievability of the treatment effectiveness values used to establish the limitations and standards.

Engineering Site Visits and Sampling Trips. In addition to the above data sources, prior to proposal, EPA sampled 17 nonferrous metals forming plants. After proposal EPA visited and sampled nine nonferrous forming plants. Plant visits were made to sample and untreated wastewater and to gather additional treated information on manufacturing processes, wastewater flows, and wastewater treatment technologies and associated costs. Samples were collected at these 17 plants in order to characterize the wastewaters from the various nonferrous metals forming manufacturing operations and to characterize the performance of existing The 17 plants selected for sampling practice treatment systems. combination of hot rolling, cold rolling, drawing, some extrusion, forging, tube reducing, cladding, metal powder production and powder metallurgy, as well as the associated heat treatment, operations of casting, surface treatment, alkaline cleaning, sawing, grinding, tumbling, burnishing, and product testing. These plants were chosen for sampling because the flow rates and pollutant concentrations in the wastewaters discharged from their manufacturing operations are representative of the flow rates and pollutant concentrations of wastewaters generated by similar operations at other plants in the nonferrous metals forming industry.

In addition, EPA requested that 49 plants submit analytical data on specific raw waste streams. Twenty-four plants provided these data and 19 plants provided samples which were subsequently analyzed by EPA's contract laboratory. Three plants responded that they were no longer forming the metal for which information was requested, or their production schedule did not include this metal within the timeframe of the request. Three plants reported they did not actually generate the waste stream for that which the Agency received information was requested. In all, analytical data for 51 waste streams for which wastewater characteristic data were not previously available.

Utilization of Industry Data

Data from the previously listed sources were used to develop BPT and BAT limitations and NSPS and pretreatment standards as described in this document. Subcategorization of the nonferrous metals forming category, described in Section IV, was based on information obtained from previous EPA studies, the technical literature and our own sampling data. Sampling results were used to determine raw wastewater characteristics, presented in Section and to select pollutant parameters for control, as described V, in Section VI. After determining the pollutants requiring control and the concentrations at which they are commonly found, applicable treatment technologies were identified. The applicability of wastewater treatment technologies currently in use at nonferrous metals forming plants (reported in dcps and observed at sampled plants) was especially considered. These technologies are described in Section VII. Section VIII describes the method

used to estimate the cost of various treatment technology options. The cost estimates were based on data from the technical literature and from equipment manufacturers. Finally, data from dcps and sampling, along with estimated treatment system performance, were used to develop the limitations and standards described in Sections IX, X, XI, XII, and XIII of this document. The data were used first to select treatment technologies applicable to the category and then to calculate achievable effluent pollutant concentrations for each subcategory.

DESCRIPTION OF THE NONFERROUS METALS FORMING CATEGORY

The nonferrous metals forming category is generally included within SIC 3356, 3357, 3463, and 3497 of the Standard Industrial Classification Manual, prepared in 1972 by the Office of Management and Budget, Executive Office of the President. These SIC (1) 3356: Rolling, Drawing, Extruding of Nonferrous codes are: Metals; (2) 3357: Drawing and Insulating Nonferrous Wire; (3) 3463: Nonferrous Forgings; and (4) 3497: Metal, Foil, and Leaf. The category includes establishments engaged in the forming of nonferrous metals and their alloys, except for copper and aluminum for which separate regulations have been promulgated [40 CFR Part 468 (48 FR 36942, August 15, 1983), 40 CFR Part 467 (48 FR 49126, October 24, 1983)] and beryllium. Beryllium alloy forming was included in the nonferrous metals forming category when the regulation was proposed, but was not included in the final regulation.

Casting of nonferrous metals is included in this category when it is performed as an integral part of the nonferrous metals forming process. Casting of parts is included in the metal molding and casting category [40 CFR Part 464 (proposed at 47 FR 51512 on November 15, 1982)]. Casting which is an integral part of a nonferrous metals smelting and refining operation is included in the nonferrous metals manufacturing category [40 CFR Part 421 (nonferrous metals manufacturing phase I, promulgated at 49 FR 8742 on March 8, 1984; nonferrous metals manufacturing phase II, proposed at 49 FR 26352 on June 27, 1984)].

For the purpose of this regulation, nonferrous metal has been defined as any pure metal other than iron, copper, or aluminum; or metal alloy for which a metal other than iron, copper, or aluminum is its major constituent by weight. Alloys are considered as only one metal type. The metal type of any particular alloy is defined to be the metal that is the major component in percent by weight. Thus, an alloy which is 53 percent lead and 47 percent zinc is considered as lead, and an alloy which is 40 percent nickel, 35 percent zinc, and 25 percent tin is consid-Forming of an alloy which is greater than ered as nickel. 50 percent iron, copper, or aluminum is not included in the category. The above definition is applicable for all metals except beryllium and precious metals alloys. Beryllium alloys are defined as any nonferrous metal alloy in which beryllium is present at 0.1 or greater percent by weight.

Alloys are considered precious metal alloys when the precious metal is present at 30 or greater percent by weight. Any alloy of a precious metal and another nonferrous metal, where the precious metal is present at 30 or greater percent by weight, is included in the precious metals subcategory.

Use of the term "metal" throughout this document is not meant to imply pure metals only. "Metal" means any substance having metallic properties, including alloys composed of two or more chemical elements, of which at least one is an elemental metal. Thus "copper" means copper and its alloys (brass, bronze, nickel silver, beryllium copper, etc.); "iron" means iron and its alloys (including steel, an alloy of iron and carbon), and so forth.

Forming is the deformation of a metal into specific shapes by hot or cold working. The major forming operations include rolling (both hot and cold), extruding, forging, and drawing. Minor forming operations included in the category are cladding, tube swaging, and metal powder production. reducing, Ancillary operations performed as an integral part of the forming process are also included in the category. These operations include casting for subsequent forming, heat treatment, surface treatment, surface coating, alkaline cleaning, solvent degreasing, product testing, and wet air pollution controls on forming operations and the associated operations. Iron, copper, and aluminum powder manufacturing and forming of parts from metal powders as well as any associated ancillary operations (listed above), are covered under the nonferrous metals forming category, although the other forming operations for these metals are covered under separate regulations (Iron and Steel, 40 CFR Part-420; Copper Forming, 40 CFR Part 468; 1983; and Aluminum Forming, 40 CFR Part 467). Metal powder production processes included in this category include metal powder production such as milling, abrading or atomizing. This category does not include the of metal powders by chemical means production such as precipitation. The production of metal powders by chemical means may be regulated under the inorganic chemicals manufacturing regulation, 40 CFR Part 415. The production of metal powder as final step in refining metal is regulated under the the nonferrous metals manufacturing regulation, 40 CFR Part 421.

Casting of nonferrous metals is considered a nonferrous metals forming operation when performed as an integral part of the nonferrous metals forming process and located at the same plant site at which nonferrous metals are formed. This includes shotcasting and casting of billets, ingots, bars, and strip which are subsequently formed on-site. Casting of lead which is subsequently rolled and fabricated into battery cases is regulated under this category and under battery manufacturing 40 CFR Part 461. However, the limitations for this casting operation are the same in each category.

Surface treatment of nonferrous metal includes any chemical or electrochemical treatment applied to the surface of the metal. Surface treatment of nonferrous metals is considered to be an integral part of nonferrous metals forming whenever it is performed at the same plant site at which nonferrous metals are formed. Wastewater discharges covered by the nonferrous metals forming point source category, as delineated above, are not subject to regulation under 40 CFR Part 413 (electroplating) or 40 CFR Part 433 (metal finishing).

Historical

The nonferrous metals forming category covers forming operations performed on 30 metals. Nine of these metals have been excluded from this regulation. These metal types are listed in Table III-1. They are excluded from regulation because, according to information reported in dcps, they are not formed on a production scale in the United States or because the forming operations performed on them do not discharge wastewater. As previously discussed, the forming of beryllium alloys will be covered under another regulation. The 21 nonferrous metal types that are covered under this regulation are listed in Table III-2.

Employment data are given in the dcp responses for 280 plants (84 percent of the plants known to be engaged in nonferrous metals forming). These plants report a total of 39,000 workers in nonferrous metals forming. At an average plant 117 employees are engaged in nonferrous metals forming. The employment distribution of nonferrous metals forming workers at 280 plants is: 31 percent employ fewer than 25 people in nonferrous metals forming operations; 71 percent employ fewer than 100 people in this capacity; and 96 percent employ fewer than 500 people.

Nonferrous metals forming plants are not limited to any one geographical location. As shown in Figure III-1, plants are found throughout most of the United States, but the majority are located east of the Mississippi River. Population density is not a limiting factor in plant location. Nonferrous metals forming plants tend to be more common in urban areas, but they are frequently found in rural areas as well.

The majority of the nonferrous metals forming plants (72 percent) that reported the age of their facility indicated they were built since 1954. Table III-3 shows the age distribution of nonferrous metals forming plants according to their classification as direct, indirect, and zero discharge type.

Product Description

Nonferrous metals are formed by a variety of operations, described in the second half of this section. The product of one operation is often the starting material for a subsequent operation, as shown in Figure III-2. Cast ingots and billets are the starting point for making sheet and plate, extrusions, and forgings, as well as rod, for use in drawing operations. Rolled sheet and plate can be used as stock for stampings, can blanks, and roll formed products; as finished products in building, and aircraft construction; or as foil. Extrusions can be used as raw stock for forging and drawing; or can be sold as final products, such as beams or extruded tubing. Forgings are either sold as consumer products or used as parts in the production of machinery, aircraft, and engines.

Products manufactured by nonferrous metals forming operations generally serve as stock for subsequent fabricating operations. Because the 21 metals included in this category have a wide range of physical, chemical, and electrochemical properties, they are used in a wide range of fabricated products. The forming and associated operations in common use for a particular metal depend on what is possible, given the physical properties of the metal, and what is required for a specific application. For example:

- Bismuth has a low melting point and thus is rolled into strip for use in fuses. When alloyed with lead, tin, or cadmium, it is also extruded and drawn into solder wire.
- Cobalt is often alloyed with nickel, and is formed by the same method used to form steels. It is used for applications requiring strength and corrosion resistance at high temperatures, such as turbine blades.
- Hafnium is formed into control rods for nuclear reactors because of its special properties.
- Lead is extruded and swaged into bullets because it is dense and inexpensive. When alloyed with tin, bismuth, and cadmium, it is extruded into solder, an application which makes use of its low melting point. Lead is formed into cases for automobile batteries because of its electrochemical properties and because it is inexpensive.
- Magnesium is extruded into cases for batteries used in portable communications equipment. The application takes advantage of the metal's electrochemical properties and light weight.
- Nickel is often alloyed with chrome and iron to make stainless steel alloys, many greater than 50 percent nickel. It is formed by all major forming operations and is used in applications requiring high strength and corrosion resistance at high temperatures, such as tubing for steam and gas turbines and in jet engines.
- Precious metals (silver, gold, platinum, and palladium) are corrosion-resistant and good electrical conductors. Because of their expense, they are often used as a thin layer clad to a layer of base metal (usually copper or nickel) which is rolled into strip and stamped into electrical contacts. Pure and clad precious metals are also drawn to wire used to fabricate jewelry. The corrosion resistance of precious metals makes them useful in dentistry.

- Refractory metals (columbium, molybdenum, rhenium, tantalum, tungsten, and vanadium) must be formed at high temperatures (relative to other metals) or as powders because they have melting points above 1,960C. Their unique properties make them useful for specialized applications. Columbium is used as a structural material in nuclear reactors. Molybdenum is drawn into semiconductor wires. Although rhenium can be cold worked there are no common uses and very little production of formed rhenium. Tantalum is used in very small capacitors and heat transfer and furnace equipment. Tungsten finds wide application as filaments for electric light bulbs. As tungsten carbide it is used in cutting tools and abrasives because of its extreme hardness.
- Tin is used in solder, usually alloyed with lead.
- Titanium, used in aerospace applications because of its high strength and light weight, is formed by all major forming techniques. It is also used for corrosionresistant hardware and surgical implants.
- Uranium, when composed of 0.2 to 0.3 percent 235U (the fissionable isotope), remainder 238U, is called depleted uranium. This material is extruded into armor piercing projectiles because it is extremely dense.
- Zinc is light-weight and corrosion-resistant. It is rolled into sheet for architectural uses and stamped into penny blanks. Its chemical properties make it useful for battery cases and lithographic plates.
- Zirconium is used to clad nuclear fuel rods in water cooled reactors and as a construction material in chemical plants because of its high melting point and corrosion resistance. It is extruded into tubes and rolled into plate and sheet.

Some forming operations are more commonly used on some metals than others. For instance, 72 percent of plants which form lead, tin, or bismuth extrude these metals, but only 8.3 percent of lead forming plants forge (swage) the metal. Casting is not common at refractory metals plants (26 percent of the plants) but powder metallurgy is (79 percent of the plants). Precious metals are commonly rolled (67 percent) and drawn (53 percent), but less commonly extruded (16 percent).

Production of formed nonferrous metal products is tabulated in Table III-4. Production varies widely, from as little as two and a half million pounds of cobalt to 391 million pounds of lead products formed in 1981. Approximately 234 million pounds of iron, steel, copper, and aluminum powders and parts made from powder were produced in 1981. Reported production of formed nonferrous metals at individual plant sites ranged from 12 kg (27 pounds) to almost 23 million kg (51 million pounds) during 1981.

Wastewater Generation and Treatment

One hundred seventy-six plants indicated that no wastewater from nonferrous metals forming operations is discharged to either surface waters or a POTW. Of the remaining 158 plants, 37 discharge an effluent from nonferrous metals forming directly to waters, while 121 discharge indirectly, surface sending nonferrous metals forming effluent through a POTW. The volume of nonferrous metals forming wastewater discharged by plants in this category ranges from 0 to 893 million liters per year (0 to 236 million gallons per year). The mean volume is approximately 28.1 million liters per year (7.42 million gallons per year) for those plants having discharges. Only 102 of the discharging plants provided enough information to calculate the volume of wastewater discharged. Of these 102 plants, 18 percent discharge less than 38,000 liters per year (10,000 gallons per year); 36 percent discharge less than 380,000 liters per year (100,000 gallons per year); 70 percent discharge less than 3,800,000 liters per year (1,000,000 gallons per year); and 90 percent discharge less than 38,000,000 liters per year (10,00,000 gallons per year). There is no correlation between overall water use and total nonferrous metals production for a plant as a whole. However, correlations can be developed between water use or wastewater discharge and production on a process basis, as discussed in Section V.

Approximately 44 percent of the plants reported some form of treatment of wastewater from nonferrous metals forming processes. The most common forms of wastewater treatment are pH adjustment, clarification, and gravity oil separation (skimming). Recirculation, including in-line filtration and cooling towers, is frequently used to control the volume of wastewater generated. Other flow reduction techniques demonstrated include countercurrent cascade and spray rinsing. Oily wastes are separated into oil and water fractions by emulsion breaking using heat or chemicals. Gravity separation is frequently used to separate neat oil and broken emulsions from the water fraction. The oil portion is usually removed by a contractor, although some plants dispose of it by land application or incineration. Wastewater treatment sludges generally are not thickened, but are disposed of without treatment; however, vacuum and pressure filters, centrifuges, and drying beds are occasionally used. Sludge disposal methods include landfill and contractor removal. Disposal of wastewater is being accomplished by discharge to surface waters or a POTW, by contractor removal, or by land application (lagoons and septic tanks).

DESCRIPTION OF NONFERROUS METALS FORMING PROCESSES

In the remainder of this section, nonferrous metal forming operations and operations associated with nonferrous metal forming are described in detail. In these descriptions, particular emphasis is placed on the use of water and generation of wastewater. The major nonferrous metals forming operations covered under this quideline include:

- 1. Rolling, drawing, extruding and forging of nonferrous metals other than copper, aluminum, and beryllium;
- Cladding of any metals other than iron, copper, aluminum, and beryllium to any base metal (including iron, steel, copper, aluminum, and beryllium);
- Production of powders of all metals except beryllium (including iron, copper, and aluminum) by mechanical methods or atomization; and
- 4. Manufacture of parts from powders of all metals except beryllium (including iron, copper, and aluminum).

Nonferrous metal forming operations which are associated with the above operations are also included in this category. These include:

- 1. Casting of nonferrous metals for subsequent forming;
- 2. Heat treatment;
- 3. Chemical surface treatments (acid, caustic, chromate, molten salt, electrocoating);
- 4. Chemical cleaning (alkaline);
- 5. Degreasing;
- 6. Mechanical surface treatments (machining, grinding, polishing, tumbling, burnishing);
- 7. Sawing;
- 8. Product testing; and
- 9. Other operations generating wastewater.

Water is used in forming of nonferrous metals to achieve desired metal characteristics such as tensile strength, malleability, hardness, and specific surface characteristics. Water can be used without additives, as in contact cooling and rinsing; in combination with soaps and oils, as in lubricating various operations; and in combination with other chemicals, as in surface treatment and cleaning operations. Water is used in vapor form to steam clean and surface treat some metals and as a high pressure jet in the production of metal powders by atomization. In addition to its use in applications which directly affect metal properties, water is used in cleaning nonferrous metal forming plants and equipment and in devices used to control air pollution generated during forming. A tally of wastewater sources in the nonferrous metals forming industry is presented in Section V. Regulatory flow allowances for waste streams under BPT, BAT,

NSPS, and pretreatment standards are presented and discussed in Sections IX, X, XI, XII, and XIII, respectively.

EPA recognizes that plants sometimes combine wastewater from nonferrous metals forming and other processes and nonprocess wastewater prior to treatment and discharge. Pollutant discharge allowances will be established by this guideline only for nonferrous metals forming process wastewater. The flows and wastewater characteristics for other waste streams are a function of the plant operations, layout, and water handling practices. As a result, the pollutant discharge effluent limitation for wastewater streams other than nonferrous metals forming process water will be prepared by the permitting authority on a case-by-case basis, applying other effluent limitations and guidelines, if appropriate. These wastewaters are not further discussed in this document.

Nonferrous Metals Forming Operations

<u>Rolling</u>. Rolling is the process of reducing the cross-sectional area of metal stock, or otherwise shaping metal products, through the application of pressure by rotating rolls. Cylindrical rolls are used to produce flat shapes; grooved rolls produce rounds, squares, and structural shapes. Two common roll configurations are shown in Figure III-3. Because multiple passes through the rolls are often required to reduce the metal to the desired thickness, mills are frequently designed to allow rolling in the reverse direction.

Rolling employs either hot- or cold-working techniques depending on the kind of metal or alloy, and the properties desired in the Hot rolling is defined as rolling above the final product. recrystallization temperature of the metal and is typically the first step in a series of operations to produce a rolled product. Cast ingots or billets are usually reduced by hot rolling to elongated forms, known as blooms or slabs. The rolling mills used for this operation are generally referred to as "breakdown mills" or "roughing mills." Additional hot or cold rolling can then follow the "breakdown" process. A diagram of a reversing hot strip mill which would be used subsequent to a "breakdown" operation is presented in Figure III-4.

Cold rolling is defined as rolling below the recrystallization temperature of the metal and may be carried out at temperatures much higher than ambient and still be considered "cold" rolling. A diagram of a typical 4-high cold rolling mill is presented in Figure III-5.

The rolling process is used to produce any one of a number of intermediate or final products from cast metal. Rolling is used to make flat products such as plate, sheet, strip, and foil. Plate is defined as being greater than or equal to 6.3 mm (0.25 inch) thick, and is usually produced from ingots by hot rolling. Cold rolled flat products are generally classified as sheet [from

6.3 to 0.15 mm (0.249 to 0.007 inch) thick] and foil [below 0.15 mm (0.006 inch) thick].

Rod, bar, and wire may be produced by either hot or cold rolling using grooved rolls. Rod is defined as having a solid round cross section 0.95 cm (3/8 inch) or more in diameter. Bar is also identified by a cross section with 0.95 cm (3/8 inch) or more between two parallel sides, but it is not round. Wire is characterized by a diameter of less than 0.95 cm (3/8 inch).

A specialized cold rolling operation, called tube reducing, is used to reduce the diameter and wall thickness of tubing. A mandrel is inserted in the tubing which is then rolled between a pair of rolls with tapered grooves. This process is used on nickel, silver, gold, zirconium, and titanium tubing.

As will be discussed later in this section, heat treatment is usually required before and between stages of the rolling process. Ingots are usually made homogeneous in grain structure prior to hot rolling in order to remove the effects of casting on the metal's mechanical properties. Annealing is typically required between passes or after cold rolling to keep the metal ductile and remove the effects of work hardening. The kind and degree of heat treatment applied depends on the metal and alloy involved, the nature of the rolling operation, and the properties desired in the product.

It is necessary to use a cooling and lubricating compound during rolling to prevent excessive wear on the rolls, to prevent adhesion of metal to the rolls, and to maintain a suitable and uniform rolling temperature. Water and oil-in-water emulsions, stabilized with emulsifying agents such as soaps and other polar organic materials, are used for this purpose in hot rolling operations. Emulsion concentrations usually vary between 5 and 10 percent oil. Evaporation of the lubricant as it is sprayed on the hot metal serves to cool the rolling process. Mist eliminators may be used to recover rolling emulsions that are dispersed to the atmosphere. The emulsions are typically filtered to remove metal fines and other contaminants and recirculated through the mills

Water without additives is also used as a coolant and lubricant in hot rolling operations. The water is typically not recycled, but used once and discharged. Oil-in-water emulsions, described above, and mineral oil or kerosene-based lubricants are used in cold rolling operations. Emulsions are used to roll lead, nickel, magnesium, precious metals, refractory metals, and zinc. Neat oils are used to roll nickel, zinc, and refractory metals. Kerosene-based lubricants are used to roll precious metals. Graphite based lubricants are sometimes used to roll refractory Often a light (low viscosity) oil or emulsion is used to metals. lubricate the outside of a tube during tube reducing, while the inside is lubricated with a heavier (higher viscosity) oil or grease. 'These lubricants eventually become rancid or degraded and are eliminated by continuous bleed or periodic discharge.

Generally, spent neat oils and tube reducing lubricants are contract hauled to treatment and disposal off-site.

The steel rolls used in hot and cold rolling operations may require periodic machining to remove metal buildup and to grind away any cracks or imperfections that appear on the surface of the rolls. The survey of the industry indicated that roll grinding with an oil-in-water emulsion is common practice. This emulsion is usually recycled and periodically discharged after treatment with other emulsified waste streams at the plant.

Of the surveyed plants, 112 have rolling operations. Wastewater is discharged from lead, nickel-cobalt, zinc, precious metals, titanium, and refractory metals rolling operations.

Drawing. Drawing is pulling of metal through a die or succession of dies to reduce its diameter, alter the cross-sectional shape, or increase its hardness. This process is used to manufacture tube, rod, bar, and wire. In the drawing of tubing, one end of an extruded tube is swaged to form a solid point and then passed through the die. A clamp, known as a bogie, grips the swaged end of tubing, as shown in Figure III-6. A mandrel is then inserted into the die orifice, and the tubing is pulled between the mandrel and die, reducing the outside diameter and the wall thickness of the tubing. Wire, rod, and bar drawing is accomplished in a similar manner, but the metal is drawn through a simple die orifice without using a mandrel. A diagram of a typical hydraulic draw bench is presented in Figure III-7.

Drawing may be carried out hot or cold. In order to ensure uniform drawing temperatures and avoid excessive wear on the dies and mandrels used, it is essential that a suitable lubricant be applied during drawing. A wide variety of lubricants are used for this purpose. Heavier draws, which have a higher reduction in diameter, may require oil-based lubricants, but oil-in-water emulsions are used for many applications. Graphite, ground glass, soap powders, and soap solutions may also be used for some of the lighter draws. Drawing oils are usually recycled until their lubricating properties are exhausted.

Intermediate annealing is frequently required between draws in order to restore the ductility lost by cold working of the drawn product. Degreasing of the metal may be required to prevent burning of heavy lubricating oils in the annealing furnaces.

Of the surveyed plants, 94 have drawing operations. Spent lubricants are discharged from lead, nickel, zinc, and precious metals drawing operations.

Extrusion. In the extrusion process, high pressures are applied to a cast metal billet, forcing the metal to flow through a die orifice. The resulting product is an elongated shape or tube of uniform cross-sectional area. If a piercing mandrel is used, or if the center of the billet or round has been removed by boring or trepanning, the extruded product is a tube. There are two basic methods of extrusion practiced in the nonferrous metals forming category:

- Direct extrusion, and
- Indirect extrusion.

The direct extrusion process is shown schematically in Figure A heated cylindrical billet is placed into the ingot III-8. chamber, and the dummy block and ram are placed into position Pressure is exerted on the ram by hydraulic or behind it. mechanical means, forcing the metal to flow through the die open-The extrusion is sawed off next to the die, and the dummy ing. block and ingot butt are released. Hollow shapes are produced with the use of a mandrel positioned in the die opening so that the metal is forced to flow around it. A less common technique, indirect extrusion, is similar, except that in this method, the die is forced against the billet extruding the metal in the opposite direction through the ram stem. A dummy block is not used indirect extrusion. Diagrams of extrusion tooling equipment in and a typical extrusion press are presented in Figures III-9 and III-10, respectively.

Although some metals, such as lead, can be extruded cold, most metals are heated first to reduce adhesion of the die to the extrusion and the resulting cracks and flakes in the extruded Extrusion at elevated temperatures also product (galling). reduces the amount of work hardening that will be imposed on the Heat treatment is frequently used after extrusion to product. attain the desired mechanical properties and will be described, detail, later in this section. At some plants, contact in cooling of the extrusion, sometimes called press heat treatment, is practiced as the extrusion leaves the press. This can be done with a water spray near the die, by in one of three ways: immersion in a water tank adjacent to the runout table, or by passing the metal through a water wall. Contact cooling water may also be used to cool extrusion dummy blocks, though no plants in this category specifically reported its use. Following an extrusion, the dummy block drops from the press and is cooled before being used again. Air cooling is most commonly used for this purpose, but water may be used to quench the dummy blocks.

The extrusion process requires the use of a lubricant to prevent adhesion of the metal to the die and ingot container walls. In extrusion, limited amounts of lubricant are applied to the hot ram and die orifice or to the billet ends. For cold extrusion, the the container walls, billet surfaces, and die orifice must lubricated with a thin film of viscous or solid lubricant. be Many lubricants are used in extruding the metals in this category. Neat oils are used to lubricate nickel and uranium emulsified oils for zirconium and titanium extrusion. extrusion, Molten glass is also used as a lubricant in nickel extrusion; it acts as a heat insulator as well as a lubricant. Graphite and molybdenum disulfide in an oil or water base are other commonly used lubricants. Some metals (zirconium, titanium, nickel) may be encased in a copper or steel can before extrusion. The can prevents galling of the core metal and is reduced to a very thin shell as a result of the extrusion. The thin shell is then removed from the core metal by acid pickling or machining.

Extrusion presses that are used to extrude hard alloys such as aircraft alloys operate under extremely high pressures. These presses frequently use an oil-water emulsion as the hydraulic fluid instead of neat oil which is used as the hydraulic fluid in other presses to reduce the risk of fires. Due to the nature of this hydraulic fluid and the extremely high pressures, these extrusion presses frequently develop hydraulic fluid leaks. Extrusion press hydraulic fluid leakage was reported at plants forming lead, nickel, refractory metals, titanium, and zirconium.

The steel dies used in the extrusion process require frequent dressing and repairing to ensure the necessary dimensional precision and surface quality of the product. The metal that has adhered to the die orifice is typically removed by grinding or polishing, which is a dry process.

Of the surveyed plants, 75 have extrusion operations. Wastewater is discharged from lead, nickel, precious metals, titanium, refractory metals, zirconium, and uranium extrusion operations.

Forging. Forging is deforming metal, usually hot, with compressive force into desired shapes, with or without dies. The actual forging process is a dry operation. Five types of forging are commonly practiced in the nonferrous metals forming category:

- Closed die forging,
- Open die forging,
- Rolled ring forging,
- Impacting, and
- Swaging.

In each of these techniques, pressure is exerted on dies or rolls, forcing the heated stock to take the desired shape. The first three processes are types of hot working; the other two are cold working.

Closed die forging (Figure III-11a), the most prevalent method, is accomplished by hammering or squeezing the metal between two steel dies, one fixed to the hammer or press ram and the other to the anvil. Forging hammers, mechanical presses, and hydraulic presses can be used for the closed die forging of nonferrous metals. The heated stock is placed in the lower die and, by one or more blows of the ram, forced to take the shape of the die set. In closed die forging, the metal is shaped entirely within the cavity created by these two dies. The die set comes together to completely enclose the forging, giving lateral restraint to the flow of the metal.

The process of open die forging (Figure III-11b) is similar to that described above, but in this method, the shape of the forg-

ing is determined by manually turning the stock and regulating the blows of the hammer or strokes of the press. Open die forging requires a great deal of skill and only simple, roughly shaped forgings can be produced. It is primarily used as a breakdown process to improve the workability of cast billets and to form them into rounds, octagons, and other shapes. Occasionally the process is used in development work in which items are produced in small quantities making the cost of closed-type dies prohibitive.

The process of rolled ring forging is used in the manufacture of seamless rings. In one type of ring rolling, a hollow cylindrical billet is rotated between a mandrel and pressure roll to reduce its thickness and increase its diameter (Figure III-12a). In another type of ring rolling, a hollow preform is mounted on a saddle-mandrel and reduced in wall thickness by the repeated blows of a hammer (Figure III-12b).

Impacting, depicted in Figure III-13, is a combination of cold forging and cold extrusion. The process is performed by placing a cut-off piece of metal in a bottom die. A top die consisting of a round or rectangular punch is fastened to the press ram and is driven into the metal slug. This causes the metal to be driven up around the top punch. Usually, the metal adheres to the punch and must be stripped off as the press ram rises.

Swaging, the process of forming a taper or a reduction on metal products such as rod and tubing, is another type of forging. When swaging is the initial step in drawing tube or wire, a solid point is formed by repeated blows of one or more pairs of opposing dies (this process is also called pointing). Swaging can also be used to reduce the diameter of tube or wire without a subsequent drawing operation, especially when the metal being worked is brittle (e.g., tungsten). The process of making tapered bullets from lead wire is also called swaging.

Proper lubrication of the dies is essential in forging nonferrous metals. Colloidal graphite in either a water or an oil medium is usually sprayed onto the dies for this purpose in the hot working types of forging. For shallow impressions, a single spray is usually adequate. Dies may be sprayed manually or with automatic sprays timed with the press stroke. Deeper cavities may require a second manual spray or swabbing to ensure that all die surfaces are covered.

Forging presses that are operated under extremely high pressures develop hydraulic fluid leaks. Forging press hydraulic fluid leakage was reported at plants forming nickel and titanium.

Particulates and smoke may be generated from the partial combustion of oil-based lubricants as they contact the hot forging dies. In those cases, air pollution controls may be required. Baghouses, wet scrubbers, and commercially available dry scrubbers are in use at nonferrous metals forming facilities. Oil-in-water emulsions and neat oils are used as lubricants in swaging processes. The lubricants are usually filtered to remove metal fines and other contaminants and recirculated. As the lubricants become rancid or degraded they are discarded, either through continuous bleed or periodic batch discharge.

In addition to use in lubricants and air pollution control, water is used to cool forging dies, clean equipment, and in heat treatment. Quenching is employed to attain desired metallurgical properties, usually by plunging hot pieces in a water bath immediately after forging. Titanium, refractory metals, zirconium, magnesium, and uranium forgings are sometimes treated this way.

Of the surveyed plants, 72 have forging operations. Wastewater is discharged from lead, nickel, titanium, refractory metals, zirconium, magnesium, and uranium forging operations.

<u>Cladding</u>. A clad metal is a composite metal containing two or more layers that have been bonded together. Some typical clad configurations are shown in Figure III-14. The bonding may have been accomplished by roll bonding (co-rolling), solder application (brazing), or explosion bonding.

In the roll bonding process, a permanent bond between two metals is obtained by rolling under high pressure in a bonding mill. The high pressure increases the temperature of the metals, promoting codiffusion so that a metallurgical bond forms at the interface. In some cases a sintering step is required to increase bond strength. Clad metals consisting of a base metal with an overlay or inlay of precious metal are produced for the electrical and electronics industry and for jewelry applications (e.g., gold filled wire). To produce an inlay, a ditch is skived in the base metal, filled with a strip of precious metal and rolled to form a bond.

The solder application or brazing process is also used to make clad metals. The term soldering is used where the temperature range falls below 425C (800F). The term brazing is used where the temperature exceeds 425C (800F). In this process, a thin layer (film or foil) of a low melting point metal is placed between two layers of metal to be bonded. The three-layer assembly is then placed into a furnace at the melting temperature of the filler metal. Bonding results from the intimate contact produced by the dissolution of a small amount of the base metal and the top metal in the molten filler metal, without direct fusion of the two metal layers. Upon cooling, the clad material can be formed by any of the forming operations previously described.

A third method of producing clad metals, pressure bonding, is a combination of roll bonding and solder bonding. A three-layer assembly of solder and the metals to be bonded is placed into a furnace, just as in solder bonding. However, the heating is accompanied by the application of pressure, as in roll bonding. The bonded metal may be cooled by a water spray after it is removed from the bonding furnace.

In explosion bonding, the metallurgical joining of two or more metals is accomplished by the force of a carefully detonated explosion. The explosion moves progressively across the surface of the cladder metal, accelerating it across a "standoff distance" and against the backer metal. The force of the explosion shears away the oxide- and nitride-containing surface layers of both metals and causes them to behave as a fluid. The sheared away layers are jetted out ahead of the point where the two As the collision point advances, the jetting metals collide. action produces metallurgically clean surfaces which, under extreme pressure, allow normal interatomic and intermolecular forces to create an electron-sharing bond. The result is a cold weld, with a characteristic wave pattern at the weld interface caused by the turbulent plastic metal flow after collision.

Explosion bonding is used to produce clad plate, sheet, and tubes, and to form structural transition joints. Clad plate can be used in the gauge at which it is formed or it can be rolled down to final gauge.

Except for pressure bonding which uses some contact cooling water, none of the cladding processes described above generate process wastewater. The main source of process wastewater in metal cladding operations is in cleaning the metal surfaces prior to bonding. For small batch operations, the cleaning steps can involve dipping the metal into small cleaning bath tanks and hand rinsing the metal in a sink. For larger continuous operations, the metal may be cleaned in a power scrubline. In a typical scrubline, metal strip passes through a detergent bath, spray rinse, acid bath, spray rinse, rotating abrasive scrub brushes, and a final rinse. The metal may then pass through a heated drying chamber or may air dry.

Metal Powder Production. For regulatory convenience, the production of all metal powders but beryllium have been included in this category. Atomization, depicted in Figure III-15, is the most common method of producing metal powders. In this process, a stream of fluid, usually water or gas, impinges upon a molten metal stream, breaking it into droplets which solidify as powder particles. The size and shape of atomized powder is determined by jet configuration, jet design, composition of the impinging medium, and composition of the metal. Generally, gas atomization is used to produce spherical particles while water atomization is used to produce irregularly shaped particles, required for powder metallurgy applications in which a powder is cold pressed into a compact. In addition, the duration of cooling plays an important in determining particle configuration. Annealing usually role accompanies atomization for the purpose of rearranging internal crystal structures of metal powders, and consequently improving strength.

Powders are also produced by disintegration of solid metal into powder by mechanical comminution. This process is used for brittle ores or chemically embrittled metals. It is also used to produce powder from turnings and other scrap of more ductile metals. The most commonly utilized pieces of mechanical reduction equipment are ball mills, vortex mills, hammer mills, disc mills, and roll mills. Powder production with this type of machinery tends to produce angular, irregular, rod-like, and flaked physical structures. Occasionally, powders are milled in a water slurry.

In addition to its use as an atomization medium and a milling slurry, water is used to clean floors in metal powder production areas and in the equipment used to control particulate air pollution from metal powder production operations (wet scrubbers and electrostatic precipitators).

Surveyed plants produce powders from all of the metals formed by traditional means except titanium and rhenium (see Table III-3). Iron, stainless steel, and copper alloy powders are produced in the largest quantities and by the greatest number of manufacturers. The high demand for these metal powders is caused by their large-scale applications in the auto manufacturing and machining industries. After iron and steel, copper, and aluminum, and their alloys, the metal powders produced in the largest quantity are tungsten and tungsten carbide, lead and its alloys, and nickel and its alloys. Wastewater is discharged from nickel, precious metals, iron and steel, copper, aluminum, and refractory metals powder production operations.

<u>Production of Powder Metallurgy Parts</u>. Metal powders are formed into parts by a "press and sinter" operation, consisting of blending metal powders, compacting the mixture in a die and then heating or sintering the compacted powder in a controlled atmosphere to bond the particles into a strong shape. Parts made from pressed powder are often referred to as compacts. A diagram of two pressing configurations is presented in Figure III-16. Compaction forces range from 1.1 to 385 tons. Contact cooling water is sometimes used to cool the parts after the pressing operation. Air pollution from mixing the metals powders is sometimes controlled by wet scrubbers.

Following compaction, "green" metal powder compacts are sent to a furnace for sintering. Furnace temperatures are held below the melting point of the metal being sintered, from 1,000C to 1,800C.

To prevent formation of oxide films on particle surfaces (which inhibit formation of metallic bonds between particles) an inert atmosphere or vacuum must be maintained inside the sintering furnace. Hydrogen, although expensive, is the most commonly used inert gas. Alternatively, vacuum systems capable of maintaining a pressure of 10 MPa ($2.96 \times 10-6$ in Hg) are typically employed. As an extra precaution against contamination with air, the vacuum furnace and its inlet and outlet ports may be jacketed with inert gas.

During the sintering process, air present in the metal compacts

before sintering is exhausted, thus decreasing the porosity of the compact and increasing its strength. Further strengthening occurs as surface metal atoms recrystallize, realigning into a close crystal lattice pattern.

For some applications, porosity may be further decreased by the process of infiltration, in which a liquid phase is allowed to penetrate the pores between metal particles during or after sintering. The liquid used may be a nonalloying metal with a lower melting point than the compacted metal, oil, or an anti-friction polymer such as polytetrafluoroethylene. Infiltration with copper is commonly used in manufacturing tungsten and molybdenum compacts for electrical contacts.

In some cases, a final mechanical fabrication step, sizing or coining, is used. In this process, the sintered compact is deformed in a closed die to produce a final shape. Sizing is used to qualify dimensions and has no effect on part density. Coining increases part density in addition to qualifying dimensions. Pressures applied during coining range up to 700 MPa (100,000 psi), depending on the size and shape of the die and the nature of the metal compact being formed. In some cases a lubricant is used to prevent the compact from adhering to the This lubricant is usually not discharged from the process, die. but lost through drag-out on the parts. Sintered metal compacts also may be rolled, extruded, or drawn.

Although many parts are ready for use after sintering is completed, a number of secondary operations are available to further finish parts to meet the need of specific applications. Finishing operations used subsequent to the forming of parts from metal powder include oil and or resin impregnation, deburring, steam oxidation, and treatment with rust inhibitor. Oil impregnation improves a part's lubricity as well as increasing corrosion resistance. When part's are to be plated, resin impregnation can be used to provide maximum sealing of porosity and prevent absorption of plating acids. Rinsing may follow both oil and resin impregnation. Deburring may be sand blasting or shot peening, both of which are dry, or tumbling with grit suspended in water. Because of their porosity, parts made from iron and steel powders may oxidize excessively. To prevent this, steam treatment to produce a protective oxide layer and treatment with rust inhibitors are commonly used. Air pollution from the steam treatment operation is sometimes controlled by wet scrubbers.

As described above, process wastewater is generated in the production of powder metallurgy parts after the pressing and sintering steps. In addition to tumbling and steam treating, the parts may be cleaned or degreased (alkaline, detergent, or solvent) prior to packing and shipping. These cleaning operations are identical to those performed on other metal products and will be described in detail later in this section.

Operations Associated With Nonferrous Metals Forming

<u>Casting</u>. Casting consists of filling a shaped container or mold with molten metal so that upon solidification, the shape of the mold is reproduced. Only casting which is an integral part of and performed at the same plant site as nonferrous metals forming is included in the category, that is, shot-casting and casting of billets, ingots, bars, and strip which are subsequently formed on-site. Casting performed as part of a smelting or refining operation is included in the nonferrous metals manufacturing point source category, 40 CFR Part 421. Casting of parts is included in the metal molding and casting point source category, 40 CFR Part 464.

The choice of casting method depends on the metal or alloy being cast and the ultimate use of the cast form. The casting methods used in nonferrous metals forming can be divided into four classes:

- Stationary casting;
- Direct chill casting, including arc casting;
- Continuous or semi-continuous casting;
- Shot casting.

The method of casting most widely practiced at nonferrous metals forming plants is stationary or pig casting which allows for recycle of in-house scrap. In this process, molten metal is poured into cast iron molds and allowed to air cool. Lubricants are not usually required. Although water may be sprayed onto the molten metal to increase the cooling rate, this generally does not result in any discharge.

Direct chill casting is characterized by continuous solidification of the metal while it is being poured. The length of an ingot cast using this method is determined by the vertical distance it is allowed to drop rather than by mold dimensions.

As shown in Figures III-17 and III-18, molten metal is tapped from the melting furnace and flows through a distributor channel into a shallow mold. Noncontact cooling water circulates within this mold, causing solidification of the metal. The base of the mold is attached to a hydraulic cylinder which is gradually lowered as pouring continues. As the solidified metal leaves the mold, it is sprayed with contact cooling water to reduce the temperature of the forming ingot. The cylinder continues to descend into a tank of water, causing further cooling of the ingot as it is immersed. When the cylinder has reached its lowest position, pouring stops and the ingot is lifted from the pit. The hydraulic cylinder is then raised and positioned for another casting cycle.

In direct chill casting, lubrication of the mold is required to ensure proper ingot quality. Lard or castor oil is usually applied before casting begins and may be reapplied during the drop. Much of the lubricant volatilizes on contact with the molten metal, but contamination of the contact cooling water with oil and oil residues does occur. Arc casting is a form of direct chill casting used for refractory metals (tungsten, molybdenum, tantalum, columbium, vanadium, and rhenium), because the melting points of these metals are too high for them to be easily cast by conventional techniques. The bars as consumable electrodes in an arc-melting process. serve The end product of refining these metals is a powder which can be compacted and sintered into solid bars. Under vacuum, in an appropriate furnace consisting of a water-cooled copper crucible, the preformed bars form an electrode for striking a high current, low voltage arc between the bar and a starting pad of metal. As the bar is progressively melted, molten metal falls through the arc and forms an ingot which gradually freezes into solid form. ingot may be remelted to improve purity or The directlv fabricated to product form.

Many nonferrous metals forming plants use continuous casting instead of, or in addition to, direct chill casting methods. Unlike direct chill casting, no restrictions are placed on the length of the casting, and it is not necessary to interrupt production to remove the cast product. The use of continuous casting eliminates or reduces the degree of subsequent rolling required.

A relatively new technology, continuous casting of metal first came into practice in the late 1950's. Since then, improvements and modifications have resulted in the increased use of this pro-Current applications in this category include the casting cess. sheet and strip. Because continuous casting affects of the mechanical properties of the metal cast, the use of continuous casting is limited by the metals and alloys used, the nature of subsequent forming operations, and the desired properties of the finished product. In applications where continuous casting can be used, the following advantages have been cited:

- Increased flexibility in the dimensions of the cast product;
- Low capital costs, as little as 10 to 15 percent of the cost of conventional direct chill casting and hot rolling methods; and
- Low energy requirements, reducing the amount of energy required to produce comparable products by direct chill casting and rolling methods by 35 to 80 percent, depending on the product being cast.

In addition, the use of continuous casting techniques has been found to significantly reduce or eliminate the use of contact cooling water and oil lubricants.

Two continuous casting processes are commonly used in the industry. Methods in use at a particular plant will vary somewhat, but they are similar in principle to the processes diagrammed schematically in Figures III-19 and III-20. Continuous sheet casting, shown in Figure III-19, substitutes a single casting process for the conventional direct chill casting, scalping, heating, and hot rolling sequence. The typical continuous sheet casting line consists of melting and holding furnaces, a caster, pinch roll, shear, bridle, and coiler. Molten metal flows from the holding furnace to the caster headbox. The level of molten metal maintained in the headbox causes the metal to flow upwards through the top assembly, which distributes it uniformly across the width of the casting rolls. The metal solidifies as it leaves the tip and is further cooled and solidified as it passes through the internally water-cooled rolls. It leaves the caster as a formed sheet and successively passes through pinch rolls, a shear, and a tension bridle before being wound into a coil. The cooling water associated with this method of continuous sheet casting never comes into contact with the metal.

Continuous strip casting is pictured in Figure III-20. Molten metal flows from a casting pot through an open-ended die. The die is water cooled and has the same cross-section as the cast strip. As the metal leaves the die, it descends vertically past water sprays, guided by rolls. The strip can be coiled as it is cast, or small sections can be cut from the end as the strip continues to grow.

Metal shot is commonly produced by casting of a number of metals, including lead and precious metals. In the shot casting process pictured in Figure III-21, metal ingots are melted in a furnace, the furnace is tapped, and the molten metal is poured down a trough or into a heated mold. At the bottom of the trough or mold is a shot mold plate, typically made of steel or a ceramic material, which has holes punched in it. The size of the shot pellets is determined by the size of the holes.

As the molten metal flows through the holes in the shot mold it forms droplets. The droplets become round as they descend through several inches of air, then fall into a tank of water for quick quenching. This water may be stagnant or circulating. In some shot casting operations a wetting agent is added to the quench water, altering the surface tension and ensuring the formation of spherical shot particles. To prevent excessive loss of quench water through evaporation and to maintain the water temperature required by some operations, the quench water may be cooled using noncontact cooling water in a jacket around the tank.

Cast shot may be processed through a sizing operation to remove the irregular shaped particles. Reject shot is usually remelted and recast.

In this document, semi-continuous casting is used to denote a particular casting process reported in the forming of lead, tin, and bismuth. Molten metal is poured down a trough and into vertical billet molds. A tank of water is raised up around the molds to cool the metal (noncontact cooling). When the tank is lowered the billet molds are inverted and the billets fall out of

the molds and onto an inclined track. Lubricant may be placed inside the mold between casting cycles to facilitate the release of the billets. Lubricant may also be placed on the track to allow the billets to roll more easily. As the billets move down the track they are quenched with a spray of water. At the bottom of the track the billets move into a sawing operation.

In addition to its use to cast metal, water is used in equipment which controls air pollution from stationary casting and shotsizing operations. Water is also used to wash billets immediately after casting. In vapor form, water is used to draw a vacuum from some melting furnaces. The condensed steam, which may carry any material volatilized during melting, is recirculated with a periodic blowdown.

Of the surveyed plants, 81 have casting operations. Wastewater is discharged from lead, nickel, zinc, precious metals, and refractory metals casting operations.

Heat Treatment. Heat treatment is an integral part of nonferrous metals forming practiced at nearly every plant in the category. It is frequently used both in-process and as a final step in forming to give the metal the desired mechanical properties. There are four general types of heat treatment:

- Homogenizing, to increase the workability and help control recrystallization and grain growth following casting;
- Annealing, to soften work-hardened and heat-treated metals, relieve stress, and stabilize properties and dimensions;
- Solution heat treatment, to improve mechanical properties by maximizing the concentration of hardening contaminants in solid solution; and
- Artificial aging, to provide hardening by precipitation of constituents from solid solution.

Homogenizing, annealing, and aging are dry processes, while solution heat treatment typically involves significant quantities of contact cooling water.

During casting, large crystals of intermetallic compounds are distributed heterogeneously throughout the ingot. Homogenization of the cast ingot provides a more uniform distribution of the soluble constituents within the metal. By reducing the brittleness caused by casting, homogenization prepares the ingot for subsequent forming operations. The need for homogenization and the time and temperatures required are dependent on the metal and alloy involved, the ingot size, the method of casting used, and the nature of the subsequent forming operations. Typically, the ingot is heated to an appropriate temperature and held at that temperature for four to 48 hours. The ingots are then allowed to air cool.

Annealing is used by plants in the nonferrous metals forming category to remove the effects of strain hardening or solution In the annealing operation, the metal is raised heat treatment. to its recrystallization temperature. Nonheat-treatable, strainhardened metals need only be held in the furnace until the annealing temperature is reached; heat-treatable metals usually require a detention time of two to three hours. In continuous furnaces such as that pictured in Figure III-22, the metal is raised to higher temperatures and detained in the furnace for 30 Once removed from the annealing furnace, to 60 seconds. it is that the heat-treatable metals be cooled at a essential slow, controlled rate. After annealing, the metal is in a ductile, more workable condition suitable for subsequent forming opera-Some metals are annealed in a protective (nonoxidizing) tions. atmosphere to prevent discoloration of the bright surface. This process is called bright annealing and is commonly used to anneal silver and its alloys. Typical protective atmospheres are dissociated ammonia, hydrogen, and nitrogen.

Solution heat treatment, also referred to as solution annealing, is accomplished by raising the temperature of a heat-treatable to the eutectic temperature, where it is held for metal the required length of time, then quenching it rapidly. As a result of this process, the metallic constituents in the metal are held a super-saturated solid solution, improving the mechanical in properties of the metal. The required length of time the metal must be held at the eutectic temperature varies from one to 48 Certain nonferrous metal alloys can be solution heat hours. treated immediately following extrusion and forging. In this procedure, known as press heat treatment, the metal is extruded forged at the required temperatures and quenched with contact or cooling water as it emerges from the die or press.

The guenching techniques used in solution heat treatment are frequently critical in achieving the desired mechanical properties. The sensitivity of metals and alloys to quenching varies, but delays in transferring the product from the furnace the to quench, a quenching rate that is incorrect or not uniform, and the characteristics of the quenching medium used can all have serious detrimental effects. With few exceptions, contact cooling water is used to quench solution heat treated products. flush quenching is sometimes used to quench thick Spray or Solution heat treated forgings of certain metals can products. $ilde{ extsf{be}}$ quenched using an air blast rather than a water medium. Air quenching can also be used for certain extrusions following press heat treatment. The continuous annealing operation depicted in Figure III-22 contains a spray quench zone.

Artificial aging, also known as precipitation heat treatment, is applied to some nonferrous metals in order to cause precipitation of super-saturated constituents in the metal. The metal is heated to a relatively low temperature for several hours and then air cooled. Artificial aging is frequently used following solution heat treatment to develop the maximum hardness and ultimate tensile and yield strength in the metal. For certain metals, the mechanical properties are maximized by sequentially applying solution heat treatment, cold working, and artificial aging.

<u>Chemical</u> <u>Surface</u> <u>Treatments</u>. Surface treatment operations performed as an integral part of forming processes are within the scope of the nonferrous metals forming category. For the purposes of this regulation, surface treatment of nonferrous metals is considered to be an integral part of nonferrous metals forming whenever it is performed at the same plant site at which nonferrous metals are formed.

A number of chemical treatments may be applied to nonferrous metals after they are formed. The objective of these treatments is to in some way alter the surface of the metal, either by removing some of it or changing its characteristics. Wastewater discharges from these operations are generated when these solutions must be replaced with fresh chemicals and in rinsing operations used to remove residual solution from the formed metal after treatment. The contaminants in the spent solution and rinse water are a function of the chemicals used to make the solutions and the metal treated. Most of the contaminants are acids, bases, and metal salts.

The most frequently used chemical surface treatments are designed to remove the surface layer of oxidized metal created during forming of nonferrous metals at elevated temperatures. The most common method of removing this layer is to dissolve it in acid in an operation known as pickling, brightening, etching, or acid surface treatment. In addition to removing the oxide layer from a metal surface, this treatment will remove burned-on lubricants and any other substances not entirely removed by solvent or alkaline cleaning.

Pickling operations can be batch operations in which formed parts are moved from tank to tank to be dipped in acid baths, overflowing rinse tanks and spray chambers. The rinses are usually plain water, but occasionally ammonia solutions are used. A diagram of a bulk product pickling tank is presented in Figure III-23. A continuous surface treatment line, consisting of a series of tanks, can be used to provide strip metal with a series of treatments. A diagram of a typical continuous strip pickling line is presented in Figure III-24.

Sulfuric, hydrochloric, ammonium bifluoride, hydrofluoric, phosphoric, nitric, and chromic acids or acid mixtures are commonly used as pickling solutions. The pickling process may be chemical (formed metal is immersed in a tank of pickling solution and held until scale is removed) or electrochemical (electric current is forced through the pickling bath to speed up the pickling process). Acid concentration, bath temperature, and process time depend on the type of metal or alloy being treated, the components of the pickling solution, and the amount of scale to be removed. Acid consumed during pickling operations must be periodically replenished. Dissolved metal salts in the pickling solution gradually reduce pickling efficiency. Spent pickle liquor may be concentrated by high temperature precipitation of metal salts and recycled to minimize acidic waste discharge.

Brightening solutions for nonferrous metals and alloys usually contain mixtures of two or more acids: sulfuric, phosphoric, nitric, chromic, or hydrochloric. Acid ratios and concentrations vary widely. Dipping times range from 5 seconds to greater than 5 minutes. Other chemicals such as metal salts, glycerol, or ethylene glycol also may be added to brightening solutions.

layer of oxide scale formed from hot working operations on The nickel, cobalt, titanium, zirconium, and certain refractory metals is very difficult to remove with acid surface treatment Consequently, molten salt baths may be used to descale alone. the metal prior to acid surface treatment. Molten salt baths are oxidizing baths composed of sodium hydroxide or potassium hydroxide and sodium nitrate or potassium nitrate. The nitrate is the oxidizing agent in the bath. Sodium chloride and potassium chloride are added to depress the melting part of the bath, increase fluidity, and inhibit attack on the metal itself. Sodium carbonate or potassium carbonate may be added in small proportions to adjust the melting point of the mixture, and to inhibit deleterious reactions. Molten salt baths are maintained The formed metal parts are dipped in the baths at 480 to 540C. for 15 minutes or more and then rinsed and quenched in a water The molten salt bath performs its descale function by bath. three mechanisms:

- (1) Molten oxides present on the metal surface are converted to a higher oxidation state which is more soluble in the acid surface treatment operations which follow the molten salt operation;
- (2) The abrupt transfer of the metal from the hot bath to the cold rinse causes a thermal shocking effect which helps loosen the scale; and
- (3) Physical penetration of the molten salt on the surface of the metal helps to loosen the scale.

Physical penetration may be enhanced by agitating the molten salt baths.

Anodizing and chemical conversion coating are used to change the characteristics of the surface of formed metal by chemically or electrochemically depositing an inorganic coating to the metal. These coatings are applied for corrosion protection and in preparation for painting.

Anodizing is an electrochemical oxidation process which forms an insoluble oxide of the metal on the formed metal surface. The

oxide coating, which is extremely thin and nonporous, is used to provide corrosion resistance, decorative surfaces, a base for applying other coatings, and special electrical or mechanical properties. Anodizing is applied by immersing the metal form in an acid solution (containing fluoride, phosphate, chromate, or sodium ions) and passing a direct or alternating electrical current through the metal form. After anodizing, parts are rinsed in cold then hot water to facilitate drying.

Chemical conversion coatings are applied to previously-deposited metal or base metal for increased protection, lubricity, or in preparation for another special coating or to achieve a special surface appearance. Typical operations include chromating to form a protective film, and phosphating which is used to provide a good base for paints and other organic coatings, to lubricate the metal surface before cold forming or drawing, and to impart corrosion resistance. When chromating, the formed metal surface is coated by immersion or wetting with a solution containing hexavalent chromium and active organic and inorganic compounds. When phosphating, the metal surface is wetted, usually by immersion, with a phosphate solution which reacts with the metal surface.

Electrocoating is depositing metal in an adherent form upon the surface of a formed piece of metal which acts as a cathode. The coating may be applied as the finished surface. It may also act as a soft, lubricating coating for hard metal alloys prior to cold working (tube reducing or extruding). Lubricating coatings (often copper) are dissolved away in acid after the forming operation has been performed.

Electrocoating operations usually include precleaning with detergents followed by rinsing. The cleaned metal is electrocoated and then rinsed in one or more stages.

Surface treatments and their associated rinses are usually combined in a single line of successive tanks. In some cases, rinsewater from one treatment is reused in the rinse of another. Surface treatment rinses are the major source of wastewater in the nonferrous metals forming category. Of the surveyed plants, 154 have surface treatment operations, many plants having several. Wastewater is discharged from operations used to treat nickel, cobalt, zinc, precious metals, titanium, refractory metals, zirconium, hafnium, magnesium, and uranium. Wastewater is also generated by the equipment used to control air pollution from surface treatment of nickel, titanium, refractory metals, and uranium.

Alkaline Cleaning. Alkaline cleaning involves the removal of oil, grease, and dirt from the surface of a formed metal product using water with a detergent or other dispersing agent. Ultrasonic vibration is sometimes used in conjunction with chemical cleaners to clean wire and other fine parts.

Alkaline cleaners are formulations of alkaline salts, water, and

surfactants. Salts used include sodium hydroxide, sodium orthosilicate, trisodium phosphate, sodium metaborate, sodium carbonate, and sodium polyphosphates. Frequently, two or more of these salts are blended to form the cleaning solution.

Uninhibited alkaline cleaners will attack many nonferrous metals. Therefore, inhibiting compounds which coat the metal with a thin film to prevent etching, pitting, or tarnishing are typically added to the cleaning solution.

Alkaline solutions are commonly used to clean formed metal parts prior to chemical treatment or as a final step before packaging the product. The type of solution used depends on the metal to be cleaned and the contaminant to be removed. Alkaline cleaning may be preceded by solvent cleaning via vapor degreasing or cold cleaning. Following this step, formed metal parts are immersed in or sprayed with the alkaline cleaning solution. Solution concentration, temperature, and immersion time vary with metal type.

Following alkaline treating, metal parts are rinsed with water. Rinsewater is often warm, to decrease drying time and reduce water spotting. Spent solutions and rinses are discharged from alkaline cleaning processes. Streams are frequently combined with acid waste streams to adjust wastewater pH prior to discharge. In addition to cleaning nonferrous metals after they are formed, alkaline cleaning is used to prepare metals for cladding. The process may be hand cleaning or use a power scrubline, as described in the cladding discussion above.

Alkaline cleaning is associated with lead, nickel, zinc, precious metals, titanium, refractory metals, and zirconium forming operations.

Degreasing. Solvent cleaners are used to remove lubricants (oils and greases) applied to the surface of nonferrous metals during mechanical forming operations. Basic solvent cleaning methods include straight vapor degreasing, immersion-vapor degreasing, spray-vapor degreasing, ultrasonic vapor degreasing, emulsified solvent degreasing, and cold cleaning.

Solvents most commonly used for all types of vapor degreasing are trichloroethylene, l,l,l-trichloroethane, methylene chloride, perchloroethylene, and various chlorofluorocarbons. Solvent selection depends on the required process temperature (solvent boiling point), product dimension, and metal characteristics. Contaminated vapor degreasing solvents are frequently recovered by distillation. The sludge residue generated is toxic and may be flammable, requiring appropriate handling and disposal procedures.

Straight vapor degreasing uses hot vapors of chlorinated solvents to remove oils, greases, and waxes. A vapor degreasing unit typically consists of an open steel tank as shown in Figure III-25. Solvent at the bottom of the tank is heated to boiling, generating hot vapors. The heavy vapors fill the tank and are condensed at the top of the tank by cooling coils, thus containing the solvent vapors below the condensing coil level. Cooled nonferrous metal forming products are lowered into the hot vapor bath where solvent vapors condense onto the metal surface. Oils and greases are dissolved from the metal surface by the solvent.

Immersion-vapor degreasing is used to clean metal parts coated with large quantities of oil, grease, or hard-to-remove soil. Solvents used are the same as those used in straight vapor degreasing. Metal parts are first immersed in boiling solvent, then in a clean cool solvent rinse, and finally in solvent vapors. Immersion in cool solvent rinses residual matter left from the first cleaning and lowers the metal temperature so that vapor rinsing will be effective. Clean solvent for the cool rinse is supplied by condensation of pure vapors in the condenser section of the degreaser. From the condenser, solvent flows into the cool rinse chamber and overflows into the sump where it is again yaporized.

When mild scrubbing action is required to remove grease or dirt, spray-vapor degreasing is used. In this process, clean solvent is pumped from the degreaser condenser to a spray lance. Parts are impingement-sprayed with clean solvent to loosen soil and insoluble material. Spray lances may be fixed so that parts move in front of them for impingement, or may be hand-held so that an operator may direct the spray. Parts enter the degreaser's vapor phase, pass through the spray bank, and finally go through a final vapor rinse.

Ultrasonic vapor degreasing is similar to immersion-vapor degreasing, with ultrasonic transducers built into the clean solvent rinse tank. Metal parts are initially cleaned by immersion in boiling solvent, then immersed in cool solvent for ultra-sonic scrubbing, followed by a vapor or spray-vapor rinse.

During ultrasonic scrubbing, high frequency sound waves are transmitted through the solvent to the part, producing rapid agitation and cavitation (formation/implosion of solvent bubbles). The scrubbing action caused by solvent cavitation efficiently removes particulate and insoluble materials from the metal surface.

The ultrasonic frequency used depends on the type of part being cleaned, the degree of soil contamination, and the solvent used. The most commonly used frequency range is 20,000 to 50,000 cycles per second.

Emulsified solvent degreasing is primarily used to remove both water- and oil-soluble soils from complex mechanical parts. Chlorofluorocarbons are typically employed as solvents in this process. Reclamation of emulsified solvents is generally not economical.

Water contaminated with salts and other water-soluble contaminants is periodically removed from the system and replaced with clean water to renew the system's cleaning strength.

Cold solvent cleaning involves hand wiping, spraying, and immersion of metal parts in solvents to remove oil, grease, and other contaminants from the metal surface. Petroleum and chlorinated hydrocarbons are typically used in cold cleaning operations. Contaminated solvents are reclaimed by distillation or are disposed of via contractor.

Following degreasing, metal parts may be rinsed to remove adhering solvent. This practice was reported by two plants.

Mechanical Surface Treatments. Mechanical surface treatments are used, like chemical surface treatments, to alter the surface of formed nonferrous metals. Machining, grinding, polishing, tumbling (barrel finishing), and burnishing are commonly used mechanical surface treatments.

Machining is the general process of removing stock, in the form of chips, from a workpiece by forcing a cutting tool through the workpiece. Machining operations such as turning, milling, drilling, bar peeling, boring, trepanning, tapping, planing, broaching, sawing and cutoff, slitting, shaving, threading, reaming, shaping, shearing, slotting, hobbing, filing, and chamfering are included in this definition.

Grinding is the process of removing stock from a workpiece by the use of a tool consisting of abrasive grains held by a rigid or semirigid binder. The tool is usually in the form of a disk (the basic shape of grinding wheels), but may also be in the form of a cylinder, ring, cup, stick, strip, or belt. The most commonly used abrasives are aluminum oxide, silicon carbide, and diamond. The processes included in this unit operation are sanding (or cleaning to remove rough edges or excess material), surface finishing, centerless grinding, and separating (as in cut-off or slicing operations).

Polishing is an abrading operation used to remove or smooth out surface defects (scratches, pits, tool marks, etc.) that adversely affect the appearance or function of a part. Polishing is usually performed with either a belt or wheel to which an abrasive such as aluminum oxide or silicon carbide is bonded.

Both wheels and belts are flexible and will conform to irregular or rounded areas where necessary. Rotary brushes may also be used for the polishing operation. The operation usually referred to as buffing or hydrobuffing using rotary brushes is included in the polishing operation.

Burnishing is the process of finish sizing or smooth finishing a workpiece (previously machined or ground) by displacement, rather than removal, of minute surface irregularities. It is accomplished with frictional contact between the workpiece and some hard material, such as hardened metal balls. Water may also be used to cool or rinse parts during or after mechanical surface treatment. The contact cooling water and rinsewater are sources of wastewater.

Machining, grinding, polishing, and burnishing operations commonly use a recirculated oil-water emulsion or soap solution to cool and lubricate the contact between metal and finishing tool. Spent or rancid lubricant is discharged periodically. Water may also be used to cool or rinse parts during or after mechanical surface treatment. The contact cooling water and rinsewater are sources of wastewater.

Tumbling or barrel finishing is a controlled method of processing parts to remove burrs, scale, flash, and oxides as well as to improve surface finish. Widely used as a finishing operation for many parts, it obtains a uniformity of surface finish not possible by hand finishing. For large quantities of small parts it is generally the most economical method of cleaning and surface conditioning. Parts to be finished are placed in a rotating barrel or vibrating unit with ceramic or metal slugs or abrasive media, water or oil, and usually some chemical compound to assist in the operation. As the barrel rotates slowly, the upper layer of the work is given a sliding movement toward the lower side of the barrel, causing the abrading or polishing action to occur. The same results may also be accomplished in a vibrating unit, in which the entire contents of the container are in constant motion. When the parts have been sufficiently deburred they are drained in a basket or shaker table and transferred to an oven for drying. The tumbling solution is usually used once and then discarded.

Sawing is cutting a workpiece with a band, blade, or Sawing. circular disc having teeth. It may be required for a number of metal forming processes. Before ingots can be used as stock for rolling or extrusion, the ingot may require scalping or sawing to Following processes such as rolling, a suitable length. extrusion, and drawing, the metal products may be sawed. The circular saws and band saws used generally require a cutting lubricant in order to minimize friction and act as a coolant. Oil-in-water emulsions or mineral-based oils are usually applied to the sides of the blade as a spray. In some cases, a heavy grease or wax may be used as a saw lubricant. Normally, saw oils are not discharged as a wastewater stream. The lubricants frequently are carried over on the product or removed together with the saw chips for reprocessing. In some cases, however, recycle and discharge of a low-volume saw lubricant stream is Contact cooling water may also be used in the sawing practiced. Following sawing, parts may be rinsed to remove grit process. and lubricant from the metal.

<u>Product Testing</u>. Various product testing operations are used to check nonferrous metals parts for surface defects or subsurface imperfections. Parts are submerged in a water bath and subjected to ultrasonic signals, or in the case of tubing, pressurized with air. Piping and tubing may also be filled with water and pressurized to test their integrity. Dye penetrant testing is another product testing operation. Product testing operations are sources of wastewater because the spent water bath or test media must be periodically discarded due to the transfer into the testing media of oil and grease, solids, and suspended and dissolved metals from each product tested. In addition, a rinse may be needed following operations such as dye penetrant testing to remove chemicals from the part.

Other Operations Generating Wastewater. Other operations associated with nonferrous forming which generate wastewater include:

- Steam cleaning,
- Equipment cleaning,
- Area cleaning,
- Drum wash,
- Laboratories,
- Laundries, and
- Miscellaneous operations.

Steam is sometimes used for cleaning purposes such as removing lubricant from the inside of tubes. The discharge of condensate from steam cleaning operations was reported by two plants in the nickel-cobalt forming subcategory. Wastewater from cleaning various equipment such as forging presses, ring rollers, spray driers, and saws was reported by a few refractory metal forming plants. Area cleaning, drum wash, laboratory and laundry wastewater streams were reported by uranium forming plants. Except for laboratory wastes, these uranium forming operations originate from cleaning operations used to comply with the Nuclear Regulatory Commission (NRC) and occupational safety and health regulations.

Table III-1

METAL TYPES NOT FORMED ON A COMMERCIAL SCALE, OR FOR WHICH FORMING OPERATIONS GENERATE NO WASTEWATER

> Cadmium (Cd) Chromium (Cr) Gallium (Ga) Germanium (Ge) Indium (In) Lithium (Li) Manganese (Mn) Neodymium (Nd)

Praseodymium (Pr)

Table III-2

METAL TYPES COVERED UNDER THE NONFERROUS METALS FORMING CATEGORY

Rhenium (Re) Bismuth (Bi) Silver (Ag) Cobalt (Co) Tin (Sn) Columbium (Niobium) (Cb (Nb)) Titanium (Ti) Gold (Au) Tungsten (W) Hafnium (Hf) Uranium-Depleted (U) Lead (Pb) Vanadium (V) Magnesium (Mg) Zinc (Zn) Molybdenum (Mo) Nickel (Ni) Palladium (Pd) Platinum (Pt)

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Zirconium (Zr)

Iron, Copper, and Aluminum Metal Powder Production and Powder Metallurgy Operations

01 t		Table III-3												
Plant Discharge Status	YEARS SINCE NONFERROUS FORMING OPERATIONS BEGAN AT PLANT													
	AGE AS OF 1985 (YEARS)													
	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-50	51-60	ا 61-74	nsuffic 75+	ient Data	Total
Direct	2	0	2	2	7	9	4	1	3	1	1	2	4	38
Indirect	10	7	9	13	10	21	13	4	4	4	7	6	13	121
Zero	12	21	19	17	16	15	8	6	7	7	2	7	43	175
TOTAL	24	- 28	30	32	33	45	25	11	14	12	10	10	60	334
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Table III-4

NONFERROUS METAL PRODUCTION BY PRODUCT FORMED IN 1981 (POUNDS)

Metal	Plate	Sheet and Strip	Foil and Leaf	Tubing, Bar, and Rod	Wire and Cable	Irregular Shapes	Powders	Other	Total
Lead-Tin-Bismuth ¹	3,392,454	98,405,844	10,632,969	28,490,665	59,477,444	23,936,451	6,633,810	160,448,300	391,417,937
Nickel	8,367,100	19,017,611	2,100	41,606,002	31,255,978	17,715,599	6,758,852	23, 182, 698	147,905,940
Cobalt	66,000	671,000	0	516,351	137,826	180,900	613,139	363,948	2,549,164
Zinc	163,558	22,052,143	100,000	423,252	6,292,230	25,495,000	3,919,600	. 0	58,445,783
Precious Metals ¹ , ²	600,756	1,903,619	68,881	30,881	4,237,537	350,833	304,946	1,693,819	9,191,272
Titanium	6,133,244	6,024,982	240	12,700,524	0	17,856,871	0	20,958,569	63,674,430
Refractory Metals ³	272,335	331,377	16,722	2,420,615	1,651,192	7,609,942	18,033,783	3,582,433	33,918,999
Zirconium-Hafnium ¹	647,845	539,696	54,531	3,776,996	40,623	447,854	60,154	304,839	5,872,538
Iron			·			71,315,052	69,148,748	28,727,830	169,191,600
Copper				57,742		8,184,051	28,594,139	2,933,233	39,769,165
Aluminum						222,556	18,364,657	6,739,520	25,326,733
Magnesium	*	*	*	*	*	*	*	*	*
Uranium	*	*	*	*	*	*	*	*	*
Other4	0	1,768	33,450	30,480	321	120,660	4,609,174	40,137,083	44,932,936
Total	19,643,292	148,948,040	10,908,893	90,053,508	103,093,151	173,435,769	157,040,972	289,072,272	992,195,897

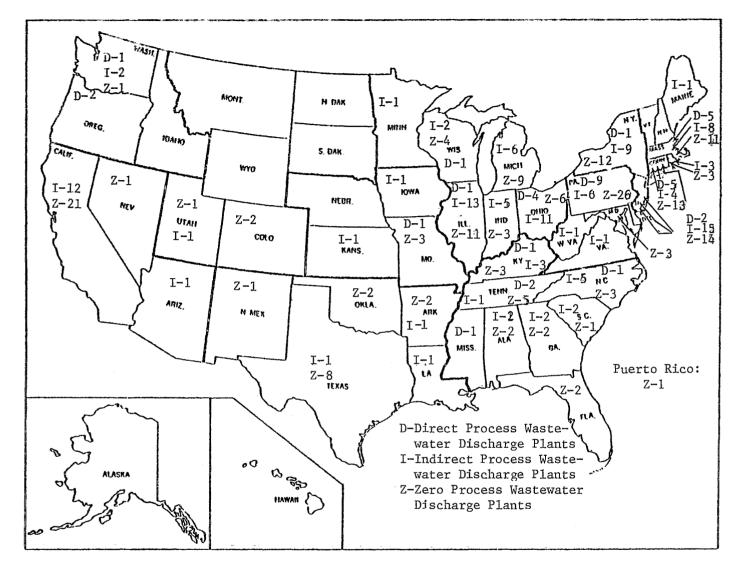
*Production information for this subcategory is confidential.

11t was not possible to break out production of these metals from information supplied in data collection portfolios.

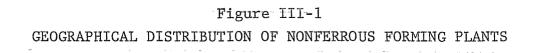
2Precious metals includes silver, gold, platinum, and palladium.

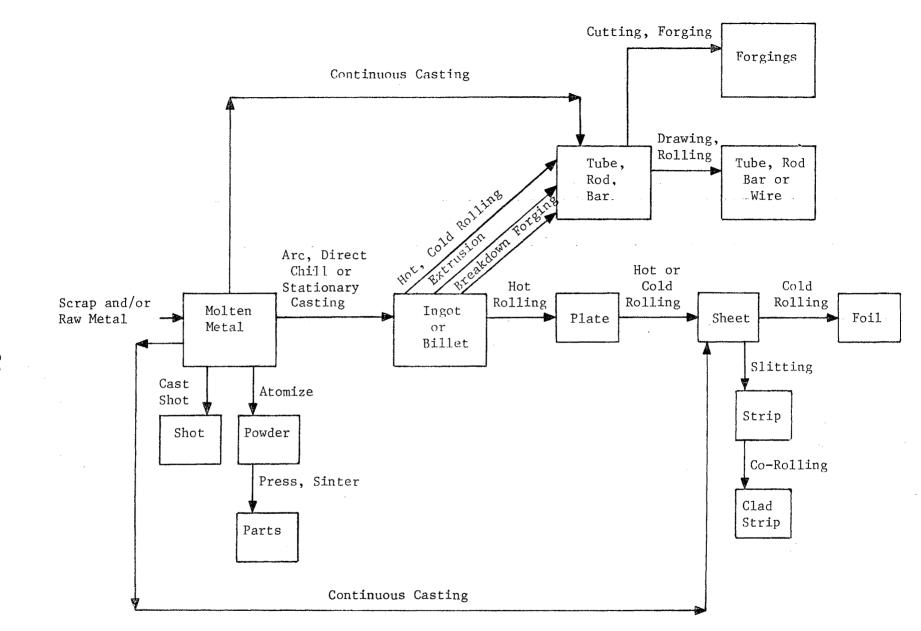
3Refractory metals includes tungsten, columbium, tantalum, molybdenum, rhenium, and vanadium.

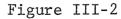
4Cadmium, chromium, gallium, germanium, indium, lithium, manganese, neodymium, and praseodymium; all excluded from regulation.



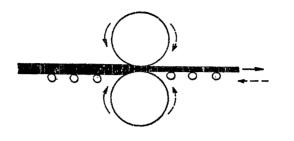
Three plants (in MA, CT, and TN) are both D & I dischargers but were classified as D.
 Four plants (in PA, CT, TS, and NY) are both D & I dischargers but were classified as I.



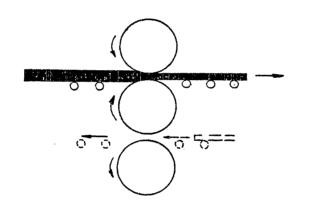




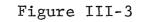
SEQUENCE OF NONFERROUS METALS FORMING OPERATIONS



A. TWO - HIGH REVERSING MILL



B. THREE - HIGH CONTINUOUS ROLLING MILL



COMMON ROLLING MILL CONFIGURATIONS

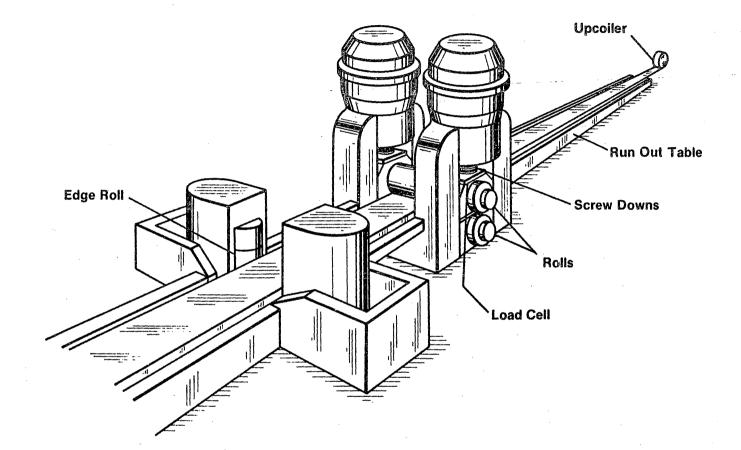
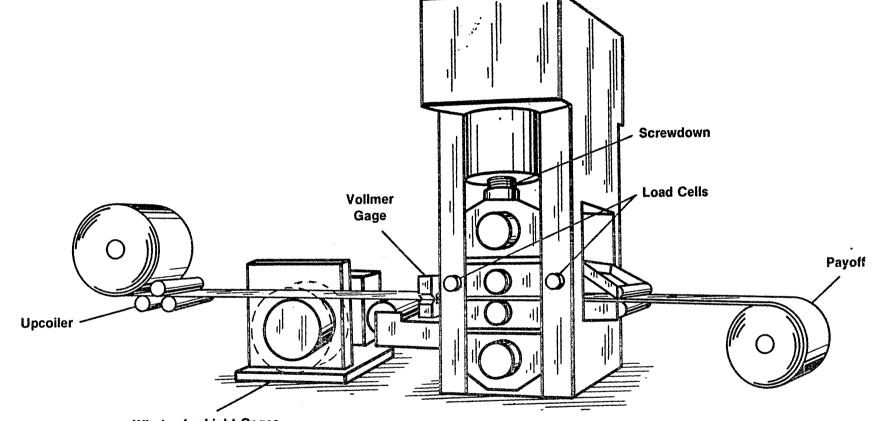


Figure III-4

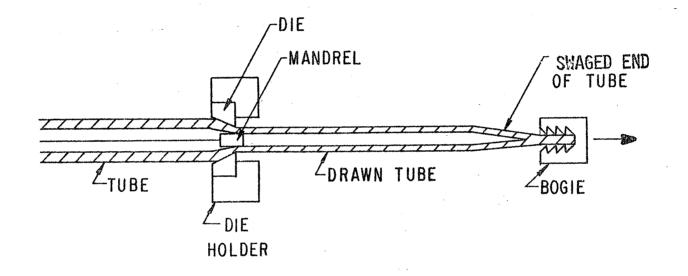
REVERSING HOT STRIP MILL

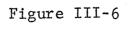


Winder for Light Gages

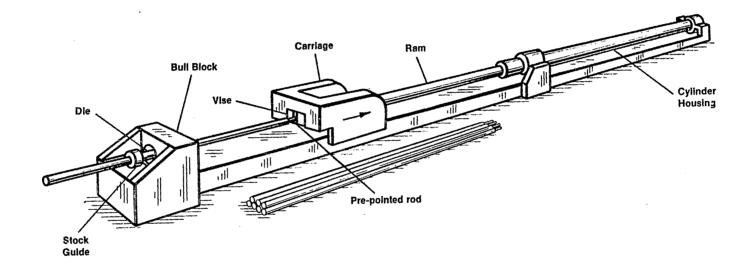
Figure III-5

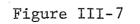
4-HIGH COLD ROLLING MILL





TUBE DRAWING





HYDRAULIC DRAW BENCH

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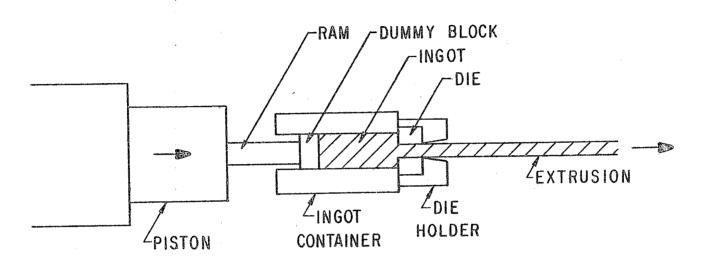


Figure III-8

DIRECT EXTRUSION

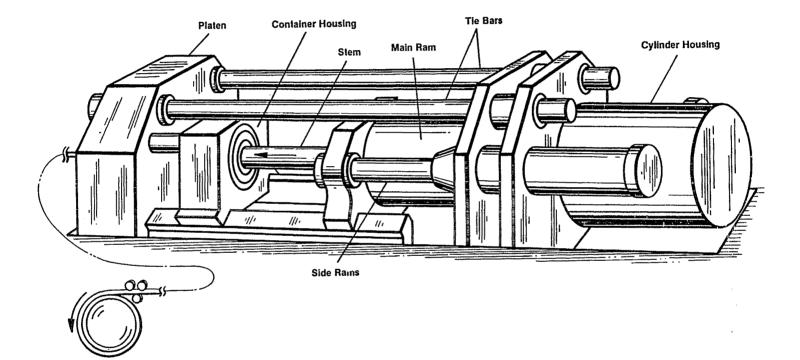


Figure III-9 EXTRUSION PRESS

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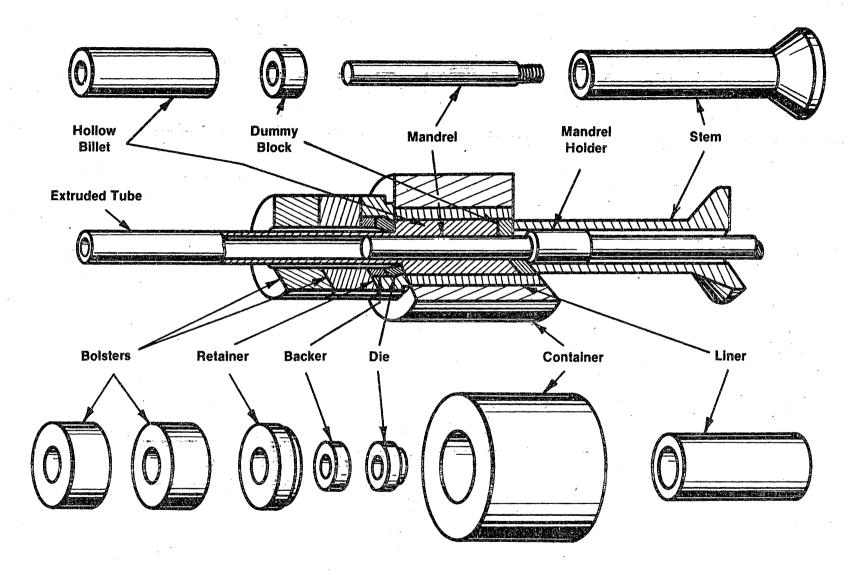
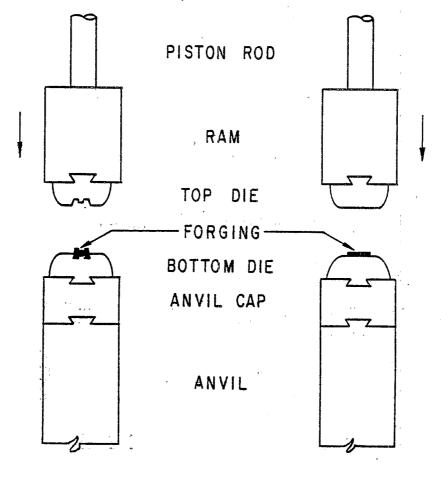


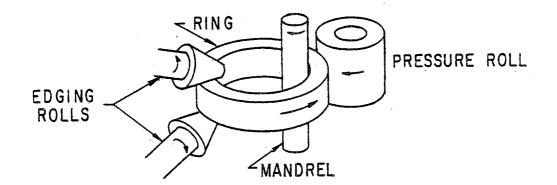
Figure III-10 EXTRUSION TOOLING AND SETUP



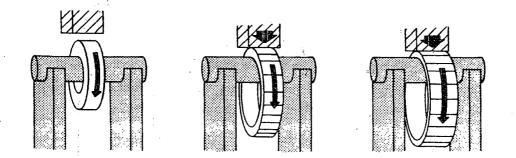


B. OPEN DIE FORGING

Figure III-11 FORGING



A. ROLLED RING FORGING



B. SADDLE/MANDREL FORGING

Figure III-12

RING ROLLING

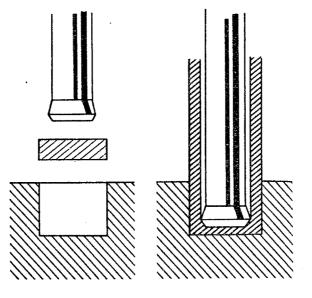


Figure III-13 IMPACTING

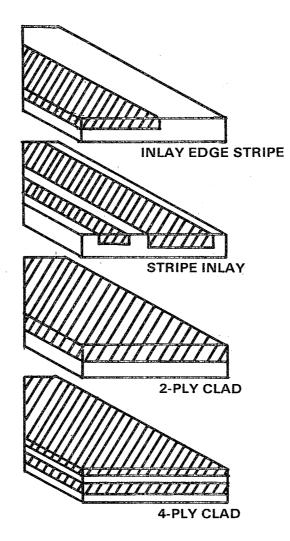
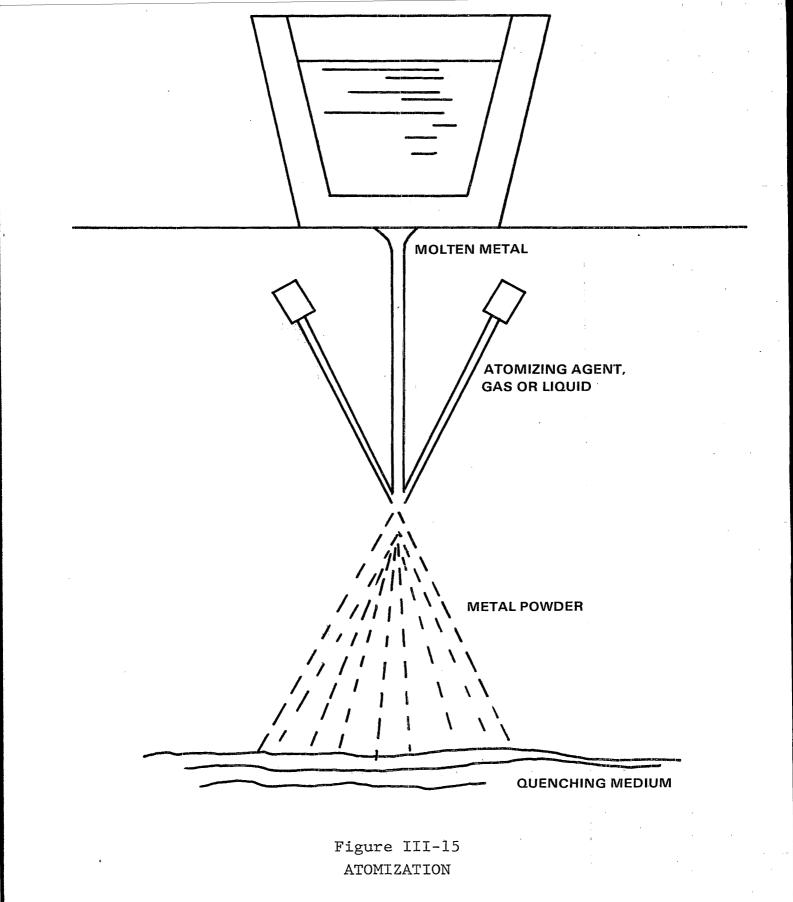
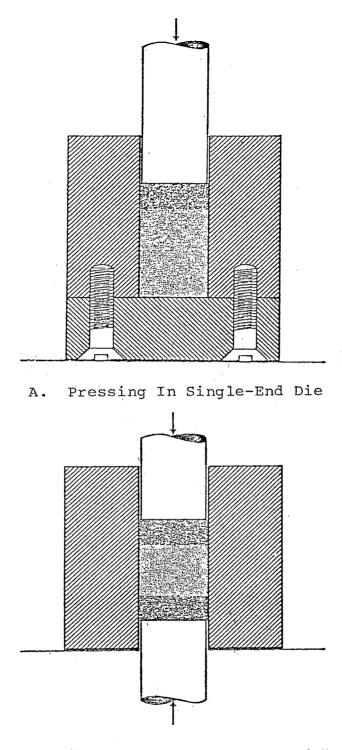


Figure III-14

SOME CLAD CONFIGURATIONS

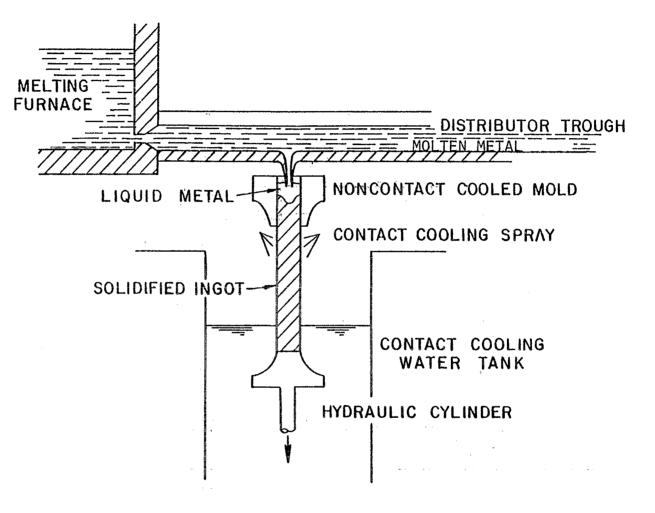


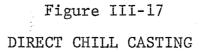


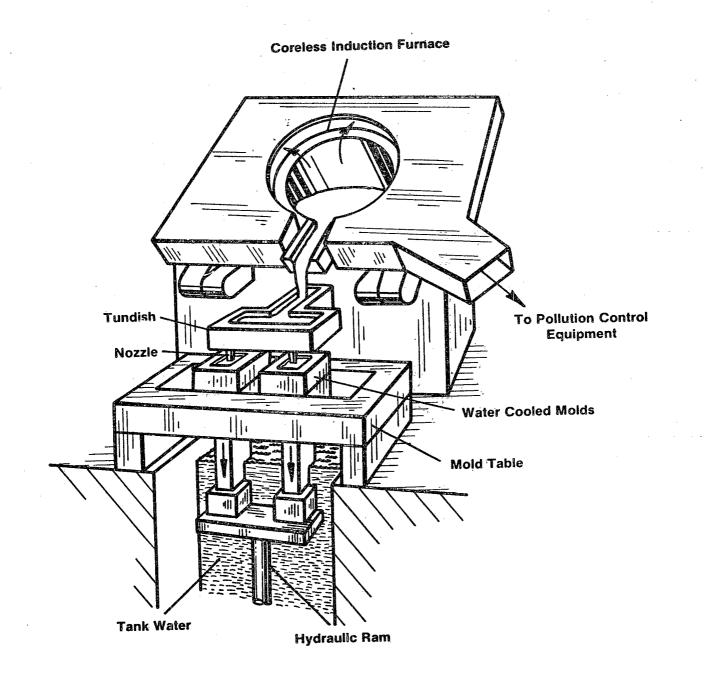
B. Pressing In Double-End Die

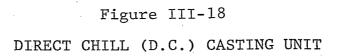
Figure III-16

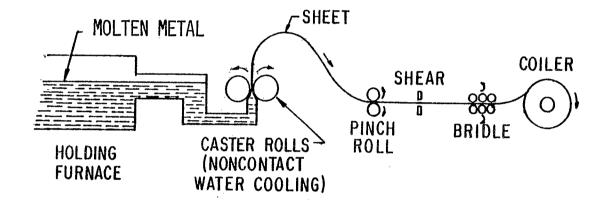
POWDER METALLURGY DIE COMPACTION



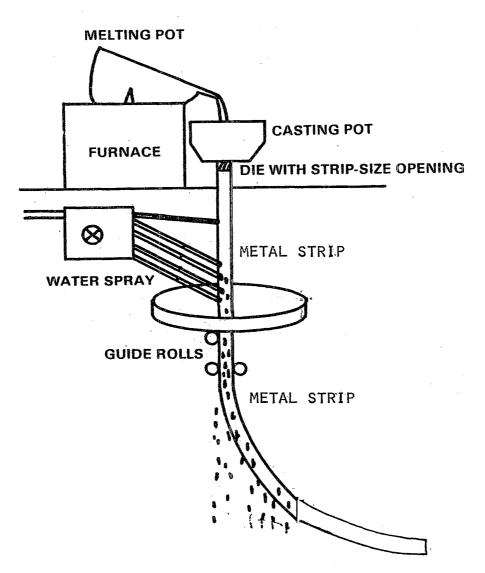


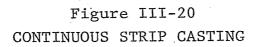






CONTINUOUS SHEET CASTING





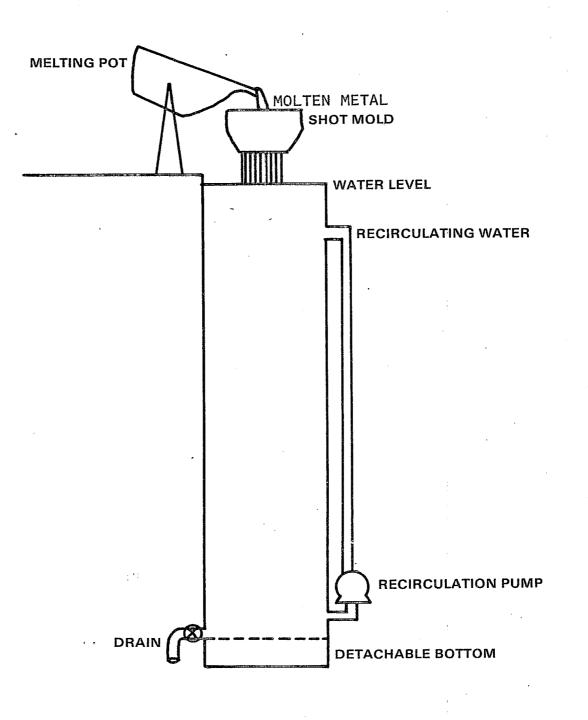
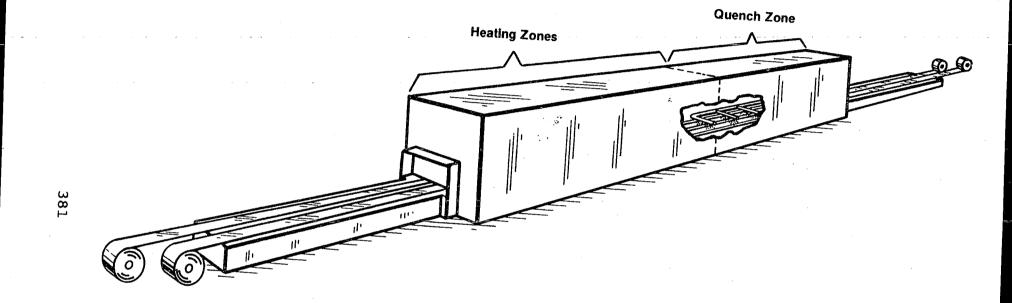
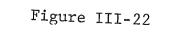


Figure III-21 SHOT CASTING





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ROLLER HEARTH ANNEALING FURNANCE

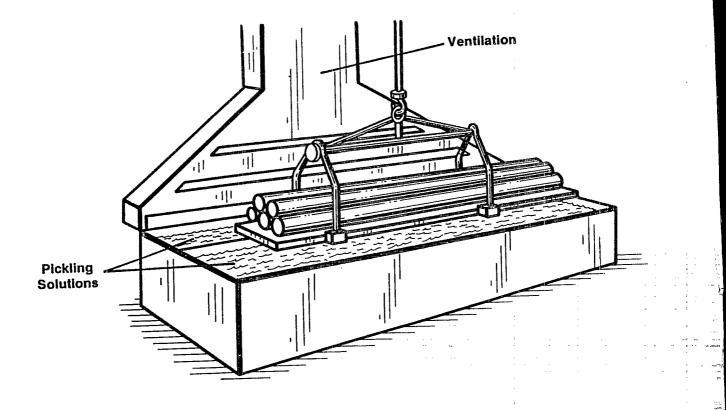
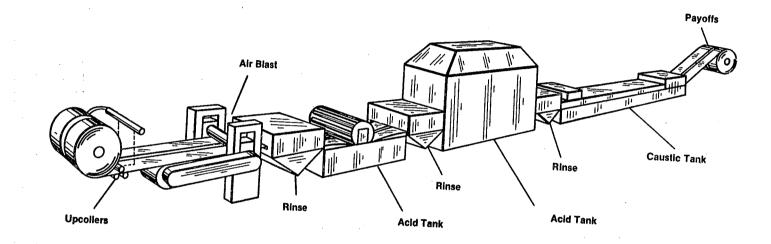
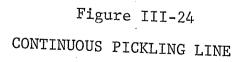
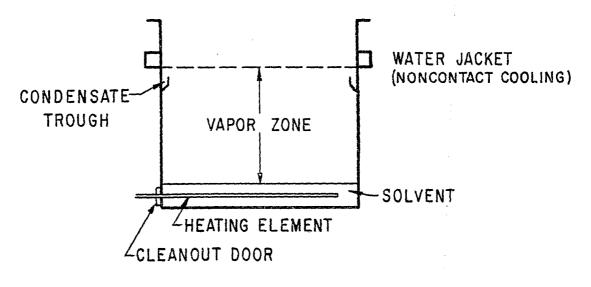


Figure III-23

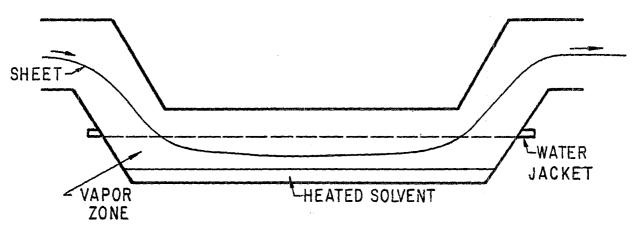
BULK PICKLING TANK



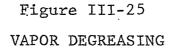








B. STRIP CONVEYORIZED DEGREASER



SECTION IV

INDUSTRY SUBCATEGORIZATION

In developing regulations for the nonferrous metals forming category, the Agency considered whether different effluent limitations and standards are appropriate for different segments of the category. The regulations are technology based. If uniform regulations are to be applied to the entire category, the technology upon which they are based must be available and appropriate for every segment of the category. If not, subcategorization is required. Subcategorization is also appropriate if different pollutants are regulated in various segments of the category.

EPA considers several factors to determine the appropriate subcategorization of a category. These include plant location and nonwater quality environmental impacts, including energy costs and solid waste generation. These factors affect the availability of wastewater treatment technology. Other subcategorization factors which must be considered are raw materials, manufacturing processes, products manufactured, plant size and age, and process water use. These factors may influence water use and wastewater characteristics and thus determine the appropriateness of in-process controls, end-of-pipe wastewater treatment technologies and the presence of pollutants to be regulated.

EVALUATION AND SELECTION OF SUBCATEGORIZATION FACTORS

Factors Considered

The analysis of potential subcategorization factors was carried out in the context of developing the nonferrous metals forming category. The manufacturing activities included in the category are:

- Forming of nonferrous metals other than copper and aluminum by rolling, drawing, extruding, and forging operations;
- 2. Production of ferrous and nonferrous metal powders;
- 3. Production of ingots and metal parts from ferrous and nonferrous metal powders; and
- 4. Production of clad metals and bimetallics from nonferrous metals other than copper and aluminum.

The following factors were considered as a basis for subcategorization:

- 1. Metal formed and raw materials used;
- 2. Manufacturing processes;
- 3. Products manufactured;
- 4. Process water use;
- 5. Plant size;
- 6. Plant age;
- 7. Plant location;
- 8. Solid waste generation and disposal, air emissions, and energy usage; and
- 9. Individual waste streams generated by manufacturing activities.

In addition to considering how the individual factors influenced subcategorization, the interrelationship between different factors was evaluated. An evaluation of these factors is presented below.

<u>Metal Formed and Raw Materials Used</u>. The raw materials used in the nonferrous metals forming category can be classified as follows:

- Metal and metal alloys;
- Lubricants and additives to lubricants; and
- Surface treatment, degreasing, and furnace fluxing chemicals.

The pollutants discharged from a particular forming operation depend on the metal formed and other raw materials used in that operation. For example, nickel forming wastewater will contain nickel and any lubricants or surface treatment chemicals used in forming and associated process steps. Therefore, while nickel is probably present in all nickel forming wastewater, the presence of other pollutants varies from plant to plant and operation to operation.

All of the manufacturing activities in this category, with the exception of metal cladding, can easily be divided into subcategories according to the metal formed. The metal formed and the metallurgical properties that are required in the final product will determine the other raw materials used during the forming process itself and associated process steps. The metal formed will also determine the manufacturing processes used, the products manufactured, and the amount and type of process water use. Because the type of metal formed will have a major impact on wastewater flow and characteristics, subcategorization of manu-facturing activities by the type of metal formed is appropriate.

Pollutants generated by the production of clad metals and bimetallics are dependent on the metals processed, just as are discharges from other nonferrous metals forming processes. However, because cladding involves more than one type of metal, the categorization of this forming operation in a subcategorization scheme based on the type of metal formed is not straightforward. In general, the wastewater generated by forming a clad metal product will have characteristics that are dependent on the metal that is on the surface.

Manufacturing Processes. As discussed above, there are four manufacturing activities included in the nonferrous metals forming category, each of which uses one or more distinct manufacturing processes. Subcategorization on the basis of manufacturing process would group all rolling operations, all drawing operations, all extrusion operations, etc., together. The Agency does not believe this is an appropriate basis for subcategorization because it does not adequately distinguish the type of pollutants likely to be present in waste streams from the resulting subcategories. For instance, lead is likely to be present in lead rolling wastewater but is not expected to be properties of the metal or alloy may influence the type of waste stream that is generated.

<u>Products</u> <u>Manufactured</u>. Another approach is subcategorization based on the products manufactured, as listed below:

Product	Associated Manufacturing Process
Plate	Rolling
Sheet Strip	Rolling Rolling
Foil	Rolling
Rod and bar	Rolling, extrusion, & drawing
Tubing	Extrusion or drawing
Wire and cable	Drawing or extrusion
Other (L shapes, I-beams, etc.)	Extrusion
Clad metals	Roll bonding, solder
	application, explosion bonding, co-drawing
Metal powders	Water atomization, gas atomization, grinding, etc.

Forging, powder metallurgy

Miscellaneous shapes

The product manufactured would be an excellent basis for subcategorization if waste characteristics and the process to produce a given item were the same from plant to plant; however, this is not true for many formed metal products. For example, rods can be produced by two different production processes which generate similar wastewater (e.g., rolling and drawing), but the mass of pollutants generated per unit of rod produced by rolling will be different than the amount generated by drawing the rod. Furthermore, as discussed previously, rods formed from different metals but produced by the same process may use different lubricants, therefore generating a waste with different characteristics. Because the type and mass of pollutant generated per unit of product will be different depending on the metal formed and type of forming operation employed, the type of manufactured is an inappropriate products basis for subcategorizing the nonferrous metals forming category.

<u>Process</u> <u>Water</u> <u>Use</u>. Major differences in water use (volume of work applied to a process per mass of product) between facilities with large and small production could be considered as a factor in the development of subcategories.

However, as will be discussed in Section V, analysis of the data indicates that production normalized water use (i.e., liters per kkg of metal formed) for a given unit operation is usually independent of production volume. For example, a large direct chill casting operation will use about the same amount of water per ton of ingot produced as an operation casting much less nonferrous metal by the same method. Production normalized water use appears to be relatively constant over a wide range of production and therefore process water use is not an appropriate parameter for subcategorization.

<u>Plant</u> Size. The number of employees and amount of metal processed can be used as relative measures of the size of nonferrous metals forming plants.

Process wastewaters are largely independent of the number of plant employees. Variations in staff occur for many reasons, including shift differences, clerical and administrative support, maintenance workers, efficiency of plant operations, and market fluctuations. Due to these and other factors, the number of employees is constantly fluctuating, making it difficult to develop a correlation between the number of employees and wastewater generation. Subcategorization based on size in terms of production of nonferrous metals would group plants by the off-pounds of extrusions, sheets, rods, etc. However, this method of subcategorization does not adequately distinguish between waste streams with different characteristics.

Therefore, for the reasons discussed above, subcategorization on the basis of size (number of employees, production, or volume of wastewater generated) is not appropriate.

<u>Plant Age</u>. Although some nonferrous metals forming plants date from the late nineteenth and early twentieth centuries, most were built in the past 35 years. Since metal forming technologies are developing and changing rapidly, most plants, even those built 60 or 70 years ago, have been modernized frequently in order to remain competitive. Therefore, determination of a particular plant's technological age is very difficult. Accordingly, plant age is not an appropriate basis for subcategorization.

<u>Plant Location</u>. The geographical distribution of the nonferrous metals forming plants which responded to the dcp is presented in Figure III-1. The plants are not limited to any one geographical location, but they are generally located east of the Mississippi River. Although some cost savings may be realized for facilities located in nonurban settings where land is available to install lagoons, equivalent control of wastewater pollutant discharge can be achieved by urban plants with the use of physical and chemical treatment systems that have smaller land requirements. Since most plants are located in the eastern part of the United States (an area where precipitation exceeds evaporation) or in urban areas, evaporation and land application of the wastewater are not commonly used. Thus, location does not appear to be a significant factor on which to base subcategorization.

Solid Waste Generation and Disposal, Air Emissions and Energy Usage. Certain manufacturing plants may be limited in the wastewater treatment technology available to them by their patterns of solid waste generation and disposal, air emissions or energy usage. However, after a review of all available information, the Agency was unable to identify any plant or type of plant which has any unusual energy requirements or any unusual limitations based on available energy, solid waste disposal, or air emissions.

Individual Waste Streams Generated by Manufacturing Activities. Use of this scheme will yield subcategories of homogeneous character and treatability. The principal benefit from using waste streams as a basis for subcategorization is that an appropriate effluent limitation or standard could be established for each stream. For each regulated pollutant, a specific pollutant mass discharge value could be calculated for each waste stream present at the facility. These values would be summed to determine the total mass discharge allowed for that pollutant at that facility.

The difficulties with this approach are the large number of subcategories - approximately 175 - that it would generate. The Agency believes that a guideline with this many subcategories would be extremely difficult to administer. However, waste stream by waste stream analysis of production, flow, and pollutants present was used to calculate pollutant mass limitations for each subcategory.

Summary of Subcategorization

The nonferrous metals forming category can be subcategorized on the basis of metal type formed. Based on information reported by 334 surveyed plants, 10 subcategories which have plants that discharge process water to surface waters or a POTW can be established. These subcategories are:

- o Lead-Tin-Bismuth Forming,
- o Magnesium Forming,
- o Nickel-Cobalt Forming,
- o Precious Metals Forming,
- o Refractory Metals Forming,
- o Titanium Forming,
- o Uranium Forming,
- o Zinc Forming,
- o Zirconium-Hafnium Forming, and
- o Metal Powders.

The metal powders subcategory includes only operations which involve iron, copper, or aluminum powders. Forming of these metals are included in other point source categories; iron and steel, aluminum forming, and copper forming. Nine other metals are formed, however, there is no process water discharge associated with the forming of these metals they are not discussed at any length in this document.

PRODUCTION NORMALIZING PARAMETER SELECTION

In order for regulations to be equitable among plants with high production and plants with low production, effluent limitations have been established on a pollutant mass basis, (i.e. mass of pollutant discharged per unit of production). The mass limitations must be normalized by an appropriate unit of production called a production normalizing parameter (PNP). That is, pollutant discharge limitations are written as allowable mass of pollutant discharge per PNP (mg/PNP). Therefore, for a PNP to be appropriate, mg/PNP must be independent of both production and wastewater volume, for a particular waste stream. Mass of metal, number of pieces, surface area, and mass of process chemicals used were considered as possible PNP's. An evaluation of these alternatives follows.

Mass of Metal Processed. The nonferrous metals forming category typically maintains production records of the pounds of metal processed. Availability of these production data and lack of data for other production parameters, such as number of pieces produced, makes this the most convenient parameter to use. The nonferrous metals forming dcp requested three production values: the capacity production rate for specific unit operation (in offlbs/hr), the average production rate for 1981 (in off-lbs/hr), and the total off-pounds of final product formed in 1981.

Number of Pieces Processed. The number of pieces processed by a given plant would not account for the variations in size and shape typical of formed products. It would be unreasonable to expect the quenching of a large forging to use the same amount of water required for a smaller forged product and yield a constant mass of pollutant per piece. Therefore, the Agency concluded that the number of pieces processed is not an appropriate PNP.

Surface Area of Metal Processed. Surface area may be an appropriate production normalizing parameter for formed metal which is rinsed (i.e., the mass of pollutants generated may correlate with However, the mass of pollutants generated by surface area). other metal forming operations, such as cooling, is unrelated to Hence, surface area might be an adequate PNP for surface area. some processes but would be wholly inappropriate for others. In addition, records of the surface area of metal processed are not generally kept by industry. In some cases, such as forging of miscellaneous shapes, surface area would be very difficult to In any case, surface area data would be difficult to determine. collect. For these reasons, the Agency concluded that surface area is an inappropriate PNP for the nonferrous metals forming category.

<u>Mass of</u> <u>Process</u> <u>Chemicals Used</u>. The mass of pollutants discharged is more dependent on the processes which the metal undergoes than on the amount of process chemical used in the process. Some operations, such as heat treatment with contact cooling water, generate pollutants but do not use any process chemicals. In addition, the use of this parameter as the production normalizing parameter would tend to discourage regeneration and reuse of process chemicals. For these reasons, the Agency concluded that mass of process chemicals used is an inappropriate PNP for the nonferrous metals forming category. Selection of Production Normalizing Parameter

For the reasons outlined above, the Agency has selected mass of product formed as the most appropriate PNP. The mass of pollutants is related to the mass of metal processed and most companies keep production records in terms of mass.

The PNP for nonferrous metals forming is "off-kilograms" defined as the kilograms of product removed from a machine at the end of a process cycle. For example, in the rolling process, an ingot enters the mill to be processed. Following one process cycle which may substantially reduce the ingot's thickness, the metal is removed from the rolling mill where it may be processed through another operation, such as annealing, sizing, cleaning, or it may simply be stored before being brought back to the rolling mill for another process cycle, further reducing the thickness. The mass of metal removed from the rolling mill after each process cycle multiplied by the number of process cycles is the PNP for that process.

DESCRIPTION OF SUBCATEGORIES

The nonferrous metals forming category was divided into 10 subcategories, based on type of metal formed. Five of these subcategories cover forming operations for more than one metal. This subcategorization allows separate limitations to be established for groups of metals whose wastewater is similar, are formed by similar processes, and would be expected to utilize similar or identical wastewater treatment within the subcategory.

The metal powders subcategory covers only iron, copper, and aluminum powder production and production of iron, copper, and aluminum parts from powder. All other subcategories cover traditional forming operations (rolling, drawing, extruding, forging), powder metallurgy processes (powder production and compaction), and ancillary operations integral to the production of formed metal (heat treatment, chemical and mechanical surface treatment, and casting). Clad metals are subcategorized according to the metal on the surface or outside of the product.

The number of surveyed plants in each subcategory and the number of plants in each subcategory discharging process wastewater (directly to surface streams and to a POTW) are listed in Table IV-1.

Lead-Tin-Bismuth Forming. Of the surveyed plants, 66 form lead. Twenty of these plants discharge process wastewater, three directly to surface water and 17 to a POTW. Some of the products made from lead forming are: bullets, made by extrusion and swaging lead; solder, formed by extrusion and drawing of lead, tin, and bismuth in various alloy combinations; and insulated cable, in which lead is extruded over copper cable.

<u>Operation</u>		Waste Stream	Production Normal- ing Parameter
Rolling		Spent emulsions	Mass of lead-tin- bismuth rolled with emulsions
		Spent soap solutions	Mass of lead-tin- bismuth rolled with soap solu- tions
Drawing		Spent neat oils Spent emulsions	Mass of lead-tin- bismuth drawn with emulsions
		Spent soap solutions	Mass of lead-tin- bismuth drawn with soap solu- tions
Extrusion		Press or solution heat treatment contact cooling water	Mass of lead-tin- bismuth heat treated and sub- sequently cooled with water
		Press hydraulic fluid leakage	Mass of lead-tin- bismuth extruded
Swaging		Spent emulsions	Mass of lead-tin- bismuth swaged with emulsions
Casting			
Continuous S Casting	Strip	Contact cooling water	Mass of lead-tin- bismuth cast by the continuous strip method
Semi-Continuo Ingot Castino		Contact cooling water	Mass of lead-tin- bismuth cast by the semi-contin- uous method

Operation	Waste Stream	Production Normal- ing Parameter
Shot Casting	Contact cooling water	Mass of lead-tin bismuth shot cast
Shot-Forming	Wet air pollution control blowdown	Mass of lead-tin- bismuth shot formed
Alkaline Cleaning	Spent baths	Mass of lead-tin- bismuth alkaline cleaned
	Rinsewater	Mass of lead-tin- bismuth alkaline cleaned

<u>Magnesium</u> Forming. Magnesium forming processes consist of forging, rolling, and extrusion. Water is used in post-extrusion etching, chromating, and rinsing processes. Nine of the surveyed plants form magnesium. Three plants discharge process water, one directly to surface water and two to a POTW.

Spent solvents

Degreasing

Operation	<u>Waste</u> Stream	Production Normal- ing Parameter
Rolling	Spent emulsions	Mass of magnesium rolled with emul- sions
Forging	Spent lubricants Contact cooling water	Mass of forged mag- nesium cooled with water
	Equipment cleaning wastewater	Mass of magnesium forged on equip- ment requiring cleaning with water

Operation

Waste Stream

Production Normaling Parameter

Direct Chill Casting Contact cooling

water

Spent baths

Rinsewater

Sawing or Grinding

Surface Treatment

Spent emulsions

Degreasing

Spent solvents

Wet Air Pollution Blowdown Control

Mass of magnesium cast with direct chill methods

Mass of magnesium surface treated Mass of magnesium surface treated

Mass of magnesium sawed or ground

Mass of magnesium sanded and repaired or forged

Nickel-Cobalt Forming. Nickel and cobalt are formed by rolling, drawing, extrusion, and forging, with extrusion the least common forming process. The two metals were grouped together because the metals are formed by identical processes and are frequently combined together in alloys which can be predominantly nickel or predominantly cobalt. Also, 19 of the 20 surveyed plants which form cobalt also form nickel.

Of the surveyed plants, 91 form nickel and cobalt, making this the largest subcategory in the category. Forty-eight plants discharge process wastewater, 14 directly to surface water and 34 to a POTW.

The operations and associated waste streams covered by this subcategory and the appropriate production normalizing parameters are listed below.

<u>Operation</u>	 Waste Stream	Production Normal- ing Parameter
Rolling	Spent neat oils Spent emulsions	Mass of nickel- cobalt rolled with emulsions
	Contact cooling water	Mass of nickel- cobalt rolled with water

Tube Reducing

Spent lubricants

395

Operation	<u>Waste</u> <u>Stream</u>	Production Normal- ing Parameter
Drawing	Spent neat oils Spent emulsions	Mass of nickel- cobalt drawn with emulsions
Extrusion	Spent lubricants Press or solution heat treatment contact cooling water Press hydraulic fluid leakage	Mass of nickel- cobalt extruded or heat treated and subsequently cooled with water Mass of nickel- cobalt extruded
Forging	Spent lubricants Contact cooling water Equipment cleaning wastewater	Mass of forged nickel-cobalt cooled with water Mass of nickel- cobalt forged on equipment requir- ing cleaning with water
	Press hydraulic fluid leakage	Mass of nickel- cobalt forged
Metal Powder Pro- duction	Atomization waste- water	Mass of nickel- cobalt metal powder produced by wet atomiza- tion
Stationary Casting	Contact cooling water	Mass of nickel- cobalt cast with stationary cast- ing methods
Vacuum Melting	Steam condensate	e A
Annealing and Solu- tion Heat Treatment	Contact cooling water	
Surface Treatment	Spent baths	Mass of nickel- cobalt surface treated

cobalt surface

treated

Operation	Waste Stream	Production Normal- ing Parameter
Ammonia	Rinsewater	Mass of nickel- cobalt treated with ammonia solution
Alkaline Cleaning	Spent baths	Mass of nickel- cobalt alkaline cleaned
	Rinsewater	Mass of nickel- cobalt alkaline cleaned
Molten Salt	Rinsewater	Mass of nickel- cobalt treated with molten salt
Sawing or Grinding	Spent emulsions	Mass of nickel- cobalt sawed or ground with emul- sions
	Rinsewater	Mass of sawed or ground nickel- cobalt rinsed
Steam Cleaning	Condensate	Mass of nickel- cobalt steam cleaned
Hydrostatic Tube Testing and Ultrasonic Testing	Wastewater	
Dye Penetrant Testing	Wastewater	Mass of nickel- cobalt tested with dye pene- trant methods
Miscellaneous Waste- Water Sources	Various	Mass of nickel cobalt formed
Degreasing	Spent solvents	
Wet Air Pollution Control	Blowdown	Mass of nickel- cobalt formed
Electrocoating	Rinsewater	Mass of nickel- cobalt electro- coated

Precious Metals Forming. This subcategory includes processes used to form gold, silver, platinum, and palladium. The Agency believes that it would be very difficult to subcategorize by the individual precious metals because most plants in this subcategory form all of the precious metals using the same equipment and cleaning operations. In addition, the metals are alloyed with each other in many combinations, some of which have no one constituent that is greater than 50 percent of the alloy. The precious metals subcategory includes any alloy of gold, platinum, palladium or silver that contains 30 percent or greater of that metal (even if another metal occurs in a larger percentage). Since all of the plants that form these alloys were already at least partially covered by the precious metals forming subcategory, this change will simplify the application of EPA regulations by regulating similar alloys formed by the same plant in the same subcategory. The additional alloys that are now included in this subcategory were previously covered by the forming regulation or other subcategories of copper the nonferrous metals forming category.

The cladding of precious metals to base metals is closely associated with precious metal forming. Typically a gold or silver overlay or inlay is roll bonded to a copper-alloy base. Nickel and stainless steel are also used as base metals. All but three of the 15 plants engaged in precious metal cladding also reported forming precious metals. The clad metals are formed by the same techniques and on the same equipment as pure metals. Therefore, it is appropriate to group precious metal cladding with precious metals forming.

The most common forming operations are rolling and drawing. Extrusion and forging are practiced to a much smaller extent. Fifty-two of the surveyed plants form precious metals. Thirty of these plants discharge process water, four directly to surface water and 26 to a POTW.

The operations and associated waste streams covered by this subcategory and the appropriate production normalizing parameters are listed below.

Production Normal-

Operation	Waste Stream	ing Parameter
Rolling	Spent neat oils Spent emulsions	Mass of precious metals rolled with emulsions
Drawing	Spent neat oils Spent emulsions	Mass of precious metals drawn with emulsions

Operation

Waste Stream

Metal Powder Production

Atomization wastewater

Contact cooling

water

Contact cooling

Contact cooling

water

water

water

Spent soap solutions Mass of precious metals drawn with

> Mass of precious metals powder produced by wet atomization

soap solutions

Production Normal-

ing Parameter

Casting

Direct Chill Casting

Shot Casting

Stationary Casting Contact cooling

Semi-Continuous and Continuous

Casting

Heat Treatment

Contact cooling water

Surface Treatment

Alkaline Cleaning

Alkaline Cleaning

Spent baths

Spent baths

Rinsewater

Rinsewater

Prebonding wastewater

Mass of precious metals cast by the direct chill method

Mass of precious metals shot cast

Mass of precious metals cast by

> the semi-continuous or continuous method

Mass of extruded precious metals heat treated

> Mass of precious metals surface treated Mass of precious metals surface treated

Mass of precious metals alkaline cleaned Mass of precious metals alkaline cleaned

Mass of precious metal and base metal cleaned prior to bonding

Production Normaling Parameter Operation Waste Stream Mass of precious Tumbling or Wastewater metals tumbled or Burnishing burnished with water-based media Spent neat oils Sawing or Grinding Spent emulsions Mass of precious metals sawed or ground with emulsions Pressure Bonding Contact cooling Mass of precious metal and base water

metal pressure bonded and subsequently cooled with water

Degreasing Spent solvents

Wet Air Pollution Blowdown Control

Refractory Metals Forming. This subcategory includes processes used to form molybdenum, tungsten, vanadium, rhenium, tantalum, and columbium. The Agency believes that it is unnecessary to subcategorize by the individual refractory metals. The metals are processed and fabricated by similar methods because of their common characteristics. Most of the plants which form one refractory metal also form one or more other refractory metals and waste streams are commonly commingled. The end product of refining these metals is metal powder which is consolidated into finished products or mill shapes. Only production of metal powders using mechanical means such as milling, abrading, and atomizing, which do not significantly increase their purity are included in this subcategory. Production of refractory metal powders in operations which significantly increase their purity is included in the nonferrous metals category. The powders can be arc or electron beam melted and cast into ingots. The mill shapes and ingots are shaped into finished form by rolling, drawing, extrusion, and forging.

Fifty-eight of the surveyed plants reported forming one or more of the refractory metals. Thirty-three of these plants discharge process wastewater, six directly to surface water and 27 to a POTW.

The operations and associated waste streams covered by this subcategory and the appropriate production normalizing parameters are listed below.

Operation	<u>Waste</u> <u>Stream</u>	Production Normal- ing Parameter
Rolling	Spent neat oils and graphite-based lubricants Spent emulsions	Mass of refractory metals rolled with emulsions
Drawing	Spent lubricants	
Extrusion	Spent lubricants Press hydraulic fluid leakage	Mass of refractory metals extruded
Forging	Spent lubricants Contact cooling water	Mass of forged refractory metals cooled with water
Metal Powder Pro- duction	Wastewater	Mass of refractory metals powder produced using water
Metal Powder Press- ing	Spent lubricants	
Surface Treatment	Spent baths	Mass of refractory metals surface treated
	Rinsewater	Mass of refractory metals surface treated
Alkaline Cleaning	Spent baths	Mass of refractory metals alkaline cleaned
	Rinsewater	Mass of refractory metals alkaline cleaned
Molten Salt	Rinsewater	Mass of refractory metals treated

with molten salt

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Operation	<u>Waste</u> <u>Stream</u>	Production Normal- ing Parameter
Tumbling or Burnishing	Wastewater	Mass of refractory metals tumbled or burnished with water-based media
Sawing or Grinding	Spent neat oils Spent emulsions	Mass of refractory metals sawed or ground with emul- sions
	Contact cooling water	Mass of refractory metals sawed or ground with con- tact cooling water
	Rinsewater	Mass of refractory metals sawed or ground and subse- quently rinsed
Dye Penetrant Testing	Wastewater	Mass of refractory metals tested with dye pene- trant methods
Equipment Cleaning	Wastewater	Mass of refractory metals formed on equipment requir- ing cleaning with water
Miscellaneous Waste- water Sources	Various	Mass of refractory metals formed
Degreasing	Spent solvents	· · · ·
Wet Air Pollution Control	Blowdown	Mass of refractory metals sawed, ground, surface coated or surface treated

Titanium Forming. Titanium is formed by rolling, drawing, extrusion, and forging. Forging is practiced by many plants which primarily forge steel. Rolling is the second most common forming operation, drawing the least. Titanium is often acid etched to remove a hard surface layer which forms at elevated temperatures. Forty-six of the surveyed plants form titanium. Thirty of these plants discharge process wastewater, 13 directly to surface water and 17 to a POTW.

The operations and associated waste streams covered by this subcategory and the appropriate production normalizing parameters are listed below.

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Operation	<u>Waste</u> Stream	Production Normal- ing Parameter
Rolling	Spent neat oils Contact cooling water	Mass of titanium rolled with con- tact cooling water
Drawing	Spent neat oils	
Extrusion	Spent neat oils Spent emulsions	Mass of titanium extruded with emulsions
	Press hydraulic fluid leakage	Mass of titanium extruded
Forging	Spent lubricants Contact cooling water	Mass of forged titanium cooled with water
	Equipment cleaning water	Mass of titanium forged on equip- ment requiring cleaning with water
	Press hydraulic fluid leakage	Mass of titanium forged
Tube Reducing	Spent lubricants	
Heat Treatment	Contact cooling water	
Surface Treatment	Spent baths	Mass of titanium surface treated
· •	Rinsewater	Mass of titanium surface treated
Alkaline Cleaning	Spent baths	Mass of titanium alkaline cleaned
	Rinsewater	Mass of titanium alkaline cleaned

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<u>Operation</u>	<u>Waste</u> Stream	Production Normal- ing Parameter
Molten Salt	Rinsewater	Mass of titanium treated with molten salt
Tumbling	Wastewater	Mass of titanium tumbled with water-based media
Sawing or Grinding	Spent neat oils Spent emulsions	Mass of titanium sawed or ground with an emulsion
	Contact cooling water	Mass of titanium sawed or ground with contact cooling water
Dye Penetrant Testing	Wastewater	Mass of titanium tested with dye penetrant methods
Miscellaneous Waste- water Sources	Various	Mass of titanium formed
Degreasing	Spent solvents	
Wet Air Pollution Control	Blowdown	Mass of titanium surface treated or forged

<u>Uranium</u> Forming. Uranium forming processes consist of forging, rolling, and extrusion. Water is used in post-forming surface treatment steps. Three surveyed plants report forming uranium. Two plants discharge process wastewater directly to surface water.

Operation	<u>Waste</u> <u>Stream</u>	Production Normal- ing Parameter
Extrusion	Spent lubricants Tool contact cooling water	Mass of uranium extruded with tools requiring contact cooling with water
Forging	Spent lubricants	
Heat Treatment	Contact cooling water	Mass of extruded or forged uranium heat treated and subsequently cooled with water
Surface Treatment	Spent baths	Mass of uranium surface treated
: -	Rinsewater	Mass of uranium surface treated
Sawing or Grinding	Spent emulsions	Mass of uranium sawed or ground with emulsions
	Contact cooling water	Mass of uranium sawed or ground with contact
	Rinsewater	cooling water Mass of uranium sawed or ground and subsequently rinsed
Area Cleaning	Washwater	Mass of uranium formed
Degreasing	Spent solvents	
Wet Air Pollution Control	Blowdown	Mass of uranium surface treated
Drum Washwater	Wastewater	Mass of uranium formed
Laundry Washwater	Wastewater	Employee-day
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Zinc Forming. Zinc is formed by rolling, drawing, and forging. It is surface treated and cleaned with alkaline detergents following forming. Ten of the surveyed plants form zinc. Three plants discharge process wastewater, one directly to surface water and two to a POTW.

Operation	Waste Stream	Production Normal- ing Parameter
Rolling	Spent neat oils Spent emulsions	Mass of zinc rolled with emulsions
	Contact cooling water	Mass of zinc rolled with contact cooling water
Drawing	Spent emulsions	Mass of zinc drawn with emulsions
Casting		
Direct Chill Casting	Contact cooling water	Mass of zinc cast by the direct chill method
Stationary Casting	Contact cooling water	
Heat Treatment	Contact cooling water	Mass of zinc heat treated and sub- sequently cooled with water
Surface Treatment	Spent baths	Mass of zinc sur- face treated
	Rinsewater	Mass of zinc sur- face treated

Operation	<u>Waste</u> Stream	Production Normal- ing Parameter	
Alkaline Cleaning	Spent baths	Mass of zinc alka- line cleaned	
	Rinsewater	Mass of zinc alka- line cleaned	
Sawing or Grinding	Spent emulsions	Mass of zinc sawed or ground with emulsions	
Degreasing	Spent solvents		
Electrocoating	Rinsewater	Mass of zinc elec- trocoated	

Zirconium-Hafnium Forming. Zirconium and hafnium are formed by rolling, drawing, and extrusion. One common manufacturing process is tube reducing (roll-rocking or pilgering), a special type of cold rolling. Post-forming operations include annealing and sand blasting (dry), acid and alkaline cleaning, and conversion coating. All of the plants which form hafnium also form zirconium by similar processes.

Twelve of the surveyed plants report forming zirconium. Ten of these plants discharge process wastewater, five directly to surface water and five to a POTW.

Operation	Waste Stream	Production Normal- ing Parameter
Rolling	Spent neat oils	
Drawing	Spent lubricants	
Extrusion	Spent lubricants Press hydraulic fluid leakage	Mass of zirconium- hafnium extruded
Swaging	Spent neat oils	
Tube Reducing	Spent lubricants	

Operation	Waste Stream	Production Normal- ing Parameter
Heat Treatment	Contact cooling water	Mass of zirconium- hafnium heat treated and sub- sequently cooled with water
Surface Treatment	Spent baths	Mass of zirconium- hafnium surface treated
	Rinsewater	Mass of zirconium- hafnium surface treated
Alkaline Cleaning	Spent baths	Mass of zirconium- hafnium alkaline cleaned
	Rinsewater	Mass of zirconium- hafnium alkaline cleaned
Molten Salt	Rinsewater	Mass of zirconium- hafnium treated with molten salt
Sawing or Grinding	Spent neat oils Spent emulsions	Mass of zirconium- hafnium sawed or ground with emul- sions
	Contact cooling water	Mass of zirconium- hafnium sawed or ground with con- tact cooling water
	Rinsewater	Mass of zirconium- hafnium sawed or ground and subse- quently rinsed
Inspection and Testing	Wastewater	Mass of zirconium- hafnium tested
Degreasing	Spent solvents	
Wet Air Pollution	Blowdown Control	
Degreasing	Rinsewater	

<u>Metal</u> <u>Powders</u>. This subcategory includes operations for producing iron, copper, and aluminum powders and metal parts from iron, copper, and aluminum powders. Powders are produced by wet or dry atomization and mechanical grinding. Pressing and sintering, the major manufacturing processes in powder metallurgy, usually use no process water. Most of the wastewater from operations in this subcategory is generated by post-forming surface treatment.

Seventy-three surveyed plants are engaged in powder production or powder metallurgy of iron, copper or aluminum. Thirty of these plants discharge process wastewater, three directly to the surface water and 27 to a POTW.

Operation W	laste Stream	Production Normal- ing Parameter
Metal Powder Pro- duction	Atomization waste- water	Mass of powder pro- duced by wet atomization
Tumbling, Burnish- ing or Cleaning	Wastewater	Mass of powder metallurgy parts tumbled, bur nished, or cleaned with water-based media
Sawing or Grinding	Spent neat oils Spent emulsions	Mass of powder metallurgy parts sawed or ground with emulsions
	Contact cooling water	Mass of powder metallurgy parts sawed or ground with contact cooling water
Sizing	Spent neat oils Spent emulsions	Mass of powder sized using emul- sions
Steam Treatment Wet Air Pollution Control	Blowdown	Mass of powder metallurgy parts steam treated
Oil-Resin Impreg- nation	Spent neat oils	

Operation

Waste Stream

Production Normaling Parameter

Degreasing

Spent solvents

Hot Pressing

Contact cooling water

Mixing Wet Air Pol- Blowdown lution Control

Mass of powder cooled with water after pressing

Mass of powder mixed

NUMBER OF PLANTS DISCHARGING NONFERROUS METALS FORMING WASTEWATER, BY SUBCATEGORY

Subcategory	Number of Direct Dischargers*	Number of Indirect Dischargers*	Total Plants
Lead-Tin-Bismuth Forming	3	17	66
Magnesium Forming	1	2	9
Nickel-Cobalt Forming	14	34	91
Precious Metals Forming	4	26	52
Refractory Metals Forming	6	27	58
Titanium Forming	13	17	46
Uranium Forming	2		3
Zinc Forming	1	2	10
Zirconium-Hafnium Forming	5	5	12
Metal Powders	3	27	73

*Plants may be in more than one subcategory.

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