

**Mineral Mining and Processing (40 CFR 436)**  
Detailed Investigation for 2004/2005 Planning Process

**Executive Summary**

During the Screening Level Review phase of the 2004/2005 planning process, mineral mining and processing was one of eight industrial categories identified solely through Factor 4 concerns. Issues driving the concerns include: 1) pollutants not covered by the guidelines (specifically TSS), and 2) consistent application of the guideline by permit writers. Based on information reported to the Toxic Release Inventory (TRI) and the Permit Compliance System (PCS), toxic discharges from mineral mining facilities are low relative to other industrial categories. In addition, generally, a few facilities drive the toxic weighted pound equivalent (TWPE) loading estimates from both TRI and PCS.

The information in the record at this time does not support a decision to revise these effluent guidelines. In the event that stakeholders provide additional data and supporting information during subsequent review cycles, EPA will reevaluate them at that time. In the absence of revisions to the effluent guidelines, concerns identified for this industry could be addressed through improved information dissemination and outreach by EPA. This is especially true due to the concentration of existing mines in Region 4 and in Michigan. The Agency could prepare a fact sheet with answers to frequently asked questions (FAQs), including the names of current contacts within the Office of Water. The Agency could announce the availability of this fact sheet at the regular meetings for permit writers and pretreatment coordinators held by the Office of Wastewater Management (OWM) and through internet postings and email alerts to the Engineering and Analysis Division (EAD) stakeholders mailing list. Finally, due to the relatively small number of facilities discharging the bulk of the TWPE, EPA could also provide assistance to permit writers in preparing BPJ-based permits.

**Overview**

This report presents information for the following topics:

- Background
- Industry and Related Subcategories
- Wastewater Characteristics and Pollutant Sources
- Pollutants Discharged
- Treatment Technology and Pollution Prevention
- Concerns Identified Pre-Proposal
- Concerns Identified in Comments to Proposal
- Followup Contacts
- Possible Solutions

Attachments provide the following supporting information:

- EPA Databases and References Used in this Review
- Point Source Categories Identified Solely Through Factor 4
- Guidelines Applicability and Regulatory History
- PCS Discharges
- TRI Discharges
- Reported Pollutant Loadings

## **Background**

In preparation for proposing the Preliminary Effluent Guidelines Program Plan for 2004/2005 (“Preliminary Plan,” published in February 2004), EPA analyzed four factors identified in the draft “National Strategy for Industrial Clean Water”(Edocket OW-2003-0074-0215). See Attachment A for more background about the 304(m) planning Process. The four factors focus on:

- 1 Potential impacts to human health and the environment. Preliminary results are summarized in the “Factor 1 Analysis: Human Health and Environmental Impacts – Status of Screening Level Review Phase” (edocket OW-2003-0074-0410).
- 2 Identification of an applicable and demonstrated technology, process change, or pollution prevention alternative that can effectively reduce pollutants discharged. Preliminary results are summarized in the “Factor 2 Analysis: Technology Advances and Process Changes – Status of Screening Level Review Phase.” (edocket OW-2003-0074-0xxx).
- 3 Evaluation of the cost, performance, and affordability of the technology, process change, or pollution prevention measures identified using the second factor.
- 4 Implementation and efficiency concerns. Preliminary results are presented in the “Factor 4 Analysis: Implementation and Efficiency Considerations – Status of Screening Level Review Phase” (edocket OW-2003-0074-0329)

When all of the results were integrated prior to proposing the Preliminary Plan, EPA determined that 8 point source categories with existing effluent guidelines had been identified solely through Factor 4 concerns. (See list in the Attachment B.) In order to determine the best course of action to address these concerns, EPA performed an analysis of issues and potential solutions for each of the 8 categories. The results of that analysis for Mineral Mining and Processing are presented in this report.

## **Industry and Related Subcategories**

The Mineral Mining point source category is regulated at 40 CFR Part 436. See Attachment C for the applicability and regulatory background. This point source category includes facilities reporting under two Standard Industrial Classification (SIC) industry groups: 14 – Mining and Quarrying of Non-metallic Minerals, except fuels, and 32 – Stone Clay, Glass, and Concrete Products. See Attachment C for the applicability and regulatory background. Specifically, it

includes SIC 1422 (Crushed and broken limestone), 1442 (Construction sand and gravel), 1459 (Clay, ceramic, and refractory minerals not elsewhere classified), 1475 (Phosphate rock), 1479 (Chemical and fertilizer mineral mining not elsewhere classified), 1481 (Non-metallic minerals services, except fuels), and SIC 3295 (Minerals and Earths, Ground or Otherwise Treated). All of these SICs are represented by dischargers reporting to the Permit Compliance System (PCS) but not in Toxic Release Inventory (TRI). It also includes SIC 3275 (Gypsum Products) which was reported in PCS and was the *only* SIC represented in the TRI. No specific subcategories were identified during the Factor 4 analysis; however, two subcategories were discussed in comments to the proposal: Crushed Stone Subcategory B (40 CFR 436.20), and Construction Sand and Gravel Subcategory C (40 CFR 436.30), covered by SIC 1442.

- SIC 1411 - *Dimension Stone* Establishments primarily engaged in mining or quarrying dimension stone. Also included are establishments engaged in producing rough blocks and slabs. Establishments primarily engaged in mining dimension soapstone or in mining or quarrying and shaping grindstones, pulpstones, millstones, burrstones, and sharpening stones are classified in Industry 1499. Establishments primarily engaged in dressing (shaping, polishing, or otherwise finishing) blocks and slabs are classified in Manufacturing, Industry 3281. Nepheline syenite mining operations are classified in Industry 1459.
- SIC 1422 - *Crushed and Broken Limestone* Establishments primarily engaged in mining or quarrying crushed and broken limestone, including related rocks, such as dolomite, cement rock, marl, travertine, and calcareous tufa. Also included are establishments primarily engaged in the grinding or pulverizing of limestone, but establishments primarily engaged in producing lime are classified in Manufacturing, Industry 3274.
- SIC 1423 - *Crushed and Broken Granite* Establishments primarily engaged in mining or quarrying crushed and broken granite, including related rocks, such as gneiss, syenite, and diorite.
- SIC 1429 - *Crushed and Broken Stone, Not Elsewhere Classified* Establishments primarily engaged in mining or quarrying crushed and broken stone, not elsewhere classified.
- SIC 1442 - *Construction Sand and Gravel* Establishments primarily engaged in operating sand and gravel pits and dredges, and in washing, screening, or otherwise preparing sand and gravel for construction uses.
- SIC 1446 - *Industrial Sand* Establishments primarily engaged in operating sand pits and dredges, and in washing, screening, and otherwise preparing sand for uses other than construction, such as glassmaking, molding, and abrasives.
- SIC 1455 - *Kaolin and Ball Clay* Establishments primarily engaged in mining, milling, or

otherwise preparing kaolin or ball clay, including china clay, paper clay, and slip clay.

- SIC 1459 - *Clay, Ceramic, and Refractory Minerals, Not Elsewhere Classified* Establishments primarily engaged in mining, milling, or otherwise preparing clay, ceramic, or refractory minerals, not elsewhere classified.
- SIC 1474 - *Potash, Soda, and Borate Minerals* Establishments primarily engaged in mining, milling, or otherwise preparing natural potassium, sodium, or boron compounds. Establishments primarily engaged in mining common salt are classified in Industry 1479.
- SIC 1475 - *Phosphate Rock* Establishments primarily engaged in mining, milling, drying, calcining, sintering, or otherwise preparing phosphate rock, including apatite. Establishments primarily engaged in the production of phosphoric acid, super-phosphates, or other manufactured phosphate compounds or chemicals are classified in Manufacturing, Major Group 28.
- SIC 1479 - *Chemical and Fertilizer Mineral Mining, Not Elsewhere Classified* Establishments primarily engaged in mining, milling, or otherwise preparing chemical or fertilizer mineral raw materials, not elsewhere classified. Establishments primarily engaged in milling, grinding, or otherwise preparing barite not in conjunction with mining or quarry operations are classified in Manufacturing, Industry 3295; similar establishments preparing other minerals of this industry are included here. Establishments primarily engaged in producing salt by evaporation of sea water or brine are classified in Manufacturing, Industry 2899.
- SIC 1481 - *Nonmetallic Minerals Services, Except Fuels* Establishments primarily engaged in the removal of overburden, strip mining, and other services for nonmetallic minerals, except fuels, for others on a contract or fee basis. Establishments primarily engaged in performing hauling services are classified in Division E, Transportation and Public Utilities.
- SIC 1499 - *Miscellaneous Nonmetallic Minerals, Except Fuels* Establishments primarily engaged in mining, quarrying, milling, or otherwise preparing nonmetallic minerals, except fuels. This industry includes the shaping of natural abrasive stones at the quarry. Establishments primarily engaged in the production of blast, grinding, or polishing sand are classified in Industry 1446, and those calcining gypsum are classified in Manufacturing, Industry 3275.
- SIC 3275 - *Gypsum Products* Establishments primarily engaged in manufacturing plaster, plasterboard, and other products composed wholly or chiefly of gypsum, except articles of plaster of paris and papier-mache.
- SIC 3295 - *Minerals and Earths, Ground or Otherwise Treated* Establishments operating

without a mine or quarry and primarily engaged in crushing, grinding, pulverizing, or otherwise preparing clay, ceramic, and refractory minerals; barite; and miscellaneous nonmetallic minerals, except fuels. These minerals are the crude products mined by establishments of Industry Groups 145 and 149, and by those of Industry 1479 mining barite. Also included are establishments primarily crushing slag and preparing roofing granules. The beneficiation or preparation of other minerals and metallic ores, and the cleaning and grading of coal, are classified in Division B, Mining, whether or not the operation is associated with a mine.

The following tables present the facilities in this category that report to the Permit Compliance System (PCS) and to the Toxic Release Inventory (TRI). (Note: Since this industry ranked low during the screening phase, EPA did not verify any of the info reported to PCS and TRI and have used it as reported. Although information in PCS and TRI is limited, it can provide insight into this industry. See Attachment A for more details about PCS and TRI.) Table 1 shows the number of facilities identified in this industry. Table 2 lists the facilities reporting to PCS under these SIC codes. Table 3 lists the facilities reporting to TRI under these SIC codes. Attachments D and E list these facilities along with their reported discharges.

**Table 1. Number of Facilities**

SIC	1997 Economic Census	PCS			TRI				
		Total	Major	Minor	Total	No reported discharge	Direct discharge	Indirect discharge	Both direct and indirect
1411	178	8	0	8	0	0	0	0	0
1422	1435	173	6	167	0	0	0	0	0
1423	290	14	0	14	0	0	0	0	0
1429	459	39	0	39	0	1	0	0	0
1442	2367	139	4	135	1	1	0	0	0
1446	140	17	0	17	0	0	0	0	0
1455	35	7	0	7	0	0	0	0	0
1459	132	23	3	20	0	0	0	0	0
1474	27	2	0	2	0	0	0	0	0
1475	20	22	18	4	0	0	0	0	0
1479	45	9	3	6	0	0	0	0	0
1481	172	1	1	0	0	0	0	0	0
1499	216	34	0	34	0	0	0	0	0
3275	208	11	0	11	18	17	1	0	0
3295	388	31	0	31	50	44	3	1	2

SIC	1997 Economic Census	PCS			TRI				
		Total	Major	Minor	Total	No reported discharge	Direct discharge	Indirect discharge	Both direct and indirect
Source: PCSLoads2000, TRIRelases2000									
*Facilities in SIC code 14, (Mining and Quarrying of Nonmetallic Minerals Except Fuels) are not required to report to TRI. Facilities in SIC codes 3275 and 3295 that meet the employee requirements and chemical use thresholds are required to report.									

**Table 2. Mineral Mining Facilities Reporting to PCS, Sorted by State**

SIC	NPDES ID	NAME	CITY	STATE
1422	AL0003662	SYLACAUGA OPERATIONS IMERYS	SYLACAUGA	AL
1442	AZ0024384	SAN XAVIER ROCK & MATERIALS	CORTARO	AZ
1475	FL0000230	IMC-AGRICO CO - NORALYN/PHO.	MULBERRY	FL
1475	FL0001902	US AGRI-CHEMICALS-FT MEADE	FORT MEADE	FL
1475	FL0000353	IMC-AGRICO CO - PAYNE CK MINE	MULBERRY	FL
1475	FL0037958	CARGILL FERT-S FT MEADE MINE	NICHOLS	FL
1475	FL0000311	AGRIFOS L.L.C. - NICHOLS MINE	NICHOLS	FL
1475	FL0000256	IMC-AGRICO CO - KINGSFORD	MULBERRY	FL
1475	FL0033294	CARGILL FERT.-HOOKERS PRARIE	BARTOW	FL
1475	FL0000671	CARGILL FERTILIZER INC.	MULBERRY	FL
1475	FL0032590	IMC-AGRICO CO - HOPEWELL	MULBERRY	FL
1475	FL0000264	IMC-AGRICO CO - PORT SUTTON	MULBERRY	FL
1475	FL0033332	IMC-AGRICO CO - LONESOME	MULBERRY	FL
1475	FL0027600	IMC-AGRICO CO - FT GREEN MINE	MULBERRY	FL
1475	FL0001198	CARGILL FERT.- FT. MEADE MINE	FT MEADE	FL
1475	FL0038652	FARMLAND HYDRO L.P.	TAMPA	FL
1475	FL0032522	NU-GULF INDUSTRIES INC	MYAKKA CITY	FL
1475	FL0035271	C F INDUSTRIES - HARDEE	WAUCHULA	FL
1475	FL0036412	IMC-AGRICO CO - FOUR CORNERS	MULBERRY	FL
1475	FL0040177	CF INDUSTRIES - HARDEE COMPLEX	WAUCHULA	FL
1479	FL0000655	PCS PHOSPHATE-WHITE SPRINGS-	WHITE SPRINGS	FL
1479	FL0036226	PCS PHOSPAPTE WHITE SPRINGS-	WHITE SPRINGS	FL
1479	LA0068250	FREEMPORT SULP CO-CAMINADA MINE	GULF OF MEXICO	LA
1422	MI0026514	STONECO INC-OTTAWA LAKE	OTTAWA LAKE	MI
1422	MI0045802	ROCKWOOD QUARRY LLC	NEWPORT	MI
1422	MI0003468	LAFARGE N AMERICA-STONEPORT	PRESQUE ISLE	MI
1422	MI0004111	MICH LIMESTONE-ROGERS CITY	ROGERS CITY	MI
1442	MI0001368	US SILICA CO	ROCKWOOD	MI
1442	MI0044491	SYLVANIA MINERALS	SOUTH ROCKWOOD	MI
1422	MI0051195	THOMPSON-MCCULLY QUARRY CO	NEWPORT	MI
1481	MO0002003	DOE RUN BUICK MINE	VIBURNUM	MO
1459	NC0000353	FELDSPAR CORP. / SPRUCE PINE	SPRUCE PINE	NC
1459	NC0000400	K-T FELDSPAR CORPORATION	SPRUCE PINE	NC

SIC	NPDES ID	NAME	CITY	STATE
1459	NC0000175	UNIMIN CORPORATION / QUARTZ	SPRUCE PINE	NC
1442	NY0006173	STONE WASH PLANT	PLEASANT VALLEY	NY

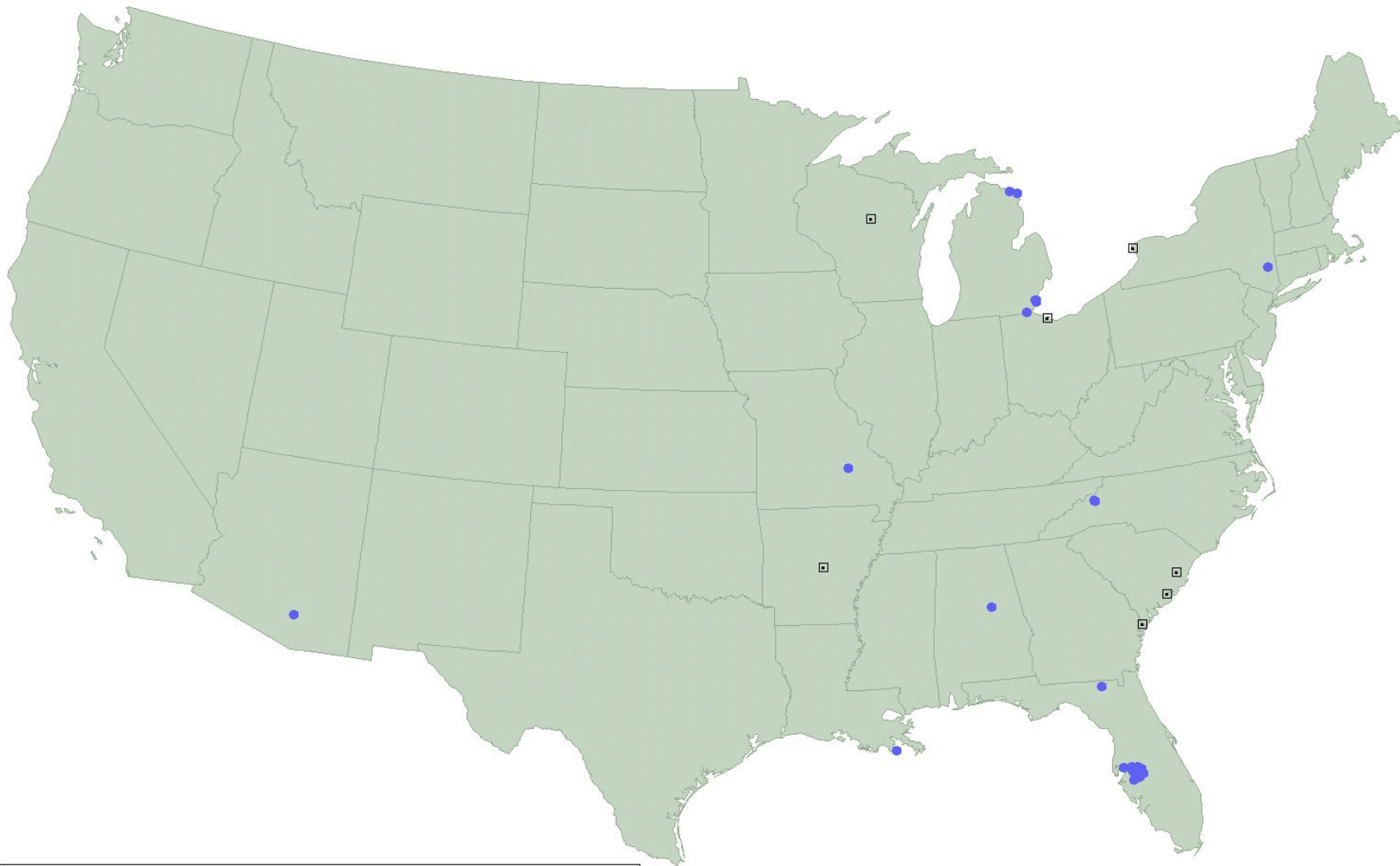
**Table 3. Mineral Mining Facilities Reporting to TRI, Sorted by State**

SIC	Facility TRI ID	Facility Name	City	State
3295	72216M POBOX	3M	LITTLE ROCK	AR
3295	31404KTLST1800E	ENGELHARD CORP. SAVANNAH OPS.	SAVANNAH	GA
3295	14305TMCRM4511H	FERRO ELECTRONIC MATERIALS	NIAGARA FALLS	NY
3275	43433NTDSTGYPSU	UNITED STATES GYPSUM CO.	GYPSUM	OH
3295	29510MTCHMROSEM	TREBOL USA L.L.C.	ANDREWS	SC
3295	29405GSRFN2900B	GS ROOFING PRODS. CO. INC. (AKA CERTAINTED CORP.)	NORTH CHARLESTON	SC
3295	54401M 144RO	3M WAUSAU DOWNTOWN	WAUSAU	WI

Of the 42 reporting facilities, 48% (20) are located in Florida. Another 17% (7) are located in Michigan. The rest are located in Alabama, Arizona, Georgia, Missouri, North Carolina, South Carolina, New York, Ohio and Wisconsin. It is worth noting that Florida is in Region IV, and other facilities are located in Alabama, North Carolina, and South Carolina meaning that 62% (26) of the reporting facilities are located in this Region. The map on the following page shows the locations of the facilities reporting to TRI or PCS.

U.S. Census data presented in Table 4 below illustrates industry trends in number of establishments and value of goods shipped between 1992 and 1997. Depending on the sector, changes in the number of establishments range from a 36% increase to a 36% decrease. The change in the value of good shipped also varied by sector, and in general increased.

North American Industry Classification System (NAICS) code 212 covers mining (except oil and gas) of metallic minerals and nonmetallic minerals, including coal. Advance comparative statistics for 1997 to 2002 for the broader category represented by NAICS code 212 show a 2% decrease in the number of establishments and a 6% increase in the value of shipments (not adjusted for inflation). See Table 5 below.



**LEGEND**

- Mineral Mining and Processing Facilities in TRI (All Reporting Facilities)
- Mineral Mining and Processing Facilities in PCS (Major Dischargers)

**Mineral Mining and Processing Facilities (2000 PCS and TRI Data)**



**Table 4. 1992 and 1997 Census Data**

SIC	Industry Segment	Number of Establishments			Value of Goods Shipped (billions of dollars)		
		1997	1992	% Change	1997	1992	% Change
1411	Dimension stone	178	NA	NA	0.13	0.10	27.0
1422	Crushed and broken limestone	1,435	1,322	8.5	4.5	3.2	40.7
1423	Crushed and broken granite	290	247	17.4	1.5	0.90	69.0
1429	Crushed and broken stone, n.e.c.	459	428	7.2	1.3	0.93	35.5
1442	Construction sand and gravel	2,367	2,430	-2.6	3.5	2.8	26.2
1446	Industrial sand	140	149	-6.0	0.51	0.41	24.5
1455	Kaolin and ball clay	35	NA	NA	0.94	0.78	20.3
1459	Clay, ceramic, and refractory minerals n.e.c.	132	148	-10.8	0.619	0.620	0.1
1474	Potash, soda, and borate minerals	27	NA	NA	1.7	1.5	12.4
1475	Phosphate rock	20	NA	NA	1.0	1.2	-14.5
1479	Chemical and fertilizer mineral mining, n.e.c.	45	70	-35.7	0.36	0.42	-14.5
1481	Nonmetallic minerals services, except fuels	172	NA	NA	0.191	0.189	1.1
1499	Misc. nonmetallic minerals, except fuels	216	270	-20.0	0.632	0.596	6.0
3275	Gypsum products	208	153	35.9	4.4	2.1	109.0

Source: 1997 U.S. Economic Census NA indicates that comparable data were not available.

**Table 5. 1997 and 2002 Census Data**

NAICS	Industry Segment	Number of Establishments			Value of Goods Shipped (billions of dollars)		
		2002	1997	% Change	2002	1997	% Change
212	Mining (except oil & gas)	7,173	7,348	-2	54	51	6

Source: 2002 U.S. Economic Census

**Wastewater Characteristics and Pollutant Sources**

Wastewater quantities and content vary day-to-day, and are affected by rainfall and exposure to surface and underground water. Composition of the wastewater depends on the mineral being mined and the raw materials required for processing. The most important pollutant parameter for this industry is suspended solids.

Many facilities achieve zero discharge by recycling wastewater through the process. Most facilities use settling ponds to control TSS. Aside from pH adjustment, chemical treatment is not common for this industry.

**Table 6. Wastewater Flows**

SIC	No. of Major Facilities Reporting Nonzero Flows	Median Facility Flow 2000 (MG)	Range of Facility Flows 2000 (MG)	Total Flow 2000 (MG)
1422	5	2,644.20	913-8499	19,175.60
1442	3	1,334.96	2-3291	4,628.54
1459	3	241.49	100-950	1,291.73
1475	15	429.20	3-3072	10,839.13
1479	2	8,845.50	8,044-9,647	17,691.00
1481	1	4,802.40	NA	4,802.40

Source: PCSLoads2000. NA– no range was calculated because only one facility reported a nonzero flow.

There are three major classifications of wastewater from mining operations:

- Mine dewatering;
- Process water; and
- Rain water runoff.

Process wastewater includes water used to transport minerals from one operation to another, water used in separation processes such as flotation and heavy media separation, air pollution control, and dust control. The pollutant concerns for mineral mining wastewater are suspended and dissolved solids. Table 7 presents sources of wastewater for each step of the mining process.

**Table 7. Process Sources of Wastewater**

Mining Process	Wastewater
Mineral Extraction	Surface runoff, groundwater seepage
Mineral Transportation	Transport water
Mineral Processing	Transport water, wash water, dust control water, classification water, heavy media separation water, flotation water, solution water, air emissions control water, floor wash down
Source: Sector Notebook for Non-Fuel, Non-Metal Mining, 1995.	

### **Pollutants Discharged**

Pollutant discharges to surface waters as reported to PCS and TRI were evaluated as part of the Factor 1 Analysis: Human Health and Environmental Impacts. Pounds reported as discharged were converted, wherever possible, to their toxic weighted pound equivalents to provide a sense of relative hazard associated with those discharges. (Note: indirect discharge amounts reflect reductions that are expected to occur at the receiving treatment facility.) Both TRI and PCS contain information about pollutants discharged by mineral mining facilities, although the single reporting TRI facility discharges a very small amount of toxic weighted pound equivalents (TWPEs).

**PCS:** Of the 35 facilities reporting discharges to PCS, two facilities in Michigan discharge 67% of the pounds reported as discharged to this database. Combined, discharges from the six facilities in Michigan account for 72% of the pounds reported discharged. The remaining 27% is contributed by the 17 facilities in Florida. *When looking at toxic weighted pounds, discharges reported to PCS by a single facility in Florida (with two NPDES permit numbers) accounts for 50% of the toxic weighted pound equivalents (TWPE) discharged by this industry. A second facility in Florida discharges an additional 14% of the PCS TWPE. Overall, the 17 facilities in Florida contribute 78% of the TWPE discharged. An additional 14% is contributed by the three facilities in North Carolina.*

**TRI:** Seven facilities report discharges to TRI. A single facility in Georgia contributes 69% of the pounds reported as discharged to this database. AN additional 30% is contributed by two other

facilities, one located in South Carolina and the other in New York. *When looking at toxic weighted pounds, discharges reported to TRI by two facilities account for 95% of the TWPE discharged by this industry. A facility in Arkansas accounts for 55% of the TWPE, and a second facility in New York contributes an additional 40%.*

**Overall:** Of the 48 facilities reporting discharges to PCS and TRI, two facilities in Michigan discharge 67% of the pounds reported as discharged to this database. Combined, discharges from the seven facilities in Michigan (part of Region V) account for 72% of the pounds reported discharged. The remaining 27% is contributed by the 17 facilities in Florida. *When looking at toxic weighted pounds, discharges reported to PCS by a single facility in Florida (with two NPDES permit numbers) accounts for 48% of the TWPE discharged by this industry. A second facility in Florida discharges an additional 14% of the PCS TWPE. Overall, the 17 facilities in Florida contribute 75% of the TWPE discharged. An additional 14% is contributed by the three facilities in North Carolina. Basically, 89% of the TWPE discharged by this industry is discharged by facilities in Region IV.*

Discharged pollutants can be characterized as nonconventional, conventional, or priority pollutants. Table 8 below shows the relative contributions of each pollutant type. See Attachment D for the discharges in toxic weighted pounds as reported to PCS by each facility and see Attachment E for the discharges in toxic weighted pounds as reported to TRI by each facility. See Attachment F for a breakout of these discharges by pollutant. A discussion of each pollutant type discharged follows the table.

**Table 8. Pollutant Discharges Reported to PCS and TRI**

<b>Pollutant Category &amp; Primary Pollutants</b>	<b>PCS LBS</b>	<b>PCS TWPE</b>	<b>TRI POUNDS</b>	<b>TRI TWPE</b>
<b>All Pollutants</b>	<b>95,892,593</b>	<b>29,402</b>	<b>479,076</b>	<b>1,137</b>
<b>Nonconventional</b>	<b>91,767,088</b>	<b>28,215</b>	<b>477,573</b>	<b>109</b>
TOTAL DISSOLVED SOLIDS	67,076,047	0	0	0
TOTAL FLUORIDE	759,269	26,574	0	0
BARIUM	0	0	17,793	35
NITROGEN, NITRATE TOTAL (as N)	32	0	443,398	27
<b>Conventional</b>	<b>4,116,305</b>	<b>0</b>	<b>0</b>	<b>0</b>
TOTAL SUSPENDED SOLIDS	4,082,539	99%	–	–
OIL AND GREASE	33,766	1%	–	–
<b>Priority</b>	<b>9,200</b>	<b>1,187</b>	<b>1,503</b>	<b>1,029</b>
LEAD	200	449	184	412

<b>Pollutant Category &amp; Primary Pollutants</b>	<b>PCS LBS</b>	<b>PCS TWPE</b>	<b>TRI POUNDS</b>	<b>TRI TWPE</b>
ZINC	8,764	410	312	15
COPPER	100	63	750	470
CHROMIUM	0	0	257	132

Nonconventional Pollutants Over 96% of the pounds of both discharged pollutants reported to TRI and PCS and total discharged TWPE are primarily nonconventional pollutants. Total fluoride contributes 97% of the nonconventional TWPE, and 89% of the total TWPE discharged by this industry.

Conventional Pollutants Only 4% of the discharged pounds reported to PCS are conventional pollutants, specifically total suspended solids (TSS) and Oil and Grease. However, toxic weights are not available for conventional pollutant parameters. No information on conventional pollutants is available through TRI.

Priority Pollutants Priority pollutants contributed only 7% of the total TWPE reportedly discharged by this industry. Among the priority pollutants discharged, lead, copper, and zinc accounted for 81% of the discharged TWPE.

For purposes of comparison, the toxic weighted pound equivalents (TWPE) for Mineral Mining are presented in the following tables along with the industries reporting the highest discharges in each database. Table 9 presents the information reported to PCS and Table 10 presents the information reported to TRI. For a description of the derivation of the values in these tables, see the memo in the public record titled "Description and Results of EPA Methodology to Synthesize Screening Level Results for the Effluent Guidelines Program Plan for 2004/2005," which is available through Edocket at document number OW-2003-0074-0391.

**Table 9. Mineral Mining TWPE Reported to PCS Compared to Top Ranking Results**

<b>40 CFR Part</b>	<b>Point Source Category</b>	<b>PCS Reported TWPE</b>	<b>PCS Rank</b>
423	Steam electric power generation	2,933,209	1
414	Organic chemicals, plastics and synthetic fibers	1,805,928	2
422	Phosphate manufacturing	1,095,321	3
415	Inorganic chemicals manufacturing	853,568	4

<b>40 CFR Part</b>	<b>Point Source Category</b>	<b>PCS Reported TWPE</b>	<b>PCS Rank</b>
421	Nonferrous metals manufacturing	434,925	5
440	Ore mining and dressing	383,560	6
410	Textile mills	296,601	7
419	Petroleum refining	198,251	8
455	Pesticide chemicals manufacturing, formulating	178,977	9
418	Fertilizer manufacturing	116,464	10
<b>436</b>	<b>Mineral Mining</b>	<b>29,402</b>	<b>15</b>

**Table 10. Mineral Mining TWPE Reported to TRI Compared to Top Ranking Results**

<b>40 CFR Part</b>	<b>Point Source Category</b>	<b>TRI Reported TWPE</b>	<b>TRI Rank</b>
414	Organic chemicals, plastics and synthetic fibers	7,303,782	1
423	Steam electric power generation	1,856,645	2
421	Nonferrous metals manufacturing	978,450	3
430	Pulp, paper and paperboard (Phase II)	628,785	4
415	Inorganic chemicals manufacturing	624,250	5
429	Timber products processing	404,926	6
419	Petroleum refining	385,347	7
455	Pesticide chemicals manufacturing, formulating	324,393	8
428	Rubber manufacturing	166,343	9
463	Plastic molding and forming	106,189	10
<b>436</b>	<b>Mineral Mining</b>	<b>1,137</b>	<b>33</b>

## Treatment Technology and Pollution Prevention

*Solids removal:* The predominant treatment technique for solids removal involves the use of settling ponds. Other treatment technologies that may be used include flocculation, filters, clarifiers, and thickeners.

*Neutralization/Chemical Precipitation:* This treatment technology is often used for removal of dissolved solids such as fluoride, iron, sulfides, and zinc.

*Recycle:* Facilities recycle settled wastewater to the process.

**Table 11. Water Conservation and Pollution Prevention Alternatives**

Process	Water Conservation/Pollution Prevention Alternatives
Surface Runoff	Use diversion systems to channel runoff away from exposed mine pits and waste dumps.
Dust Control	Reuse contaminated wastewater for dust elimination in the mineral extraction process.
Groundwater Seepage	Use subsurface drainage systems and barriers to collect or deflect groundwater prior to contact with exposed mine pits.
Source: Sector Notebook for Non-Fuel, Non-Metal Mining, 1995.	

### Concerns Identified Pre-Proposal

Mineral Mining and Processing was identified by several groups surveyed by the Agency in the process of preparing the 2004/2005 Plan. Each group and their suggestions are summarized below.

*Previous Suggestions (Sec. 2.4 of the “Factor 4 Analysis: Implementation and Efficiency Considerations – Status of Screening Level Review Phase” (Edocket OW-2003-0074-0329)*  
 Responders suggested the need for more complete effluent guidelines, including the addition of TSS limits, and were concerned that the existing guidelines are inconsistently applied.

### Concerns Identified in Comments to Proposal

For the Crushed Stone Subcategory and the Construction Sand and Gravel Subcategory, a commenter asserts that the existing effluent guidelines established by the EPA for the aggregates industry are adequate. The constituents indicative of discharges from aggregate operations are

limited, and no new processes have developed within the aggregates industry over the past several decades that would contribute to an increase of constituents discharged. These conclusions are supported by the findings of two reports indicate that the existing guidelines are adequate. These reports are 1) the National Stone Association (NSA) April 1993 report “An Analysis of the EPA Effluent Guidelines and Standards For the Mineral Mining Industrial Category as Related to the Requirements of the EPA NPDES Storm Water Regulations” and 2) U.S. EPA’s June 1982 report from the Office of Water & Waste Management, “The Effects of Discharges from Limestone Quarries on Water Quality and Aquatic Biota”

### **Followup Contacts**

Marv Rubin, EPA/OST/EAD (202) 566-1050

Edward Stone, Maryland Department of Environment, (410) 537-5323

Dan Sweeney, EPA Region 3, (215) 814-5731

### **Possible Solutions**

EPA appreciates all comments and suggestions provided by the stakeholders and EPA Regional staff. However, as with any comments received by the Agency, EPA can not address these suggestions without adequate supporting data. The major issue raised concerned a lack of TSS limitations. Contrary to this stakeholder’s assertion, the effluent guidelines for Mineral Mining contain TSS limits for three of the 21 subcategories. For 16 of the remaining 18, limits are set at no discharge of process wastewater with the exception of stormwater or cases in which wet scrubbers, wet processes, or flotation processes. (The sand and gravel subcategory and the industrial sand category have limits only for pH.) Based on information reported to TRI and PCS, toxic discharges from mineral mining facilities are low relative to other industrial categories. In addition, generally, a few facilities drive the TWPE estimates from both TRI and PCS. In the event that stakeholders provide additional data and supporting information, on these or any of the issues identified above, EPA will reevaluate them at that time. In the absence of revisions to the effluent guidelines, these concerns could be addressed through improved information dissemination and outreach by EPA.

***Pollutants Not Covered by the Guidelines:*** The effluent guidelines do in fact set limits for total suspended solids (TSS) for three of the 21 subcategories. For 16 of the remaining 18, limits are set at no discharge of process wastewater with the exception of stormwater or cases in which wet scrubbers, wet processes, or flotation processes. (The sand and gravel subcategory and the industrial sand category have limits only for pH.) In these circumstances, permit writers can use best professional judgement (BPJ) to set TSS limits for stormwater, and are referred to existing stormwater permits for feasible limits for TSS in stormwater. More complex questions are best addressed through individual discussions with Engineering and Analysis (EAD) staff. EAD can share these concerns with the Office of Wastewater Management (OWM) to assist them in implementing multi-sector general permits for stormwater.



***Consistent Application of the Guidelines:*** Inconsistent application of the guidelines is often the result of lack of information. This condition can best be addressed through improved dissemination of information about the guidelines. EAD can share these concerns with the OWM to assist them in increasing the consistency of application of effluent guidelines.

***Summary of Potential Solutions:*** Concerns identified for this industry could be addressed through improved information dissemination and outreach by EPA. This is especially true due to the concentration of existing mines in Region 4 and in Michigan. The Agency could prepare a fact sheet with answers to frequently asked questions (FAQs), including information on BPJ for stormwater discharges, and post it on its web site. In addition, the Agency could announce the availability of this fact sheet, and the name of the current EAD staff available to answer questions at the regular meetings for permit writers and pretreatment coordinators held by the OWM and through email alerts to the EAD stakeholder mailing list. Finally, due to the relatively small number of facilities discharging the bulk of the TWPE, EPA could also provide assistance to permit writers in preparing BPJ-based permits.

## **Attachment A**

### **EPA Databases and References Used in this Review**

#### **Overview of 304(m) Planning Process**

CWA Section 304(m)(1) requires EPA to establish a schedule for the annual review and revision of all existing effluent guidelines and to identify categories of point sources discharging toxic or non-conventional pollutants for which EPA has not published effluent guidelines. To accomplish this review, EPA conducted a screening-level analysis using readily available information from EPA's Permit Compliance System (PCS) and Toxics Release Inventory (TRI) databases. EPA estimated the mass of pollutants discharged from each category, weighted the pollutant releases based on chemical toxicity, and ranked the categories based on the toxic-weighted pollutant releases.

In addition to reported discharges in PCS and TRI, EPA used other readily available data, as well as information from public outreach, including industry categories recommended by stakeholders for regulatory development or regulatory revision, to evaluate implementation and efficiency considerations.

For additional details on EPA's screening-level analysis refer the following documents in EPA Docket Number OW-2003-0074:

- Memorandum: Description and Results of EPA Methodology to Synthesize Screening Level Results for the Effluent Guidelines Program Plan for 2004/2005, DCN 548, Section 3.0;
- Development of PCSLoads 2000, DCN 620, Section 2.1.2 (this document explains how pollutant loads were calculated from PCS data); and
- Evaluation of RSEI Model Runs, DCN 618, Section 2.1.1.

Information from EPA's Permit Compliance System (PCS) and Toxics Release Inventory (TRI) databases were used to create the PCSLoads2000 and TRIRelases2000 databases. These databases were the primary source of information used to conduct this review. Since this industry ranked low during the screening phase, however, EPA did not verify any of the information reported to PCS and TRI, and has used it as reported.

#### **TRIRelases2000**

The Toxic Release Inventory (TRI) is the major source of data for the TRIRelases2000 database. TRI is the common name for Section 313 of the Emergency Planning and Community

Right-to-Know Act (EPCRA). Each year, facilities that meet certain thresholds must report their releases and other waste management activities for listed toxic chemicals. That is, facilities must report the quantities of toxic chemicals recycled, collected and combusted for energy recovery, treated for destruction, or disposed of. A separate report must be filed for each chemical that exceeds the reporting threshold. The TRI list of chemicals for reporting year 2000 includes more than 600 chemicals and chemical categories. For this review, EPA used data for reporting year 2000, because they were the most recent available at the time the review began.

There are three criteria that a facility must meet to be required to submit a TRI report for that reporting year. The criteria are:

- (1) *SIC Code Determination*: Facilities in SIC Codes 20 through 39, seven additional SIC codes outside this range, and federal facilities must concern themselves with TRI reporting. EPA rarely checks or refutes facility claims regarding the SIC code identification. The primary SIC code determines TRI reporting.
- (2) *Number of Employees*: Facilities must have 10 or more full-time employees or their equivalent. EPA defines a “full-time equivalent” as a person that works 2,000 hours in the reporting year (there are several exceptions and special circumstances that are well-defined in the TRI reporting instructions).
- (3) *Activity Thresholds*: If the facility is in a covered SIC code and has 10 or more full-time employee equivalents it must conduct an activity threshold analysis for every chemical and chemical category on the current TRI list. The facility must determine whether it manufactures, processes, OR otherwise uses each chemical at or above the appropriate activity threshold. Reporting thresholds are not based on the amount of release. All TRI thresholds are based on mass, not concentration. Different thresholds apply for persistent bioaccumulative toxic (PBT) chemicals than for non-PBT chemicals.

In TRI, facilities report annual loads released to the environment of each toxic chemical or chemical category that meets reporting requirements. They must report onsite releases to air, receiving streams, disposal to land, underground wells, and several other categories. They must also report the amount of toxic chemicals in wastes transferred to off-site locations, including discharges to POTWs and other off-site locations, such as commercial waste disposal facilities.

For this review, EPA focused on the amount of chemicals facilities reported either discharging directly to a receiving stream or transferring to a POTW. For facilities discharging directly to a stream, the loads were taken directly from the reported TRI data for calendar year 2000. For facilities that transfer toxic chemicals to POTWs, EPA first adjusted the TRI pollutant loads reported to be transferred to POTWs to account for pollutant removal that occurs at the POTW prior to discharge to the receiving stream. This adjustment was made using POTW

removal efficiencies from EPA's Risk Screening Environmental Indicators (RSEI) model (see Section 2.1.1 of the docket for more information on TRI and the RSEI model).

Reporting facilities are not required to sample and analyze wastestreams to determine the quantities of toxic chemicals released. They may estimate releases based on mass balance calculations, published emission factors, site-specific emission factors, or other approaches. Facilities are required to indicate, by a reporting code, the basis of their release estimate. TRI's reporting guidance is that for chemicals reasonably expected to be present but measured below the detection limit, facilities should use one half the detection limit to estimate the mass released. The guidance is slightly different for dioxins and dioxin-like compounds in that it allows non-detects to be treated as zero.

TRI provides the option for facilities to report releases as specific numbers or as ranges, if appropriate. Specific estimates are encouraged if data are available to ensure the accuracy; however, EPA allows facilities to report releases in the following ranges: 1 to 10 pounds, 11 to 499 pounds, and 500 to 999 pounds. For this analysis, EPA used the mid-point of each reported range to represent a facility's releases.

EPA weighted the direct and indirect pollutant releases to surface waters using toxic weighting factors (TWFs) developed by Office of Water/Engineering and Analysis Division (EAD), to calculate toxic weighted pound equivalents (TWPE) for each reported release. See 4.2.3 and 4.2.4 for more discussion of TWFs and calculation of TWPE. EPA compiled data taken from TRI, the adjusted releases from POTWs to surface waters, the calculated TWPE, and the relationship between SIC codes and point source category into a Microsoft Access™ database named *TRIReleases2000*. Some corrections were made to this database as further study was conducted on the TRI data. Limitations of TRI are discussed in Section IV of the Technical Support Document for this planning process.

## **PCSLoads2000**

The Permit Compliance System (PCS) is the major source of data for the PCSLoads2000 database. PCS is a computerized management information system maintained by EPA's Office of Enforcement and Compliance Assurance (OECA). It was created to track permit, compliance, and enforcement status of facilities regulated by the National Pollutant Discharge Elimination System (NPDES) program under the Clean Water Act (CWA).

More than 65,000 industrial facilities and water treatment plants have obtained permits for water discharges of regulated pollutants. To provide an initial framework for setting permit issuance priorities, EPA developed a major/minor classification system for industrial and municipal wastewater discharges. Major discharges almost always have the capability to impact receiving waters if not controlled and, therefore, have been accorded more regulatory attention than minor discharges. There are approximately 6,400 facilities (including sewerage systems)

with major discharges for which PCS has extensive records. Permitting authorities classify discharges as major based on an assessment of six characteristics:

- (1) toxic pollutant potential;
- (2) ratio of discharge flow to stream flow;
- (3) conventional pollutant loading;
- (4) public health impact;
- (5) water quality factors; and
- (6) proximity to coastal waters.

Facilities with major discharges must report compliance with NPDES permit limits via monthly Discharge Monitoring Reports (DMRs) submitted to the permitting authority. The permitting authority enters the reported DMR data into PCS, including the type of violation (if any), concentration and quantity values, and the Quarterly Non-Compliance Report (QNCR) indicators. Minor discharges may, or may not, adversely impact receiving water if not controlled. Therefore, EPA does not require DMRs for facilities with minor discharges. For this reason, the PCS database includes data only for a limited set of minor dischargers when the states choose to include these data. As a consequence, extensive data are not available for minor discharges in PCS.

Parameters in PCS include water quality parameters (such as pH and temperature), specific chemicals, bulk parameters (such as BOD<sub>5</sub> and TSS), and flow rates. Although other pollutants may be discharged, PCS only contains data for the parameters identified in the facility's NPDES permit. Facilities typically report monthly average pounds per day discharged, but also report daily maxima, and pollutant concentrations.

For this review, EPA used data for reporting year 2000, to correspond to the data obtained from TRI. EPA used its Effluent Data Statistics (EDS) system program to calculate annual pollutant discharges using the monthly reports in PCS. Because units of measure vary widely in PCS, EPA developed the EDS system to estimate mass loadings based on data stored in PCS. The EDS system uses existing PCS reported mass loading values or multiplies reported discharge flows and effluent concentrations to estimate loadings for each outfall (discharge pipe), taking into account the various units of concentration and flow rates.

Where concentrations were reported as below detection limit (BDL) EPA assumed the parameter concentration was equal to zero for parameters never detected by the facility in 2000. For parameters sometimes detected and sometimes not, the "BDL" concentration was set equal to half of the detection limit. . The EDS system program sums the monthly loads to calculate annual discharges, interpolating (using average reported loads) for months with missing reports.

EPA weighted the calculated annual pollutant discharges using EAD's TWFs to calculate TWPE for each reported discharge, as it did for the reported TRI releases. See sections 4.2.3 and 4.2.4 for more discussion of TWFs and calculation of TWPE. EPA compiled data taken from

PCS, the calculated TWPE, and the relationship between SIC codes and point source category into a Microsoft Access™ database named *PCSLoads2000*. As further study was conducted on the PCS data, some corrections were made.

### **Other Information Sources**

In addition to TRI and PCS, EPA used the following sources of information in its review of this industry include:

- 1997 Economic Census data; and 2002 Economic Census data.
- Contacts with reporting facilities to verify reported releases and facility categorization.
- US EPA, 1979. Development Document for Effluent Limitations Guidelines and Standards for the Mineral Mining and Processing Industry.440176059b.
- US EPA, 1995. Profile of the Non-Fuel, Non-Metal Mining Industry. Publication # 310-R-95-011.
- US Census Bureau. Comparative Statistics for the United States. Accessed at <<http://www.census.gov>> on June 28, 2004.

**Attachment B**  
**Point Source Categories Identified Solely Through Factor 4**

<b>Industry</b>	Formal Comment Process		Previous Suggestions (Sec. 2.4)	Draft <i>Strategy</i> Outreach	
	Comments on Draft <i>Strategy</i> (Sec. 2.2)	Comments on 2002/2003 Plan (Sec. 2.3)		Permitting Authorities (Sec. 2.5)	AMSA & ASIWPCA (Sec. 2.6)
Coal Mining		✓	✓		✓
Coil Coating				✓	
Dairy Products Processing			✓		
Electrical and Electronic Components				✓	
Fruits and Vegetable Processing			✓	✓	
Metal Molding and Casting	✓		✓	✓	✓
Mineral Mining and Processing			✓		
Seafood Processing			✓	✓	✓

## **Attachment C**

### **Applicability and Regulatory History**

#### **Applicability of 40 CFR Part 436**

*Subpart A—Dimension Stone Subcategory [Reserved]*

*Subpart B—Crushed Stone Subcategory.* The provisions of this subpart are applicable to the mining or quarrying and the processing of crushed and broken stone and riprap. This subpart includes all types of rock and stone. Rock and stone that is crushed or broken prior to the extraction of a mineral are elsewhere covered. The processing of calcite, however, in conjunction with the processing of crushed and broken limestone or dolomite is included in this subpart.

*Subpart C—Construction Sand and Gravel Subcategory.* The provisions of this subpart are applicable to the mining and the processing of sand and gravel for construction or fill uses, except that on-board processing of dredged sand and gravel which is subject to the provisions of 33 CFR part 230 of this chapter will not be governed by the provisions of this subpart.

*Subpart D—Industrial Sand Subcategory.* The provisions of this subpart are applicable to the mining and the processing of sand and gravel for uses other than construction and fill. These uses include, but are not limited to glassmaking, molding, abrasives, filtration, refractories, and refractory bonding.

*Subpart E—Gypsum Subcategory.* The provisions of this subpart are applicable to the processing of gypsum.

*Subpart F—Asphaltic Mineral Subcategory.* The provisions of this subpart are applicable to the processing of bituminous limestone, oil-impregnated diatomite and oilsonite not primarily as an energy source.

*Subpart G—Asbestos and Wollastonite Subcategory.* The provisions of this subpart are applicable to the processing of asbestos and wollastonite.

*Subpart H—Lightweight Aggregates Subcategory [Reserved]*

*Subpart I—Mica and Sericite Subcategory [Reserved]*

*Subpart J—Barite Subcategory.* The provisions of this subpart are applicable to the processing of barite.

*Subpart K—Fluorspar Subcategory.* The provisions of this subpart are applicable to the processing of fluorspar.



*Subpart L—Salines From Brine Lakes Subcategory.* The provisions of this subpart are applicable to the processing of salines from brine lakes.

*Subpart M—Borax Subcategory.* The provisions of this subpart are applicable to the processing of borate minerals. Borax obtained from brine lakes is regulated in the salines from brine lakes subcategory (subpart L of this part).

*Subpart N—Potash Subcategory.* The provisions of this subpart are applicable to the processing of potash. Potash obtained from brine lakes is regulated in the saline from brine lakes subcategory (subpart L of this part).

*Subpart O—Sodium Sulfate Subcategory.* The provisions of this subpart are applicable to the processing of sodium sulfate. Sodium sulfate obtained from brine lakes is regulated in the salines from brine lakes subcategory (subpart L of this part).

*Subpart P—Trona Subcategory [Reserved]*

*Subpart Q—Rock Salt Subcategory [Reserved]*

*Subpart R—Phosphate Rock Subcategory.* The provisions of this subpart are applicable to the mining and the processing of phosphate bearing rock, ore or earth for the phosphate content.

*Subpart S—Frasch Sulfur Subcategory.* The provisions of this subpart are applicable to the processing of sulfur on shore and in marshes and estuaries by the Frasch process. Not covered are sulfur refining operations that are not performed at the mining and collection site.

*Subpart T—Mineral Pigments Subcategory [Reserved]*

*Subpart U—Lithium Subcategory [Reserved]*

*Subpart V—Bentonite Subcategory.* The provisions of this subpart are applicable to the processing of bentonite.

*Subpart W—Magnesite Subcategory.* The provisions of this subpart are applicable to the processing of naturally occurring magnesite ore.

*Subpart X—Diatomite Subcategory.* The provisions of this subpart are applicable to the processing of diatomite.

*Subpart Y—Jade Subcategory.* The provisions of this subpart are applicable to the processing of jade.

*Subpart Z—Novaculite Subcategory.* The provisions of this subpart are applicable to the

processing of novaculite.

*Subpart AA—Fire Clay Subcategory [Reserved]*

*Subpart AB—Attapulgitic and Montmorillonite Subcategory [Reserved]*

*Subpart AC—Kyanite Subcategory [Reserved]*

*Subpart AD—Shale and Common Clay Subcategory [Reserved]*

*Subpart AE—Aplite Subcategory [Reserved]*

*Subpart AF—Tripoli Subcategory.* The provisions of this subpart are applicable to the processing of tripoli.

*Subpart AG—Kaolin Subcategory [Reserved]*

*Subpart AH—Ball Clay Subcategory [Reserved]*

*Subpart AI—Feldspar Subcategory [Reserved]*

*Subpart AJ—Talc, Steatite, Soapstone and Pyrophyllite Subcategory [Reserved]*

*Subpart AK—Garnet Subcategory [Reserved]*

*Subpart AL—Graphite Subcategory.* The provisions of this subpart are applicable to the mining and processing of naturally occurring graphite.

## **REGULATORY BACKGROUND**

### **Regulatory History**

Interim final regulations were published October 16, 1975 for Subparts E, F, G, J, K, L, N, O, S, V, W, X, Y, Z, AF, and AL.

Proposed regulations were issued June 10, 1976 for Subparts B, C, D, E, F, G, J, K, L, M, N, O, R, S, V, W, X, Y, Z, AF, and AL.

Final versions of the effluent limitations for Subparts B, C, D, and R were published July 1979. National Amendments were made to the effluent Guidelines December 28, 1979.

## Existing Limitations

Limitations for BAT are the same as BPT for all subcategories except industrial sand HF floatation; rock salt; sulphur (frash process, salt dome operations); feldspar floatation; and talc (heavy media and floatation). Limitations for NSPS are the same as BAT. EPA established no limitations for PSES or PSNS.

The following processes are required to achieve no discharge of process generated waste water pollutants to navigable waters:

- A. Dimension Stone;
- B. Crushed Stone (dry process only);
- C. Construction Sand and Gravel (dry process only);
- D. Industrial Sand (dry process only);
- E. Gypsum;
- F. Asphaltic Minerals:
  - bituminous limestone;
  - oil impregnated diatomite;
  - gilsonite;
- G. Asbestos and Wollastonite;
- H. Lightweight Aggregates:
  - perlite;
  - pumice;
  - vermiculite;
- I. Mica and Sericite:
  - mica and sericite (dry process);
  - mica (wet process, grinding process);
  - mica (wet beneficiation process);
- J. Barite (dry process only);
- K. Fluorspar (heavy media separation process only);
- M. Borax;
- N. Potash;
- O. Sodium Sulfate;
- P. Trona;
- S. Sulfur (anhydrite only);
- T. Mineral Pigments;
- V. Bentonite;
- W. Magnesite;
- X. Diatomite;
- Y. Jade;
- Z. Novaculite;
- AA. Fire Clay;
- AB. Fuller's Earth (montmorillonite and attapulgite);
- AC. Kyanite;

- AD. Shale and Common Clay;
- AE. Aplite;
- AF. Tripoli;
- AG. Kaolin (general purpose grade);
- AH. Ball Clay;
- AI. Feldspar (non-flotation processes); and
- AJ. Talc Group (dry and washing processes).

The concentration-based limitations presented in Table C-1 apply to discharges from wet processes, flotation processes, mine dewatering, and dredging for the crushed stone, construction sand and gravel, and industrial sand subcategories of 40 CFR Part 436. Dry processes for these subcategories are required to achieve no discharge of process wastewater. Concentration-based limits for other subcategories of Part 436 are presented in Table C-2.

**Table C-1. Effluent Guidelines for Crushed Stone, Construction Sand and Gravel, and Industrial Sand Subcategories of Part 436**

Parameter	BPT 30-day averages (mg/L)	BPT daily maximum (mg/L)
TSS <sup>a</sup>	25	45
pH	within range of 6 to 9	within range of 6 to 9

<sup>a</sup>BPT limits for industrial sand HF flotation for TSS are 0.023kg/kkg (monthly avg) and 0.046 kg/kkg (daily maximum), and 0.003 kg/kkg (monthly avg) and 0.006 kg/kkg (daily maximum) for fluoride. BAT requires no discharge.

**Table C-2. Effluent Guidelines for Other Subcategories<sup>a</sup> of Part 436**

Parameter	BPT 30-day averages (mg/L)	BPT daily maximum (mg/L)
TSS	10 to 50	20 to 100
Total iron <sup>b</sup>	1 to 3.5	2 to 7
Sulfide <sup>c</sup>	1 to 5	2 to 10
Zinc <sup>d</sup>	0.25	0.50

<sup>a</sup>Subcategories include barite mine dewatering, phosphate rock, sulfur (frash, salt dome operations), fire clay acid mine drainage, kaoline (wet process), talc (mine dewatering), and graphite.  
<sup>b</sup>Total iron limits for barite mine dewatering, fire clay acid mine drainage, and graphte only.  
<sup>c</sup>Sulfide limits for Sulfur (frash, salt dome operations) only. BAT limits for sulfur are 1 to 2 mg/L (monthly avg) and 2 to 4 mg/L (daily maximum).  
<sup>d</sup>Zinc limits for Kaolin wet processing only.

The limitations guidelines in Table C-3 are normalized on the basis of metric ton (kkg) of raw material.

**Table C-3. Normalized Effluent Guidelines for Subcategories<sup>a</sup> of Part 436**

<b>Parameter</b>	<b>BPT 30-day averages (kg/kkg)</b>	<b>BPT daily maximum (kg/kkg)</b>
TSS <sup>b,c</sup>	0.02 to 1.5	0.04 to 3.0
Fluoride <sup>d</sup>	0.175	0.35
Dissolved fluoride <sup>e</sup>	0.2	0.4
<p><sup>a</sup>Subcategories include feldspar floatation; talc, steatite, soapstone, and pyrophyllite (heavy media separation and flotation); mica wet beneficiation process (ceramic grade clay by-product); fluorspar flotation; and rock salt.  <sup>b</sup>BAT limits for TSS for talc (heavy media and flotation) are 0.3 kg/kkg (monthly avg) and 0.6 kg/kkg (daily maximum).  <sup>c</sup>BAT limits for TSS for rock salt are 0.002 kg/kkg (monthly avg) and 0.004 kg/kkg (daily maximum).  <sup>d</sup>Fluoride limits for feldspar flotation only. BAT limits for fluoride are 0.13 kg/kkg (monthly avg) and 0.26 (daily maximum).  <sup>e</sup>Dissolved fluoride limits for fluorspar flotation only.</p>		

**Attachment D  
PCS Discharges**

SIC	NPDES ID	NAME	CITY	Flow (MGD)	LBS/YR	TWPE	Percent of Total SIC TWPE	Cumulative Percent of Total SIC TWPE
1422	MI0026514	STONECO INC-OTTAWA LAKE	OTTAWA LAKE	3	2,731,974	14	79%	79%
1422	MI0045802	ROCKWOOD QUARRY LLC	NEWPORT	4	35,725,744	4	21%	100%
1422	MI0003468	LAFARGE N AMERICA-STONEPORT	PRESQUE ISLE	15	490,997			
1422	MI0004111	MICH LIMESTONE-ROGERS CITY	ROGERS CITY	23	905,684			
1422	AL0003662	SYLACAUGA OPERATIONS IMERYS	SYLACAUGA	7	118,539			
1422	MI0051195	THOMPSON-MCCULLY QUARRY CO	NEWPORT	0	0			
<b>1422</b>	<b>TOTAL</b>			<b>53</b>	<b>39,972,938</b>	<b>17</b>		
1442	MI0001368	US SILICA CO	ROCKWOOD	9	301,473	1,097	76%	76%
1442	MI0044491	SYLVANIA MINERALS	SOUTH ROCKWOOD	4	29,085,018	343	24%	100%
1442	NY0006173	STONE WASH PLANT	PLEASANT VALLEY	0	44			
1442	AZ0024384	SAN XAVIER ROCK & MATERIALS	CORTARO	0	0			
<b>1442</b>	<b>TOTAL</b>			<b>13</b>	<b>29,386,535</b>	<b>1,441</b>		
1459	NC0000353	FELDSPAR CORP. / SPRUCE PINE	SPRUCE PINE	3	554,264	2,623	66%	66%
1459	NC0000400	K-T FELDSPAR CORPORATION	SPRUCE PINE	0.28	79,472	862	22%	88%
1459	NC0000175	UNIMIN CORPORATION / QUARTZ	SPRUCE PINE	1	74,516	491	12%	100%
<b>1459</b>	<b>TOTAL</b>			<b>4</b>	<b>708,251</b>	<b>3,976</b>		
1475	FL0000230	IMC-AGRICO CO - NORALYN/PHO.	MULBERRY	8	8,713,689	4,149	51%	51%
1475	FL0001902	US AGRI-CHEMICALS-FT MEADE	FORT MEADE	4	4,723,294	1,418	17%	68%
1475	FL0000353	IMC-AGRICO CO - PAYNE CK MINE	MULBERRY	3	689,813	687	8%	76%
1475	FL0037958	CARGILL FERT-S FT MEADE MINE	NICHOLS	1	3,919,551	497	6%	82%
1475	FL0000311	AGRIFOS L.L.C. - NICHOLS MINE	NICHOLS	4	1,819,911	429	5%	88%
1475	FL0000256	IMC-AGRICO CO - KINGSFORD	MULBERRY	1	432,136	326	4%	92%
1475	FL0033294	CARGILL FERT.-HOOKERS PRARIE	BARTOW	0.46	482,411	205	3%	94%
1475	FL0000671	CARGILL FERTILIZER INC.	MULBERRY	0.23	57,992	199	2%	97%
1475	FL0032590	IMC-AGRICO CO - HOPEWELL	MULBERRY	1	389,976	150	2%	98%

SIC	NPDES ID	NAME	CITY	Flow (MGD)	LBS/YR	TWPE	Percent of Total SIC TWPE	Cumulative Percent of Total SIC TWPE
1475	FL0000264	IMC-AGRICO CO - PORT SUTTON	MULBERRY	3	124,317	113	1%	100%
1475	FL0033332	IMC-AGRICO CO - LONESOME	MULBERRY	0	20,575	12	0%	100%
1475	FL0027600	IMC-AGRICO CO - FT GREEN MINE	MULBERRY	0	3,066	4	0%	
1475	FL0001198	CARGILL FERT. - FT. MEADE MINE	FT MEADE	1	225,886	1	0%	
1475	FL0038652	FARMLAND HYDRO L.P.	TAMPA	2	11,707	0	0%	
1475	FL0032522	NU-GULF INDUSTRIES INC	MYAKKA CITY	0	93,936			
1475	FL0036412	IMC-AGRICO CO - FOUR CORNERS	MULBERRY	0	0			
1475	FL0040177	CF INDUSTRIES - HARDEE COMPLEX	WAUCHULA	0	0			
1475	FL0035271	C F INDUSTRIES - HARDEE	WAUCHULA	0	0			
<b>1475</b>	<b>TOTAL</b>			<b>30</b>	<b>21,708,260</b>	<b>8,190</b>		
1479	FL0000655	PCS PHOSPHATE-WHITE SPRINGS-	WHITE SPRINGS	22	2,104,249	8,658	59%	59%
1479	FL0036226	PCS PHOSPAHTE WHITE SPRINGS-	WHITE SPRINGS	26	1,955,319	6,069	41%	100%
1479	LA0068250	FREEPORT SULP CO-CAMINADA MINE	GULF OF MEXICO	0	0			
<b>1479</b>	<b>TOTAL</b>			<b>48</b>	<b>4,059,568</b>	<b>14,727</b>		
1481	MO0002003	DOE RUN BUICK MINE	VIBURNUM	13	58,831	1,051	100%	100%
<b>1481</b>	<b>TOTAL</b>			<b>13</b>	<b>58,831</b>	<b>1,051</b>		

**Attachment E  
TRI Discharges**

SIC Code	Facility TRI ID	Facility Name	Facility City	Facility State	Direct lbs	Direct TWPE	Indirect lbs	Indirect TWPE	Total lbs	Total TWPE	Percent Total of SIC TWPE	Cumulative Percent Total of SIC TWPE
3275	43433NTDSTGYPSU	UNITED STATES GYPSUM CO.	GYPSUM	OH	50	0.005			50	0.005	100%	100%
<b>3275</b>	<b>Total</b>								<b>50</b>	<b>0.005</b>		
3295	72216M POBOX	3M	LITTLE ROCK	AR	1,515	631			1,515	631	55%	55%
3295	14305TMCRM4511H	FERRO ELECTRONIC MATERIALS	NIAGARA FALLS	NY			18,032	450	18,032	450	40%	95%
3295	31404KTLST1800E	ENGELHARD CORP. SAVANNAH OPS.	SAVANNAH	GA	359,000	45			359,000	45	4%	99%
3295	29510MTCHMROSEM	TREBOL USA L.L.C.	ANDREWS	SC	100,398	6			100,398	6	1%	100%
3295	54401M 144RO	3M WAUSAU DOWNTOWN	WAUSAU	WI	3	1	53	4	56	5	0%	100%
3295	29405GSRFN2900B	GS ROOFING PRODS. CO. INC. (AKA CERTAINTEED CORP.)	NORTH CHARLESTON	SC	5	0.012	20	0.047	25	0.059	0%	100%
<b>3295</b>	<b>Total</b>								<b>479,026</b>	<b>1,137</b>		



**Attachment F  
Reported Pollutant Loadings**

SIC	Pollutant Name	CAS	Pollutant Group Code	PCS			TRI Indirect Discharges			TRI Direct Discharges		
				Facilities Reporting Pollutant	Pounds	TWPE	Facilities Reporting Pollutant	Pounds	TWPE	Facilities Reporting Pollutant	Pounds	TWPE
1422	TOTAL SUSPENDED SOLIDS	C009	CP	6	1,698,463							
1422	OIL AND GREASE	C035	CP	1	613							
1422	SUM OF CONVENTIONAL POLLUTANTS				1,699,076	0		0	0		0	0
1422	TOTAL DISSOLVED SOLIDS	C010	NC	3	38,117,253							
1422	SUM OF NONCONVENTIONAL POLLUTANTS				38,117,253	0		0	0		0	0
1422	SILVER	7440224	PP	2	0	4						
1422	SUM OF PRIORITY POLLUTANTS				0	4		0	0		0	0
1442	TOTAL SUSPENDED SOLIDS	C009	CP	4	198,936							
1442	SUM OF CONVENTIONAL POLLUTANTS				198,936	0		0	0		0	0
1442	TOTAL DISSOLVED SOLIDS	C010	NC	1	28,958,794							
1442	SULFATE	14808798	NC	1	361	0.0020						
1442	PHOSPHORUS	7723140	NC	1	421							
1442	TOTAL SULFIDE	18496258	NC	1	218	610						
1442	SUM OF NONCONVENTIONAL POLLUTANTS				28,959,793	610		0	0		0	0
1442	SILVER	7440224	PP	1	3	45						
1442	THALLIUM	7440280	PP	1	11	11						
1442	BERYLLIUM	7440417	PP	1	72	77						
1442	SUM OF PRIORITY POLLUTANTS				86	132		0	0		0	0
1459	TOTAL SUSPENDED SOLIDS	C009	CP	3	501,083							
1459	SUM OF CONVENTIONAL POLLUTANTS				501,083	0		0	0		0	0

SIC	Pollutant Name	CAS	Pollutant Group Code	PCS			TRI Indirect Discharges			TRI Direct Discharges		
				Facilities Reporting Pollutant	Pounds	TWPE	Facilities Reporting Pollutant	Pounds	TWPE	Facilities Reporting Pollutant	Pounds	TWPE
1459	CHLORIDE	16887006	NC	1	84,431	2						
1459	TOTAL FLUORIDE	16984488	NC	3	113,535	3,974						
1459	SUM OF NONCONVENTIONAL POLLUTANTS				197,966	3,976		0	0		0	0
1475	OIL AND GREASE	C035	CP	7	23,210							
1475	TOTAL SUSPENDED SOLIDS	C009	CP	16	672,950							
1475	SUM OF CONVENTIONAL POLLUTANTS				696,160	0		0	0		0	0
1475	AMMONIA AS NITROGEN	7664417	NC	7	10,377	19						
1475	NITROGEN, NITRATE TOTAL (AS N)	14797558	NC	2	32	0.0020						
1475	NITROGEN, ORGANIC TOTAL (AS N)	17778880	NC	1	6,030							
1475	SODIUM	7440235	NC	1	66,248	0.36						
1475	SULFATE	14808798	NC	14	18,428,674	103						
1475	TOTAL FLUORIDE	16984488	NC	14	230,504	8,068						
1475	TOTAL PHOSPHORUS	14265442	NC	1	4,380							
1475	NITROGEN, TOTAL (AS N)	7727379	NC	17	1,102,896							
1475	PHOSPHORUS	7723140	NC	17	191,876							
1475	SUM OF NONCONVENTIONAL POLLUTANTS				20,041,018	8,190		0	0		0	0
1479	TOTAL SUSPENDED SOLIDS	C009	CP	3	971,333							
1479	SUM OF CONVENTIONAL POLLUTANTS				971,333	0		0	0		0	0
1479	PHOSPHORUS	7723140	NC	2	1,244,342							
1479	TOTAL FLUORIDE	16984488	NC	2	415,230	14,533						
1479	NITROGEN, TOTAL (AS N)	7727379	NC	2	420,099							
1479	AMMONIA AS NITROGEN	7664417	NC	2	116,832	194						
1479	TOTAL KJELDAHL NITROGEN	C021	NC	2	97,960							

SIC	Pollutant Name	CAS	Pollutant Group Code	PCS			TRI Indirect Discharges			TRI Direct Discharges		
				Facilities Reporting Pollutant	Pounds	TWPE	Facilities Reporting Pollutant	Pounds	TWPE	Facilities Reporting Pollutant	Pounds	TWPE
1479	SUM OF NONCONVENTIONAL POLLUTANTS				2,294,464	14,727		0	0	0	0	0
1481	OIL AND GREASE	C035	CP	1	9,943							
1481	TOTAL SUSPENDED SOLIDS	C009	CP	1	39,773							
1481	SUM OF CONVENTIONAL POLLUTANTS				49,717	0		0	0	0	0	0
1481	CADMIUM	7440439	PP	1	50	130						
1481	COPPER	7440508	PP	1	100	63						
1481	LEAD	7439921	PP	1	200	449						
1481	ZINC	7440666	PP	1	8,764	410						
1481	SUM OF PRIORITY POLLUTANTS				9,114	1,051		0	0	0	0	0
3275	GLYCOL ETHERS	N230	NC							1	50	0
3275	SUM OF NONCONVENTIONAL POLLUTANTS				0	0		0	0	1	50	0
3295	AMMONIA AS NITROGEN	7664417	NC							1	16,000	24
3295	BARIUM	7440393	NC				1	17,793	35			
3295	FORMALDEHYDE	50000	NC				1	20	0.05	1	5	0.01
3295	MANGANESE	7439965	NC				1	51	4	1	255	18
3295	NITROGEN, NITRATE TOTAL (AS N)	14797558	NC							2	443,398	27
3295	SUM OF NONCONVENTIONAL POLLUTANTS				0	0		17,865	39		459,658	70
3295	ZINC	7440666	PP				2	56	3	2	256	12
3295	CHROMIUM	7440473	PP							2	257	132
3295	COPPER	7440508	PP							1	750	470
3295	LEAD	7439921	PP				1	184	412			
3295	SUM OF PRIORITY POLLUTANTS				0	0		240	415		1,263	614