

US EPA ARCHIVE DOCUMENT

**MINERAL PROCESSING FACILITIES PLACING  
MIXTURES OF EXEMPT AND NON-EXEMPT WASTES  
IN ON-SITE WASTE MANAGEMENT UNITS**

**Technical Background Document  
Supporting the Supplemental Proposed Rule  
Applying Phase IV Land Disposal Restrictions to  
Newly Identified Mineral Processing Wastes**

**Office of Solid Waste  
U.S. Environmental Protection Agency**

**December 1995**

## Introduction

EPA conducted a review of the National Survey of Solid Wastes from Mineral Processing Facilities (NSSWMPF) survey instruments to identify mineral processing facilities that reportedly place mixtures of exempt and non-exempt wastes<sup>1</sup> in on-site waste management units (WMU). This document provides the results of this review.

In February 1989, EPA administered the NSSWMPF questionnaire, herein referred to as the RTI Survey (short for the Research Triangle Institute, who conducted the survey). The RTI Surveys were distributed to the operators of 198 mineral processing facilities that, to the Agency's knowledge, generated one or more of the ore and mineral processing waste streams that the Agency was considering retaining within the Bevill exclusion. EPA received detailed responses to the RTI Survey from 106 facilities. Twenty-seven of the 47 "special wastes" candidates identified in the RTI Survey have subsequently been removed from the Bevill exclusion; today, there are 20 Bevill-exempt "special wastes." Of the 198 facilities receiving the RTI Survey, 15 responded that they did not generate any mineral processing wastes, while 77 facilities indicated that they did not generate any special wastes.

## Methodology

The RTI Survey was designed to elicit information on operational characteristics of individual facilities, on sources and volumes of wastes, and on current and alternative waste management practices. Sections 4 and 5 of the RTI Survey requested the facilities to identify the various on-site WMUs, including wastewater treatment plants and surface impoundments, and the waste inflows to these WMUs. EPA analyzed the waste inflows to each WMU identified in the RTI Surveys to determine if the WMU received a mixture of exempt and non-exempt wastes. EPA used the beneficiation/processing boundaries identified in the "Identification and Description of Mineral Processing Sectors and Waste Streams," a technical background document that may be found in the docket for today's proposed rule, to determine whether the waste inflows were from an extraction/beneficiation process or from mineral processing. For example, within the copper sector, the Magma, Arizona facility places a mixture of tailings and acid plant blowdown in tailings ponds. EPA used the information on the beneficiation/processing boundary discussed in the sector analysis for copper in the technical background document and determined that the acid plant blowdown waste stream is a mineral processing waste, while tailings result from an extraction/beneficiation process. As mineral processing wastes are non-exempt and extraction/beneficiation wastes are exempt, EPA determined that the Magma, Arizona facility places a mixture of non-exempt and exempt wastes in the same WMU. EPA notes that because many of the waste stream names provided by the facility operators were different from those used in the technical background document, EPA used engineering judgment to correlate waste stream names.

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<sup>1</sup> Exempt wastes include extraction/beneficiation wastes and the "Special 20" Bevill-exempt wastes.

The Agency also reviewed EPA site visit reports for mineral processing facilities to identify any additional facilities that reportedly place mixtures of exempt and non-exempt wastes in on-site WMUs. EPA identified one other instance of placing exempt and non-exempt wastes in the same WMU. Specifically, the EPA site visit report for the McLaughlin Gold mine indicated that Agency personnel had observed various mineral processing wastes such as mercury quench water being sent to a carbon-in-pulp, carbon-in-leach (CIP/CIL) circuit that ultimately discharges to the tailings pond. Therefore, EPA determined that the facility places mixtures of exempt (tailings) and non-exempt (mercury quench water) wastes in an on-site WMU.

## Results

Exhibit 1 identifies the facilities that place mixtures of exempt and non-exempt wastes in on-site WMUs. Exhibit 1 also lists the waste streams by facility and WMU. As shown in Exhibit 1, EPA identified 20 facilities that reportedly place mixtures of exempt and non-exempt wastes in one or more on-site WMUs. The Agency notes that, for the purpose of this analysis, both the extraction/beneficiation wastes and the "Special 20" Bevill-exempt wastes are considered exempt wastes.

**EXHIBIT 1**  
**LIST OF FACILITIES PLACING MIXTURES OF EXEMPT AND NON-EXEMPT WASTES IN THE SAME WMU**

| Sector    | RTI Survey ID    | Facility                          | WMUs Receiving Mixtures    | Waste Inflows to WMUs                |
|-----------|------------------|-----------------------------------|----------------------------|--------------------------------------|
| Beryllium | 101006           | Brush Wellman, Inc.,<br>Delta, UT | Tailings Pond              | Bertrandite thickener discard slurry |
|           |                  |                                   |                            | Beryl thickener discard slurry       |
|           |                  |                                   |                            | Raffinate                            |
|           |                  |                                   |                            | Sludge leach slurry                  |
|           |                  |                                   |                            | Barren filtrate                      |
|           |                  |                                   |                            | Miscellaneous water streams          |
|           |                  |                                   |                            | Acid conversion discard              |
|           |                  |                                   |                            | Tailings                             |
|           |                  |                                   |                            | Sump water                           |
| Chromite  | CBI <sup>1</sup> | CBI                               | Wastewater Treatment Plant | Special waste # 1                    |
|           |                  |                                   |                            | Special waste # 2                    |
|           |                  |                                   |                            | Salt cake scrubber purge             |
|           |                  |                                   |                            | Chromic acid scrubber purge          |
|           |                  |                                   |                            | Utility area sumps and<br>blowdown   |

EXHIBIT 1 (Continued)

| Sector | RTI Survey ID | Facility | WMUs Receiving Mixtures | Waste Inflows to WMUs |
|--------|---------------|----------|-------------------------|-----------------------|
|        |               |          |                         | Storm sump water      |
|        |               |          |                         | Recovery well water   |

EXHIBIT 1 (Continued)

| Sector              | RTI Survey ID | Facility              | WMUs Receiving Mixtures  | Waste Inflows to WMUs |
|---------------------|---------------|-----------------------|--------------------------|-----------------------|
| Copper              | 100750        | Magma, San Manuel, AZ | Tailings Ponds # 1 and 2 | Tailings water        |
|                     |               |                       |                          | Tailings solids       |
|                     |               |                       |                          | Acid plant blowdown   |
|                     |               |                       |                          | Process wastewater    |
|                     |               |                       | Tailings Dams # 3 and 4  | Tailings water        |
|                     |               |                       |                          | Tailings solids       |
|                     |               |                       |                          | Acid plant blowdown   |
|                     |               |                       | Tailings Dam # 5         | Tailings water        |
|                     |               |                       |                          | Tailings solids       |
|                     |               |                       |                          | Acid plant blowdown   |
|                     |               |                       | Tailings Dam # 6         | Tailings water        |
|                     |               |                       |                          | Tailings solids       |
|                     |               |                       |                          | Acid plant blowdown   |
|                     |               |                       | Tailings Dam # 10        | Tailings water        |
|                     |               |                       |                          | Tailings solids       |
| Acid plant blowdown |               |                       |                          |                       |

EXHIBIT 1 (Continued)

| Sector                | RTI Survey ID | Facility                                     | WMUs Receiving Mixtures                              | Waste Inflows to WMUs                |
|-----------------------|---------------|--|--|--------------------------------------|
| Elemental Phosphorous | CBI           | CBI  | Hydroclarifier                                       | Furnace scrubber blowdown            |
|                       |               |  |  | Process wastewater                   |
|                       |               |  |  | Beneficiation acc. water             |
| Ferrous               | 100958        | Armco, Inc., Ashland, KY                     | Clarification Plant                                  | Sinter plant                         |
|                       |               |  |  | B. F. scrubbers                      |
|                       |               |  |  | Hot strip mill                       |
|                       |               |  |  | HCL acid regenerations               |
|                       |               |  |  | Pickle rinse water                   |
|                       |               |  |  | Waste oil plant                      |
|                       |               |  |  | Miscellaneous process waters         |
|                       | 101246        | National Steel Corporation, Granite City, IL | Wastewater Treatment Plant                           | Blast furnace and storm water lagoon |
|                       |               |  |  | Stormwater lagoon                    |
|                       | 101287        | LTV Steel Company, East Chicago, IN          | Wastewater Treatment Plant - BF/Sinter Plant Recycle | Blast furnaces                       |
| Sinter plant          |               |  |  |                                      |
| Terminal Lagoon       |               |  | BF/Sinter recycle                                    |                                      |
|                       |               |  | # 2 blooming mill                                    |                                      |



EXHIBIT 1 (Continued)

| Sector | RTI Survey ID | Facility | WMUs Receiving Mixtures | Waste Inflows to WMUs  |
|--------|---------------|----------|-------------------------|------------------------|
|        |               |          |                         | Boiler house and shops |

EXHIBIT 1 (Continued)

| Sector              | RTI Survey ID | Facility                                      | WMUs Receiving Mixtures        | Waste Inflows to WMUs  |
|---------------------|---------------|---|--------------------------------|--|
| Ferrous (continued) | 101744        | Bethlehem Steel Corporation, Burns Harbor, IN | Wastewater Treatment Plant     | Basic oxygen furnace   |
|                     |               |   |                                | Caster   |
|                     |               |   |                                | Basic oxygen furnace wastewater                                    |
|                     |               |   |                                | Blast furnace process wastewater                                   |
|                     |               |   |                                | Sinter plant process wastewater                                    |
|                     |               |   |                                | Wastewater from on-site hot forming and steel finishing facilities |
| Lead                | 100461        | Doe Run Company, Boss, MO                     | Wastewater Treatment Plant # 1 | Sinter plant   |
|                     |               |   |                                | Acid plant blowdown  |
|                     |               |   |                                | Stormwater   |
|                     |               |   |                                | Facility washdown  |
|                     |               |   |                                | D & E area runoff  |
|                     |               |   |                                | Process area runoff  |
|                     |               |   |                                | Fume slurry system   |
|                     |               |   |                                | Acid plant cooling   |
|                     |               |   |                                | Slag granulation   |

EXHIBIT 1 (Continued)

| Sector | RTI Survey ID | Facility | WMUs Receiving Mixtures | Waste Inflows to WMUs |
|--------|---------------|----------|-------------------------|-----------------------|
|        |               |          | Not Listed              | Area runoff           |
|        |               |          |                         | Acid plant blowdown   |

EXHIBIT 1 (Continued)

| Sector              | RTI Survey ID | Facility                            | WMUs Receiving Mixtures           | Waste Inflows to WMUs   |
|---------------------|---------------|-------------------------------------|-----------------------------------|---|
| Lead<br>(continued) |               |                                     |                                   | Sinter plant  |
|                     |               |                                     |                                   | Acid plant cooling  |
|                     |               |                                     |                                   | Fume slurry   |
|                     |               |                                     |                                   | Facility washdown   |
|                     |               |                                     |                                   | Stormwater  |
|                     |               |                                     |                                   | Slag granulation  |
|                     | 100404        | Doe Run Company,<br>Herculaneum, MO | Wastewater Treatment<br>Plant # 1 | Sinter plant scrubber water<br>SVG backwash<br>Blast furnace slag granulation<br>Dross furnace slag granulation<br>water<br>Pavement washdown<br>Neutralized acid plant<br>blowdown<br>Department washdown<br>Clothes washing<br>Plant runoff |

EXHIBIT 1 (Continued)

| Sector          | RTI Survey ID | Facility                              | WMUs Receiving Mixtures | Waste Inflows to WMUs |
|-----------------|---------------|---------------------------------------|-------------------------|-----------------------|
| Phosphoric Acid | 100230        | Agrico Chemical Company, Mulberry, FL | Process Cooling Pond    | Process wastewater    |
|                 |               |                                       |                         | Filter cake           |

EXHIBIT 1 (Continued)

| Sector                                       | RTI Survey ID | Facility                                    | WMUs Receiving Mixtures     | Waste Inflows to WMUs                                 |
|--|---------------|---|-----------------------------|---|
| Phosphoric Acid (continued)                  | 100198        | Agrico Chemical Company, Donaldsonville, LA | Cooling Pond                | Process wastewater (Sulf.)                            |
|  |               |   |                             | Process wastewater (floor)                            |
|  |               |   |                             | Process wastewater                                    |
|  |               |   |                             | Process wastewater (PA)                               |
|  |               |   |                             | Process wastewater (1st stage water treatment sludge) |
|  |               |   |                             | Gypsum decant water                                   |
|  | 100099        | CF Chemicals, Inc., Bartow, FL              | Cooling Pond                | Process wastewater                                    |
|  |               |   |                             | Gypsum stack  |
|  |               |   |                             | Runoff  |
|  | 101444        | Royster Phosphates, Inc., Palmetto, FL      | Gypsum Stack Cooling Pond   | Gypsum  |
|  |               |   |                             | Process wastewater                                    |
|  | 100552        | Gardinier, Inc., Riverview, FL              | Process Wastewater Pond # 1 | Phosphoric acid plant process wastewater              |
|  |               |   |                             | Gypsum stack water                                    |
| Dry product manufacturing process wastewater |               |   |                             |   |
| Process wastewater pond # 2                  |               |   |                             |   |

EXHIBIT 1 (Continued)

| Sector                      | RTI Survey ID | Facility                           | WMUs Receiving Mixtures        | Waste Inflows to WMUs                           |
|-----------------------------|---------------|------------------------------------|--------------------------------|---|
|                             |               |                                    |                                | Contact acid plant process wastewater           |
| Phosphoric Acid (continued) | 100800        | IMC Fertilizer, Inc., Mulberry, FL | Cooling Pond                   | Process wastewater                              |
|                             |               |                                    |                                | Ammonium sulfate                                |
| Titanium                    | CBI           | CBI                                | Surface Impoundment # 3        | Special waste residues                          |
|                             |               |                                    |                                | Other   |
|                             | CBI           | CBI                                | Wastewater Treatment Plant # 2 | Contaminated cooling water from sulfate process |
|                             |               |                                    |                                | From surface impoundment # 1                    |
|                             |               |                                    |                                | Stormwater                                      |
|                             |               |                                    |                                | Chloride process wastewater                     |
|                             | CBI           | CBI                                | 001N                           | Sulfate process wastewater                      |
|                             |               |                                    |                                | Stormwater                                      |
|                             |               |                                    |                                | DCS acid  |
|                             |               |                                    |                                | Process wastewater                              |
|                             |               |                                    |                                | Scrubber blowdown from CO <sub>2</sub>          |
|                             |               |                                    |                                | CHLN effluent                                   |

EXHIBIT 1 (Continued)

| Sector | RTI Survey ID | Facility | WMUs Receiving Mixtures | Waste Inflows to WMUs                                  |
|--------|---------------|----------|-------------------------|--|
|        |               |          |                         | CAL acid<br>Sulfate finishing effluent<br>FIN effluent |



EXHIBIT 1 (Continued)

| Sector               | RTI Survey ID       | Facility                             | WMUs Receiving Mixtures | Waste Inflows to WMUs                     |
|----------------------|---------------------|--------------------------------------|-------------------------|---|
| Titanium (continued) |                     |                                      |                         | Sewage plant effluent                     |
|                      |                     |                                      |                         | Landfill leachate                         |
| Gold                 | NA (EPA site visit) | McLaughlin Gold Mine, Lower Lake, CA | Tailings Pond           | Mercury quench water                      |
|                      |                     |                                      |                         | Tailings                                  |
|                      |                     |                                      |                         | Slag from gold smelting                   |
|                      |                     |                                      |                         | Acid washing wastes from carbon stripping |
|                      |                     |                                      |                         | Baghouse dusts                            |

<sup>1</sup> Confidential Business Information