

US EPA ARCHIVE DOCUMENT

**ENVIRONMENTAL PROTECTION AGENCY****40 CFR Part 261**

(SWH-FRL 3455-1)

**Mining Waste Exclusion****AGENCY:** Environmental Protection Agency.**ACTION:** Notice of proposed rulemaking.

**SUMMARY:** Section 3001(b)(3)(A)(ii) of the Resource Conservation and Recovery Act (RCRA) excludes "solid waste from the extraction, beneficiation, and processing of ores and minerals" from regulation as hazardous waste under Subtitle C of RCRA, pending completion of certain studies by EPA. The Agency interpreted this exclusion on a temporary basis to encompass solid waste from the exploration, mining, milling, smelting, and refining of ores and minerals" (45 FR 76619, November 19, 1980). The purpose of this notice is to further define the scope of the Bevill exclusion with respect to mineral processing wastes.

Today's proposed rulemaking would eliminate from the mining waste exclusion most wastes from the processing of ores and minerals. However, 15 specific high volume processing wastes that the Agency is refining herein as "special wastes," would remain within the Bevill exclusion, and hence, be studied in a report to Congress and be subject to a subsequent regulatory determination pursuant to section 3001 of RCRA. In addition, today's proposal includes the criteria used by the Agency to identify these "special" processing wastes.

Based upon the criteria articulated below and EPA data on the mineral processing industry, the Agency proposes to retain the following mineral processing wastes within the Bevill exclusion:

1. Slag from primary copper smelting
2. Process wastewater from primary copper smelting/refining
3. Blowdown from acid plants at primary copper smelters
4. Bleed electrolyte from primary copper refining
5. Slag from primary lead smelting
6. Blowdown from acid plants at primary zinc smelters
7. Process wastewater from primary zinc smelting/refining
8. Red and brown muds from bauxite refining
9. Phosphogypsum from phosphoric acid production
10. Slag from elemental phosphorous production

11. Iron blast furnace slag
12. Air pollution control dust/sludge from iron blast furnaces
13. Waste acids from titanium dioxide production
14. Air pollution control dust from lime kilns
15. Slag from roasting/leaching of chromite ore

If this proposal is promulgated, all other mineral processing wastes will be permanently removed from the Bevill exclusion. In other words, this reinterpretation and the subsequent Report to Congress and regulatory determination represent the final stages of EPA's response to the provisions of RCRA section 8002(p); there will be no further studies or regulatory determinations related to ore and mineral processing wastes as a group. Operators of facilities that generate non-excluded wastes will have to determine whether their processing wastes exhibit one or more of the hazardous characteristics and, if the wastes exhibit such characteristics, will have to comply with the technical and administrative requirements of Subtitle C of RCRA. These requirements shall become effective, at the latest, six months after promulgation of the final rule in those states that do not have authorization to administer an EPA-approved hazardous waste program, and somewhat later in authorized states.

In response to a Court-ordered deadline, EPA intends to finalize this proposed rule by February 15, 1989. The Agency therefore solicits public comment on its choice of wastes to be retained within the Bevill exclusion, and in particular seeks information, including chemical characterization or other relevant hazard data, regarding any other mineral processing wastes that may meet the criteria for "special wastes" described in the preamble to today's proposed rule.

**DATES:** EPA will accept public comments on this proposal until November 21, 1988. The Agency will hold a public hearing on November 17, 1988 from 10 a.m. to noon; see the section title "Public Participation" for details.

**ADDRESS:** Comments should be sent to the RCRA/CERCLA Docket Clerk, Docket No. F-88-MWEP-FFFFF, Office of Solid Waste (WH-565A), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, (202) 475-9327. Additional information pertinent to this proposal can be found in the docket supporting the recent relisting of six smelter wastes as hazardous wastes (No. F-88-SWRF-FFFFF). The public docket is available

in the Sub-basement at the above address for viewing from 9:00 a.m. to 3:30 p.m., Monday through Friday, except for Federal holidays. The public hearing is at the U.S. Environmental Protection Agency, Conference Room 13, 401 M Street, SW., Washington, DC.

**FOR FURTHER INFORMATION CONTACT:** RCRA/Superfund Hotline at (800) 424-9346 or (202) 382-3000 or Dan Derkics, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, (202) 382-3608.

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**I. Court Decision on the Applicability of the Mining Waste Exclusion to Processing Wastes****A. History of the Mining Waste Exclusion**

In section 8002(f) of the Resource Conservation and Recovery Act (RCRA), enacted on October 21, 1976, Congress instructed the Administrator of EPA to conduct, in consultation with the Secretary of the Interior, "a detailed and comprehensive study on the adverse effects of solid wastes from active and abandoned surface and underground mines on the environment, including, but not limited to, the effects of such wastes on humans, water, air, health, welfare, and natural resources."

On December 18, 1978 (43 FR 58946), EPA proposed regulations for hazardous waste management under Subtitle C of RCRA. These proposed regulations, among other things, had fewer requirements for a universe of so-called "special wastes" that were generated in large volumes, were thought to pose less of a hazard than other hazardous wastes, and were not thought to be amenable to the control techniques proposed for hazardous waste.

treatment, storage, and disposal facilities. EPA identified waste materials from the "extraction, beneficiation, and processing of ores and minerals" as one group of such "special wastes" under the proposed regulations.

On May 19, 1980, when it promulgated the final hazardous waste management regulations, EPA did not include a "special waste" category, stating that such a distinction was unnecessary because: (1) The EP toxicity and corrosivity characteristics of hazardous wastes had been narrowed, thus excluding most "special wastes" from regulatory control, and (2) the Agency intended to promulgate tailored standards for land disposal that could incorporate site- and waste-specific factors, as needed, in future regulations.

On October 21, 1980, Congress enacted Pub. L. 96-482, which included various amendments to RCRA. Section 8002 was amended to include subsection (p), which required the Administrator to study the adverse effects on human health and the environment, if any, of waste from the disposal and utilization of "solid waste from the extraction, beneficiation, and processing of ores and minerals, including phosphate rock and overburden from the mining of uranium ore," and submit a Report to Congress on its findings by October 21, 1983. (emphasis added). Section 7 of these amendments (the "Bevill Amendment") amended section 3001 of RCRA to exclude these wastes from regulation under Subtitle C of RCRA, pending completion of the studies called for in sections 8002 (f) and (p).

On November 19, 1980, EPA published an interim final amendment to its hazardous waste regulations to reflect this mining waste exclusion. The regulatory language incorporating the exclusion is identical to the statutory language (except the phrase "including coal" was added). In the preamble to the amended regulation, however, EPA tentatively interpreted the exclusion to include "solid waste from the exploration, mining, milling, smelting, and refining of ores and minerals" (45 FR 76618). The Agency also indicated that this provisional interpretation of the exclusion was temporary and was to be reconsidered following receipt of public comment.

On September 28, 1984, Concerned Citizens of Adamstown, Carroll Manor Civic Association, and the Environmental Defense Fund sued EPA for failure to complete the mining waste studies and Report to Congress required by RCRA sections 8002 (f) and (p). *Concerned Citizens of Adamstown v. EPA*, No. 84-3041, (D.C.C., August 21, 1985). EPA explained to the court that it

planned to propose to "reinterpret" the scope of the mining waste exclusion so that it encompassed fewer wastes. Therefore, EPA suggested two schedules to the court: One for completing the section 8002 mining waste studies and submitting the Report to Congress, and one for proposing and taking final action on the reinterpretation. On August 21, 1985, the District Court ordered EPA to meet these two schedules. *Id.*<sup>1</sup>

Under the court order, EPA proposed to narrow the scope of the mining waste exclusion. See 50 FR 40292 (October 2, 1985). In preparing the proposed mining waste exclusion reinterpretation, EPA adopted the "high volume, low hazard" "special waste" concept from EPA's 1978 proposed hazardous waste regulations (43 FR 58946).

In response to the proposal, many commenters "nominated" wastes that they believed fit the "special waste" (i.e., high volume low hazard) criteria, and therefore should remain excluded from Subtitle C regulation as "processing wastes." Because EPA had not explicitly defined the terms "high volume" or "low hazard" in the proposal, the Agency was unable to determine the status of these additional wastes. When EPA tried to infer definitions for these terms based upon the four wastes listed in the proposal as meeting the "special waste" criteria, it became clear that several significant issues had not been resolved (see 51 FR 36233). Because the proposed mining waste reinterpretation did not define the criteria by which wastes were excluded nor did it discuss any of the associated issues, the public could not discern whether a given waste might qualify for continued exclusion as a "high volume, low hazard" waste, or comment on the validity of those criteria.

The public's comments and the Agency's own analyses convinced it that the proposed reinterpretation could not be finalized because it did not set out "practically applicable" criteria for distinguishing "processing" (i.e., high volume, low hazard ore and mineral processing residuals) from non-processing (i.e., non-excluded) wastes. Moreover, the Agency was unsure whether such criteria could be developed, given the complexity of these

<sup>1</sup> EPA submitted its Report to Congress on wastes from the extraction and beneficiation of ores and minerals on December 31, 1985. On July 3, 1986, EPA issued a regulatory determination that it would not regulate these wastes under Subtitle C of RCRA. 51 FR 24496. The U.S. Court of Appeals has upheld this decision. *Environmental Defense Fund v. EPA*, 852 F.2d 1309 (DC Cir., 1988). EPA is currently in the process of developing regulations under Subtitle D that will address the management of extraction and beneficiation wastes.

issues. Therefore, faced with the court-ordered deadline in *Adamstown*, the Agency withdrew the proposal on October 9, 1986 (51 FR 36233). As a consequence, the interpretation of the mining waste exclusion established in the November 19, 1980, rulemaking notice remained in effect.

#### B. Court Decision on the Mining Waste Exclusion

The Agency's decision to withdraw its proposed reinterpretation of the mining waste exclusion was subsequently challenged in court (*Environmental Defense Fund v. EPA*, 825 F.2d 1316, DC Cir., 1988 (*EDF v. EPA*)). In these cases, the petitioners contended, and the Court of Appeals agreed, that EPA's withdrawal of its proposed reinterpretation of the Bevill Amendment was arbitrary and capricious because it reaffirmed an "impermissibly overbroad interpretation" of the Bevill Amendment. *EDF v. EPA*, 852 F.2d at 1326.

In reaching this decision, the Court found that the words "waste from \* \* \* processing of ores and minerals" do not convey a self-evident, accepted meaning. *Id.* at 1327. Therefore, the Court reviewed the structure and the legislative history of the Bevill Amendment to ascertain the intent of Congress. The Court found that "[t]he structure of the Bevill Amendment suggests that the term 'solid waste from the \* \* \* processing of ores and minerals' should be interpreted in a manner consistent with the concept of large volume wastes." *Id.* The Court also decided that "[t]he legislative history of the Bevill Amendment establishes that the key to understanding Congress' intent is the concept of 'special waste' articulated in the regulations proposed by EPA on December 18, 1978 following the enactment of RCRA." *Id.* See 43 FR 58911 (1978) and 50 FR 40293 (1985).

In explaining this decision, the Court cited statements made by Members of Congress during the legislative consideration of the exclusion and the description of the provision in the Conference Report accompanying the legislation. Based on these indications of congressional intent, the Court concluded that

it is clear that Congress did not intend the mining waste exclusion to encompass all wastes from primary smelting and refining. On the contrary, Congress intended the term "processing" in the Bevill Amendment to include only those wastes from processing ores or minerals that meet the "special waste" criteria, that is, "high volume, low hazard" wastes. 852 F.2d at 1328-29.

Thus, when the Agency withdrew its October 2, 1985, proposed reinterpretation of the mining waste exclusion, which was based on implicit "special waste" criteria, EPA by default reverted to its November 19, 1980, interpretation of the exclusion, which did not distinguish between high volume, low hazard processing wastes and other processing wastes. As a consequence, the number of temporarily excluded processing wastes remained very large. The Court ruled that this result was inconsistent with congressional intent. Therefore, the Court ordered EPA to propose, by October 15, 1988, a specific list of mineral processing wastes that meet the criteria of high volume and low hazard, and thus remain temporarily excluded from Subtitle C regulation. 852 F.2d at 1331. Today's proposal has been developed pursuant to the Court's mandate.

In addition to requiring that EPA use a high volume, low hazard paradigm in defining the scope of the term "solid wastes from the \* \* \* processing of ores and minerals," the Court also mandated the relisting (as hazardous wastes) of each individual metallic ore processing waste streams that the Agency had proposed on October 2, 1985. The Court concluded that, regardless of how EPA might subsequently define the high volume and low hazard parameters of the mining waste exclusion, these six wastes would clearly fall outside of the exclusion "[s]ince EPA found that those six smelter wastes are low volume and high hazard wastes \* \* \*." 852 F.2d at 1330. EPA, in a separate rulemaking, has taken action to comply with the Court's directive with regard to listing these six wastes. See 53 FR 35412. These newly listed wastes are presented in Table 1, below.

TABLE 1.—LISTED HAZARDOUS WASTES GENERATED IN MINERAL PROCESSING OPERATIONS <sup>2</sup>—Continued

RCRA waste No.	Description
KO91.....	Emission control dust or sludge from ferrochromium production.

<sup>2</sup> Several of these newly relisted wastes appear to be similar to wastes that are being proposed for retention within the Bevill exclusion in today's proposal, particularly KO64 and KO66. It is important to understand, however, that these hazardous materials are *waste management residuals*, rather than raw mineral processing waste streams. The waste streams proposed for temporary exclusion (blowdown from acid plants at primary copper smelters, blowdown from acid plants at primary zinc smelters, and wastewater from primary zinc smelting) differ significantly in volume and in chemical composition from these listed hazardous wastes.

In order to comply with the Court's other directives in this case, EPA will publish a final rule based upon today's proposal in the *Federal Register* by February 15, 1989, and will submit the required Report to Congress by July 31, 1989. 852 F.2d at 1331. This report will address the following eight study factors pertaining to ore and mineral processing wastes that are listed at section 8002(p) of RCRA:

1. The source and volumes of such materials generated per year;
2. Present disposal and utilization practices;
3. Potential danger, if any, to human health and the environment from the disposal and reuse of such materials;
4. Documented cases in which danger to human health or the environment has been proved;
5. Alternatives to current disposal methods;
6. The costs of such alternatives;
7. The impact of those alternatives on the use of phosphate rock and uranium ore, and other natural resources; and
8. The current and potential utilization of such materials.

Moreover, in keeping with statutory requirements (RCRA sections 3001(b)(3)(A)(ii) and 3001(b)(3)(C)), EPA will, six months after submission of the Report to Congress, issue a regulatory determination for each studied waste stating either that the waste is to be regulated under Subtitle C of RCRA or that such regulation is unwarranted.

**II. Processing Wastes Remaining Within the Bevill Exclusion**

To complete its response to the directives of the U.S. Court of Appeals for the DC Circuit in *EDF v. EPA*, EPA is today proposing a list of specific solid wastes from ore and mineral processing that will remain within the Bevill exclusion as special wastes.

In 1986, when EPA withdrew the 1985 proposal to eliminate from the mining waste exclusion many solid wastes from processing ores and minerals, the Agency did so in part because it had not proposed "practically-applicable criteria for distinguishing processing from non-processing wastes" (see 51 FR 36235). Today's proposal, in addition to proposing specific solid wastes from ore and mineral processing that remain within the Bevill exclusion, presents the criteria used by the Agency to identify these as "Bevill excluded" processing wastes.

The Agency examined three types of criteria in selecting the specific wastes to be retained within the Bevill exclusion: (1) Criteria for identifying wastes from ore and mineral processing; (2) criteria for identifying "high volume" wastes from ore and mineral processing; and (3) criteria for identifying "low hazard" wastes from ore and mineral processing. In practice, as discussed below, only the first two criteria were applied to mineral industry operations to produce a tentative list of the wastes that will remain within the exclusion; others may be added pending receipt and evaluation of additional information.

*A. Criteria for Identifying Wastes From Ore and Mineral Processing*

To determine the proper scope of operations that generate ore and mineral processing wastes, the Agency consulted various sources (e.g., mining dictionaries, various U.S. Bureau of Mines publications, mining handbooks), and was unable to find any standard, accepted definitions, or "plain meanings" for the term "processing." Since EPA concluded that there is no plain meaning of the Bevill Amendment term "solid waste from the \* \* \* processing of ores and minerals",<sup>3</sup> the Agency turned to the legislative history and the record of administrative decisions made by EPA in response to exclusion requests from various mineral industry facilities to determine the scope of ore and mineral processing operations (see the docket).

Based on a review of the information available in these sources, the Agency has interpreted the term "solid waste from the \* \* \* processing of ores and minerals" as referring to solid wastes, including pollution control residuals, that are *uniquely* associated with

<sup>3</sup> The Court of Appeals agreed that "the words 'waste from \* \* \* processing of ores and minerals' do not convey a self-evident, accepted meaning." 852 F.2d at 1327.

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TABLE 1.—LISTED HAZARDOUS WASTES GENERATED IN MINERAL PROCESSING OPERATIONS <sup>2</sup>

RCRA waste No.	Description
KO64.....	Acid plant blowdown slurry/sludge resulting from thickening of blowdown slurry from primary copper production.
KO65.....	Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities.
KO66.....	Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production.
KO88.....	Spent pollinators from primary aluminum reduction.
KO90.....	Emission control dust or sludge from ferrochromium/silicon production.

mineral industry operations<sup>4</sup> and that possess the following attributes:

(1) Follow beneficiation of an ore or mineral (if applicable);

(2) Serve to remove the desired product from an ore or mineral, or beneficiated ore or mineral;

(3) Use feedstock that is comprised of less than 50 percent scrap materials (i.e., at least 50 percent of the feedstock is an ore or mineral, or beneficiated ore or mineral);

(4) Produce either a final mineral product or an intermediate to the final mineral product; and

(5) Do not include operations that combine the product with another material that is not an ore or mineral, or beneficiated ore or mineral (e.g., alloying); fabrication (any sort of shaping that does not cause a change in chemical composition), except for casting or metal anodes and cathodes;<sup>5</sup> or other manufacturing activities.

EPA has chosen this definition of processing because it provides maximal flexibility in evaluating candidate waste streams, while at the same time eliminating prospective study of types of wastes that were clearly not envisioned by the Congress as being "special wastes."

Beneficiation operations, which often precede ore or mineral processing operations, include primarily, but not exclusively, physical operations (e.g., crushing, grinding, sorting, sizing, washing, flotation) that concentrate the valuable constituents from an ore or mineral in preparation for further refinement (e.g., smelting)<sup>6</sup>, and so differ from processing operations. The solid wastes generated by these beneficiation operations are normally crushed or pulverized rock, or other earthen materials such as clays or sands.

The Agency considered several alternative definitions of ore and mineral processing that would result in

a narrower interpretation of the term. For example, ore and mineral processing could be considered to end when metal is poured or the identity of the mineral is destroyed. Under such a construction, smelting would be considered a processing operation while refining would not. The Agency has not adopted this approach to defining processing because while such a definition is relatively easy to understand for metallic ores, in practice, it may be difficult to apply in many situations, such as in examining operations that use certain non-metallic ore and mineral feedstocks.

Alternatively, processing could be considered to refer only to operations that generate waste earthen materials, e.g., rock, sand, or clay. Under this definition, processing and beneficiation would be nearly synonymous terms, and no wastes from smelting and/or refining operations would be temporarily excluded from RCRA Subtitle C regulation. EPA chose not to employ this approach to defining the scope of ore and mineral processing operations because it would remove all smelter slags from the excluded waste category. The Agency believes that Congress, in adopting the Bevill Amendment, intended to include at least certain smelting slags within the excluded waste category, since many smelting slags tend to be generated in high volumes.<sup>7</sup>

Solid wastes that satisfy the above criteria, and therefore are excluded from Subtitle C regulation if they also satisfy the proposed "high volume" criteria described below, retain their temporary exclusion when treated prior to disposal if they continue to satisfy the criteria. Likewise, the residuals arising from treatment may also retain excluded status, but *only* as long as they continue to meet these criteria. For example, low volume sludges produced from treating temporarily excluded high volume aqueous wastes are *not* excluded from Subtitle C regulation by the Bevill Amendment.

EPA does not consider mixtures of excluded and other, non-excluded hazardous wastes to be excluded by the Bevill Amendment from regulation under Subtitle C of RCRA. If, for example, a listed hazardous waste is combined with an excluded solid waste from ore and mineral processing, the resulting mixture is a hazardous waste

subject to the requirements of Subtitle C, unless and until the Agency "delists" it.<sup>8</sup> Similarly, if a "characteristic" hazardous waste is mixed with an excluded solid waste, the mixture is subject to the requirements of Subtitle C if it exhibits a hazardous characteristic (i.e., EP-toxicity, corrosivity, ignitability, or reactivity) (40 CFR 261.3(b)(3)).

#### B. Criteria for Identifying "High Volume" Wastes From Ore and Mineral Processing

In *EDF v. EPA*, the Court states that:

Congress intended the term "processing" in the Bevill Amendment to include only those wastes from processing ores or minerals that meet the "special waste" criteria, that is, "high volume, low hazard" wastes. 852 F.2d at 1331-32 (emphasis added).

Given this directive, the requirements of the Bevill Amendment, and the legislative and regulatory history of the "special waste" issue, it is clear that EPA must unambiguously define criteria by which to distinguish "high volume" processing wastes. Accordingly, today's proposal describes the criteria that the Agency used to distinguish between high and low volume processing wastes, and provides a list of the wastes that, to the best of the Agency's current knowledge, meet the "high volume" criteria. In this way, EPA hopes to not only communicate to industry and the public which wastes it considers to be temporarily exempt from Subtitle C regulation, but also to allow members of the mineral processing industry to evaluate whether or not they may generate additional solid wastes that should be studied under RCRA section 8002(p) prior to a determination as to their regulatory status. Clearly, the application of the "high volume" criteria to specific wastes will depend not only on the specific elements of the criteria themselves but on the definition of "mineral processing" presented above.

Due to the extremely diverse nature of domestic mineral processing operations and their associated wastes, EPA has experienced considerable difficulty in the past in defining criteria that addressed all of the wastes envisioned by the Congress and by the Agency's original concept of "special wastes," while not concurrently including wastes that are not truly high volume and/or low hazard. When the Agency withdrew its proposed reinterpretation in 1986, it

<sup>4</sup> As EPA has previously explained, the mining and mineral processing waste exclusion does not apply to solid wastes such as "spent solvents, pesticide wastes, and discarded commercial chemical products that are not uniquely associated with \* \* \* mining and allied processing operations." 45 FR 76619 (1980).

<sup>5</sup> In certain metallic ore processing operations, intermediate metal products must be poured, or cast, prior to further processing or shipping; the casting operation is both integral and necessary to the metal refining process, and generally precedes other processing (i.e., concentrating) operations.

<sup>6</sup> U.S. EPA. 1985. *Report to Congress on Wastes from the Extraction and Beneficiation of Metallic Ores, Phosphate Rock, Asbestos, Overburden from Uranium Mining, and Oil Shale*. Office of Solid Waste and Emergency Response, EPA/530-SW-033. Thrush, P.W. 1968. *A Dictionary of Mining, Minerals, and Related Terms*. Washington, DC U.S. Bureau of Mines, U.S. Dept. of the Interior.

<sup>7</sup> See, e.g., 126 *Cong. Rec.* 3364 (1980) (remarks of Rep. Williams) (referring to the need to study copper smelting slags prior to regulation); S. Rep. No. 284, 98th Cong., 1st Sess. 28 (1983) (defining the scope of the 1980 amendment to include smelting slag).

<sup>8</sup> Unless the hazardous waste is listed only because it exhibits a hazardous characteristic; in that instance, the waste is not considered hazardous when and if it no longer exhibits any of the four characteristics of hazardous waste (40 CFR 261.3(a)(2)(iii)).

noted several issues that needed to be addressed in the development of a "high volume" criterion (51 FR 36233). These and other attendant issues are discussed below along with the "high volume" criteria that EPA has adopted for use in this rulemaking.

Because "high volume" has been so difficult to define, EPA developed an explicit analytical framework to evaluate candidate high volume wastes. In so doing, the Agency had to resolve a number of methodological issues. The following discussion of the high volume criteria addresses the following four primary methodological issues in sequence: (1) The appropriate degree of aggregation of waste streams, (2) the basis for quantitative analysis (plant-specific vs. industry-wide), (3) the units of measure, and (4) the types of other wastes to be used as the basis for comparison.

#### Degree of Aggregation of Waste Streams

EPA has evaluated three options for establishing the degree of aggregation to be used in analyzing the volumes of waste generated:

- (1) Consider each waste stream individually;
- (2) Aggregate waste streams within a facility, i.e., conduct the analysis on a facility-wide basis; or
- (3) Combine specific waste streams across mineral commodity sectors, according to similarities in feedstocks, production processes, physical/chemical characteristics, management practices, or other characteristics.

EPA has adopted the first option, deciding to evaluate waste streams individually, rather than in aggregate. For example, waste furnace brick from copper smelting/refining has been evaluated separately from other copper processing wastes such as slag and air pollution control dusts. Given the current level of available information, the Agency believes that this is the most clear and feasible approach.

Aggregating all wastes within a facility for purposes of analysis would ignore the obvious and significant differences in volume and potential hazard that exist between the diverse groups of waste streams produced at mineral processing facilities. Moreover, the discussion of "high volume" or "special" wastes in the RCRA statute, amendments, and in particular the legislative history tends to identify specific waste streams rather than generic or aggregated wastes generated by facilities or industries. In addition, where practical, EPA listings of hazardous wastes under Subtitle C tend to identify specific waste streams

generated at particular types of facilities.

On the other hand, inter-industry similarities in production processes, waste characteristics, and waste management practices suggest that certain waste types might reasonably be combined across mineral commodity sectors (e.g., non-ferrous slags from copper, lead, and zinc smelting). Statutory directive and Congressional intent are not available for guidance in evaluating the appropriateness of this approach, though in its 1985 proposed reinterpretation of the Bevill exclusion, EPA explicitly placed "primary metal smelting slags" inside the narrowed Bevill boundaries (i.e., as a *group* rather than individually) (50 FR 40292). Although the Agency believes that combining wastes for purposes of analysis may in some cases be appropriate, it has not been able to develop a simple and non-arbitrary system for implementing this approach. Therefore, EPA has not combined waste streams to determine which should continue to receive the temporary Bevill exclusion.

#### 2. Basis for Quantitative Analysis

In deciding upon the proper focal point for conducting its quantitative analysis to support a definition of "high volume" processing wastes, EPA considered three basic options:

- (1) Develop and analyze a plant-specific measure of waste generation;
- (2) Examine waste stream generation on an industry-wide basis; and
- (3) Develop and utilize a combination of the first two alternatives.

EPA has chosen option 3, and has evaluated waste streams using both industry-wide and plant-specific perspectives. In making this decision, the Agency put primary emphasis on developing criteria that were unambiguous, could be easily interpreted by industry and the public, and yielded results that were consistent with previously published discussions concerning which mineral processing wastes are high volume and which are not. *See e.g.*, 43 FR 58946, 50 FR 40292.

The high-volume concept, as originally proposed by EPA in 1978, reflected the Agency's concern that certain wastes that were generated in very large quantities could not feasibly be managed in accordance with all of the technical standards of RCRA Subtitle C, especially because many of these wastes are managed on-site. When Congress incorporated the high-volume concept into the RCRA statute with the adoption of the Bevill Amendment, it echoed these concerns. *See, e.g.*, 126 *Cong. Rec.* 3364 (1980) (remarks of Rep.

Williams). In particular, Congress directed EPA to study, under section 8002(p) of RCRA, these high volume wastes in depth in order to determine whether Subtitle C regulation would be appropriate.

In the 1985 proposed Bevill reinterpretation, the Agency relied primarily on total annual industry waste generation data to determine which waste streams would remain within the temporary exclusion. Use of this measure alone, however, fails to capture certain ore and mineral processing wastes that are not generated widely but are generated in large volumes at each plant. The operators of facilities that produce these wastes may face the same problems with respect to developing and implementing feasible waste management methods as operators in other industry sectors that generate (in aggregate) many millions of tons of waste annually. EPA believes that these facility operators should not be penalized solely because there are fewer plants in their particular ore and mineral processing industry sector than in others that may also generate one or more high volume wastes.

Therefore, EPA believes that it is appropriate to include a measure of typical waste generation at an individual plant (e.g., the mean or median level of waste generated per facility), in evaluating whether a particular waste stream is "high volume."

#### 3. Units of Measure

An important issue related to the previous two involves the units of measure that are applied to mineral processing wastes and that serve as the basis of evaluation and comparison with other "high volume" wastes. Here EPA considered two basic approaches, one of which gives rise to several different potential options:

- (1) Use total (absolute) quantity of waste generated annually (metric tons); and

- (2) Develop and utilize ratios of *relative* waste volume generated to one or more measures of material handled, such as the ratio of waste quantity to the quantity of ore/mineral feedstock, or the ratio of waste quantity to the quantity of final product. One or some combination of these ratios could be used to compare each mineral processing waste with the others and with wastes generated in other industries.

EPA has chosen option 1, which is the simplest, and allows direct comparison with other waste streams, industry sectors, etc., and also facilitates subsequent examination of the technical

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feasibility of Subtitle C regulation (e.g., waste volume compared to available disposal capacity). In addition, this simple measure of waste quantity is easy to calculate and existing data allow it to be computed for potential "high volume" processing wastes.

Production levels, and hence, waste generation volumes, in the mineral processing industry, however, fluctuate considerably over time, due primarily to market conditions. Relying upon data from a single year or even several years in succession may therefore present an inaccurate view of likely waste generation rates in the future.

The second alternative, expressing waste generation as a ratio, provides a measure of the degree of concentration that occurs in the process that generates each waste, potentially providing EPA with an additional variable by which to compare and contrast candidate "high volume" processing wastes with the extraction and beneficiation wastes that are clearly within the Bevill exclusion, as well as other "special wastes." Existing data, however, are not adequate to compile candidate ratios for certain prominent large volume mineral processing waste streams.

Nonetheless, the Agency believes that the ratio concept has merit and would consider incorporating some form of ratio into the final rule. For example, EPA has examined several ratios, and has found that a ratio of waste to product of greater than 0.5 effectively distinguishes high volume from low volume processing wastes, based upon the limited data that are available, i.e., the same list of excluded processing wastes is obtained using this criterion as is obtained using the total volume and average volume criteria described below. Although EPA did not utilize this ratio in selecting wastes to be retained within the exclusion for today's proposal, the Agency seeks public comment on this approach and on an appropriate ratio.

**4. Wastes To Be Utilized as the Basis for Comparison**

EPA also considered several bases of comparison with which to evaluate potential high volume wastes. This issue is important because "high volume" is a relative term, having essentially no meaning when applied to anything in isolation. Again, several options are available for comparing different types of high volume and/or hazardous wastes with mineral processing wastes:

- (1) Extraction and beneficiation wastes;
- (2) Other special study wastes, e.g., oil and gas wastes;
- (3) RCRA Subtitle C wastes; and

(4) Some combination of the previous three.

EPA selected option 4 to analyze and quantify the notion of "high volume." Specifically, EPA has compared and contrasted the wastes generated by mineral processing with those generated by the extraction and beneficiation of ores and minerals, and those from oil and gas production (i.e., other section 8002 wastes). See RCRA section 8002(m). In addition, the Agency has examined specific wastes currently regulated under Subtitle C to highlight the similarities and differences between these wastes and those addressed in this proposed rule. EPA believes that each of these three categories of wastes is relevant for purposes of comparison with mineral processing wastes, and that each comparison offers insight into the proper definition of the term "high volume."

Option 1 would compare each processing waste to the wastes that are (or were until studied) clearly and unambiguously within the Bevill exclusion, those from extraction and beneficiation of ores and minerals. EPA believes that this is a logical basis of comparison, and, accordingly, has examined the quantities of wastes generated by ore and mineral extraction and beneficiation and related them to the quantities of mineral processing wastes (see the docket for additional information).

The second option is to compare processing wastes with other special study wastes, such as those generated by oil and gas production. This is also a reasonable approach, given the special status of these wastes under RCRA, as amended. Moreover, oil and gas production is an *extractive* operation, in which a valuable natural resource is removed from its surroundings and collected for further refinement. As such, it has a number of obvious similarities with the extraction (mining) and subsequent beneficiation and processing of ores and minerals.

The third alternative would compare processing wastes with the existing universe of Subtitle C wastes. Although such a comparison is not directly related to the question at hand (because of the different regulatory environment afforded to "special" wastes under the Bevill Amendment), it could yield an interesting comparison between the wastes to which Subtitle C is applied and those for which Subtitle C is an option. Comparisons of this type, however, are problematic, both in theoretical and practical terms. One important question is how to define the universe of Subtitle C wastes to be used for comparative purposes. Alternatives

include examining all Subtitle C wastes, those that closely resemble mineral processing wastes with respect to physical form and chemical composition, those that are managed in ways similar to the common practices employed in the mineral processing industry, and doubtless, others. In practical terms, EPA is limited by data availability, and can only examine waste generation and management at Subtitle C facilities in fairly broad terms. Therefore, EPA has conducted only limited quantitative comparisons of listed Subtitle C wastes with the special wastes. These comparisons are not exhaustive, but demonstrate clearly that typical Subtitle C waste volumes are very different than those of many mineral processing wastes.

For example, EPA has assembled data on the generation of the top nine listed Subtitle C wastes on an aggregate national basis. These data are presented in Table 2. The largest-volume waste is spent pickle liquor from steel finishing, at just over four million metric tons per year. None of the other listed wastes (of which there are *several hundred*) is generated in volumes exceeding one million metric tons per year. As discussed below, this latter generation rate is *one-half* the quantitative total volume criterion used by EPA to designate high-volume processing wastes. Indeed, ten distinct mineral processing waste streams are generated in quantities exceeding one million metric tons per year, and some are generated at rates many times that. This indicates that at least some ore and mineral processing wastes are generated on a very different scale than are typical listed Subtitle C wastes.

**TABLE 2.—TOP NINE LISTED HAZARDOUS WASTES (1985 DATA) <sup>a</sup>**

Hazardous Waste		Quantity of hazardous waste generated (1,000 MT/yr)
Code	Description	
K062.....	Spent pickle liquor from steel finishing.	4,070
K061.....	Emission control dust/sludge from primary steel production in electric furnaces.	914
K104.....	Combined wastewater streams from nitrobenzene/aniline production.	801
K013.....	Bottom stream from the acetonitrile column in acrylonitrile production.	707
K048.....	Dissolved air flotation (DAF) from the petroleum refining industry.	10,700

TABLE 2.—TOP NINE LISTED HAZARDOUS WASTES (1985 DATA)<sup>9</sup>—Continued

Hazardous Waste		Quantity of hazardous waste generated (1,000 MT/yr)
Code	Description	
K051.....	API separator sludge from the petroleum refining industry.	10 700
K011.....	Bottom stream from the wastewater stripper in acrylonitrile production.	687
0087.....	Decanter tank tar sludge from coking operations.	576
0016.....	Heavy ends or distillation residues from carbon tetrachloride production.	414
Total U.S.		245,129

<sup>9</sup> Source: Development Planning and Research Associates, Inc. 1988. *1985 National Biennial Report of Hazardous Waste Generators and Treatment, Storage, and Disposal Facilities Regulated under RCRA (Draft)*. Prepared for Office of Solid Waste, U.S. EPA.

<sup>10</sup> Source: *Petroleum Refining Database*. 1987. Prepared from RCRA section 3007 questionnaires by Office of Solid Waste, U.S. EPA.

Moreover, when EPA examined the latest available data on the quantities of hazardous waste managed on-site at RCRA-regulated facilities, it found that only 180 facilities managing hazardous wastes on-site (well under ten percent of the total) handled more than 50,000 metric tons during this same period (as described below, 50,000 metric tons per year per facility is the other high volume cut-off that EPA has employed to identify high-volume processing wastes). These quantities refer to combined volumes of all hazardous wastes generated and managed on-site at the facilities (most of which are in the chemical and oil refining industries), and are probably dominated by relatively dilute aqueous waste streams. Most of the mineral processing waste streams proposed for retention within the Bevill exclusion today, however, are solid materials (e.g., slags), and in any case are evaluated individually rather than in aggregate at the facility level. Despite these factors, which tend to draw further distinctions between typical Subtitle C wastes and mineral processing wastes, any ore or mineral processing facility that generates and manages a waste on-site at a rate of greater than 50,000 metric tons per year would still be within the top ten percent of hazardous waste treatment, storage, or disposal (TSD) facilities nationwide in terms of volume of waste managed if the waste was to be regulated under Subtitle C.

5. Definition of High Volume Processing Waste

Based on a consideration of the factors outlined above, EPA decided that any waste generated from the processing of ores or minerals, as defined in Section II.A, above, that met either criterion 1 or criterion 2, below, would be designated a "high volume" processing waste:

(1) For a specific waste stream arising from mineral processing in any given mineral commodity sector (e.g., primary copper processing), the total quantity of the specific waste generated by all facilities in the United States in any one calendar year from 1982 through 1987 equals more than 2 million metric tons; or

(2) For a specific waste stream arising from mineral processing in any given mineral commodity sector, the specific waste stream is generated at an average rate (i.e., total quantity of the specific waste generated by all facilities in the United States in any one calendar year from 1982 through 1987 divided by the number of facilities generating the waste) of more than 50,000 metric tons per facility per year.

These criteria effectively and unambiguously distinguish the truly high volume ore and mineral processing wastes from those that are generated at lower rates, at least in those industry sectors for which EPA has adequate data to apply the criteria. As discussed below, the distribution of waste volumes within and across these sectors is essentially bimodal, with many sectors having one or a few high volume waste streams along with several other low volume waste streams. As a result, the criteria serve mainly to highlight these existing differences in volume rather than to draw arbitrary lines; changing either of the specific numeric criteria has little effect on which wastes are identified as being high volume. For example, lowering the total volume criterion from 2 million to 500,000 metric tons per year or raising it to 3 million metric tons per year would have no effect on the list of wastes proposed to be retained within the exclusion, while raising or lowering the average volume criterion by 10,000 metric tons per year per facility (a change of 20 percent) would affect the designation of, at most, one of approximately sixty waste streams examined in depth for today's proposal.

Further justification for setting a lower limit of 2 million metric tons per year on total waste generation volumes can be found in the lists of wastes that the Agency has considered to be "high volume" ever since the "special waste" concept was officially articulated in 1978. See 43 FR 58946. In addition, the wastes from ore and mineral extraction

and beneficiation, which are clearly within the exclusion, are generated by most commodity sectors at a rate of at least two million metric tons per year, as are the drilling wastes and produced waters from oil and gas production identified in section 8002(m) of RCRA.<sup>11</sup>

Therefore, under today's proposal, individual mineral processing waste streams that are generated in the aggregate in quantities exceeding 2 million metric tons per year shall be retained within the Bevill exclusion. These wastes will be studied by EPA to determine whether regulation under Subtitle C is warranted.

At the same time, as discussed above, EPA recognizes that some mineral commodity sectors may comprise very few facilities, and hence, generate lower total waste quantities than others whose wastes and waste management problems at the individual facility level are otherwise very similar. Therefore, the Agency has explicitly incorporated a consideration of typical (average) waste quantities generated at the plant level into its definition of "high volume." The limit used (50,000 metric tons per facility per year) does not retain within the exclusion the vast majority of mineral processing wastes, and in fact retains only those that are generated on a different and considerably larger scale than both the other processing wastes and typical Subtitle C wastes, as discussed above. Here again, the limit that EPA uses approximates the lower end of the range of average waste quantities generated in mineral extraction and beneficiation<sup>12</sup> (oil and gas waste data are available only on a per-well basis and hence are not useful in establishing a quantitative limit for this criterion).

C. Criteria for Identifying "Low Hazard" Wastes from Ore and Mineral Processing

Based on the court's findings in *EDF v. EPA*, an ore or mineral processing waste must be a "special waste", that is, a "high volume, low hazard" waste, in order for it to be temporarily excluded from RCRA Subtitle C regulation by the Bevill Amendment. To determine whether a processing waste is of "low hazard", EPA began with three principles:

<sup>11</sup> U.S. EPA. 1985. *Op. cit.*

U.S. EPA. 1987. *Report to Congress on Management of Wastes from the Exploration, Development, and Production of Crude Oil, Natural Gas, and Geothermal Energy; vol 1: Oil and Gas*. Washington: Office of Solid Waste and Emergency Response. EPA/530-SW-88-003.

<sup>12</sup> U.S. EPA. 1985. *Op. cit.*

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(1) The purpose of a "low hazard" criterion is to assist in identifying the wastes that EPA is required by the Bevill Amendment to study so that actual hazard can be assessed;

(2) The "low hazard" criterion must be consistent with Congressional intent; and

(3) The "low hazard" criterion must be easily applied to the universe of high volume processing wastes using existing or easily obtainable information.

EPA considered two approaches to identifying "high volume" ore and mineral processing wastes that are "low hazard," and thus, should be temporarily excluded from Subtitle C regulation by the Bevill Amendment, as follows:

(1) Define excluded waste as any "high volume" processing waste that does not exhibit any of the characteristics of hazardous waste as defined in RCRA Subtitle C (EP-toxicity, corrosivity, reactivity, or ignitability); and

(2) Eliminate this criterion, and consider all "high volume" processing wastes to be temporarily excluded from Subtitle C regulation.

Today's proposal is based on the second approach listed above, i.e., EPA considers all wastes that meet the proposed "high volume" and "processing" waste criteria to be "special wastes" and thus, temporarily excluded from RCRA Subtitle C regulation by the Bevill Amendment. EPA takes this position because the Agency believes that the alternative approach is inappropriate as a basis for screening high volume wastes to determine the need for study in a Report to Congress. Moreover, option 1 is impractical because the data needed to implement it would not be available until detailed studies, such as those that would support the Report to Congress, have been conducted.

EPA believes that it would be inappropriate to use the existing hazardous waste characteristics as a basis for determining which high-volume processing wastes are "low hazard." When EPA promulgated hazardous waste regulations on May 19, 1980, that deleted the "special waste" category proposed in 1978, the Agency indicated

that a "special waste" category was no longer necessary because the originally proposed EP-toxicity and corrosivity characteristics for defining hazardous waste had been more narrowly defined, thus eliminating prospective Subtitle C regulation of most previously identified "special wastes." See 45 FR 33175.

When Congress adopted the Bevill Amendment, it instructed EPA to study wastes from the extraction, beneficiation, and processing of ores and minerals, prior to subjecting them to Subtitle C regulation; some of these wastes exhibit hazardous characteristics and would therefore fall under Subtitle C in the absence of the Bevill exclusion. Indeed, several of the extraction and beneficiation wastes already studied by EPA under sections 8002 (f) and (p) of RCRA fail one or more of the RCRA hazardous characteristics. Yet, EPA determined to not regulate any of these studied wastes under Subtitle C. On the same day that the Court of Appeals ordered EPA to propose today's rule, it upheld the Agency's regulatory determination for extraction and beneficiation wastes, explicitly rejecting the argument that if a waste fails a characteristic then it must be regulated under Subtitle C, and accepting EPA's contention that other factors can be considered in determining whether a high-volume mining waste should be permanently excluded from Subtitle C regulation. *Environmental Defense Fund v. EPA*, 852 F.2d 1309 (D.C. Cir. 1988). EPA believes that the Court would also recognize that the characteristic tests should not be the primary factors in determining whether a mineral processing waste is to be afforded the temporary exclusion provided by the Bevill Amendment.

In addition to examining Congressional intent and recent Court decisions, the Agency also considered the practicality of using the hazardous waste "characteristics" for identifying "high volume" wastes that are not "low hazard." Specifically, EPA examined the data available on mineral processing wastes, and concluded that the necessary data on waste characteristics are only rarely available, and, where available, are highly variable. Extensive study by EPA would therefore be

necessary before the Agency could apply these criteria to the high-volume processing wastes. Accordingly, the Agency also concluded that the implementation of a "low hazard" criterion based on RCRA Subtitle C hazardous waste "characteristics" would not be feasible.

EPA also briefly considered developing a substitute test for determining whether large-volume processing wastes are low hazard. However, EPA does not have an appropriate alternative test currently in place. Further, EPA has even fewer data to characterize the hazards of large-volume processing wastes using alternate tests. In light of the very short time granted by the Court of Appeals to propose this reinterpretation, EPA found it infeasible to develop an alternate test and collect the necessary data.

For the reasons stated above, EPA believes that it is both necessary and appropriate that the emphasis in defining mineral processing wastes that are temporarily excluded from Subtitle C regulation by the Bevill Amendment be on the volume of waste generated. This is the same conclusion that EPA reached in 1985 when the Agency proposed to reinterpret the scope of the Bevill Amendment and stated that:

Based on the various indications of Congressional intent described in the text, EPA believes it is reasonable to rely primarily on volumes of waste generated to determine which wastes should have been excluded by the Bevill Amendment (50 FR 40294).

#### *D. Proposed Bevill-Excluded Processing Wastes*

Based upon available data, EPA proposes to retain the wastes presented in Table 3, below, within the Bevill exclusion, because they meet the criteria for "special" mineral processing wastes articulated in this proposal. The Agency encourages members of industry and the public to submit, in public comment, descriptions of and quantitative data regarding any *additional* specific waste streams that they believe meet these criteria for study by EPA prior to the final resolution of their regulatory status.

TABLE 3.—SPECIAL WASTES GENERATED FROM MINERAL PROCESSING THAT ARE PROPOSED FOR RETENTION WITHIN THE BEVILL EXCLUSION

Commodity sector and waste type	Number of facilities	Total estimated industry-wide waste generation (MT/yr) <sup>a</sup>	Average waste generation for facility (MT/yr) <sup>b</sup>
<b>Copper:</b> <sup>c</sup>			
Smelting Slag.....	8	3,652,080	456,510
Process Wastewater.....	10	530,500	53,050
Acid Plant Blowdown.....	7	4,399,710	628,530
Bleed Electrolyte.....	7	444,600	63,514
<b>Lead:</b> <sup>c</sup> Smelting Slag.....	5	328,630	65,726
<b>Zinc:</b> <sup>c</sup>			
Process Wastewater.....	2	1,451,000	725,500
Acid Plant Blowdown.....	4	305,800	76,450
Bauxite: <sup>c</sup> Red and Brown Muds.....	4	2,697,000	674,250
<b>Other:</b> <sup>d</sup>			
Phosphogypsum.....	27	47,000,000	1,740,741
Elemental Phosphorous Slag.....	5	3,000,000	600,000
Iron Blast Furnace Slag.....	24	9,805,000	408,542
Iron Blast Furnace APC Dust/Sludge.....	24	3,197,000	133,208
Lime Kiln APC Dust.....	117	3,300,000	28,205
Waste Acids from Titanium Dioxide Production <sup>e</sup> .....	8	1,375,000	171,825
Chromite Ore Roasting/Leaching Slag <sup>f</sup> .....	2		>50,000

<sup>a</sup> Total Estimated Industry-Wide Waste Generation=(Facility Capacity) \* (Projected Average Long-term Utilization) \* (Generation Rate). Source: EPA estimates based on data provided by the U.S. Bureau of Mines, PEDCo Environmental Incorporated, Radian Incorporated, and individual facility operators.

<sup>b</sup> Average Waste Generation per Facility=(Total Estimated Industry-Wide Waste Generation)/(Number of Facilities).

<sup>c</sup> Detailed data are available on wastes in these commodity sectors because EPA was about to complete and submit a required Report to Congress addressing their management when today's proposed rule was mandated by the Court. Data on the other wastes remaining within the exclusion are far more limited.

<sup>d</sup> Industry-wide waste totals were obtained from a prior proposed rulemaking (50 FR 40292). Number of facilities generating each waste were obtained from the Bureau of Mines (personal communication, 1988).

<sup>e</sup> Data on waste generation rates were obtained from PEI Associates, Inc., 1984. *Overview of Solid Waste Generation, Management, and Chemical Characteristics: Primary Antimony, Magnesium, Tin, and Titanium Smelting and Refining Industries*. Prepared for Industrial Environmental Research Laboratory, Office of Research and Development, U.S. EPA.

<sup>f</sup> Total waste generation data are unavailable. Average waste generation is believed to be greater than 50,000 MT/yr. based upon production volumes and quantities of feedstocks consumed.

Most mineral processing wastes on which the Agency has information do not conform to the "high volume" criteria used to compile the list presented in Table 3. This includes most that has been proposed for study under the Bevill Amendment in public comment on the 1985 proposed interpretation. In addition, none of the six smelting wastes that were recently listed as hazardous wastes satisfy the high volume criteria described here: Within the five metallic ore processing sectors that have been most extensively studied by EPA (aluminum, bauxite, copper, lead, and zinc), the range of total sector-wide volumes of waste streams that are not retained within the proposed exclusion is very broad, from 100 to 228,000 metric tons per year, though the upper end of this range is a full order of magnitude lower than the cutoff for meeting the high volume criterion. Average generation rates at individual plants range from 20 to 38,000 metric tons per year. Only one waste stream (wastewater treatment plant sludge in the copper sector) is generated in volumes that approach the limit necessary to remain within the exclusion (average of 50,000 MT/Yr).

All other waste streams arising from these five metal processing sectors are

generated at an average of less than 10,000 metric tons per year, and most are generated in the *hundreds* of tons per facility per year.

Therefore, EPA believes that it has correctly and unambiguously identified the wastes that were of concern to Congress when it enacted the Bevill amendment, and has, at the same time, presented explicit criteria that will enable members of the regulated community and the public to evaluate whether any additional wastes should be added to the list in Table 3 for the continued regulatory exclusion and study provided by the Bevill amendment. The Agency has identified and proposed for temporary exclusion all of the wastes from ore and mineral processing that, according to available data, meet these criteria. In the absence of new information submitted during the public comment period, EPA does not anticipate that additional wastes will be proposed for exclusion under the Bevill Amendment when this proposed rule is finalized on February 15, 1989. Accordingly, EPA hereby solicits public comment (and supporting data) on the approach described in this proposal, on the specific numerical criteria, on the specific waste streams proposed for continued exclusion from Subtitle C

under Bevill, and on any *additional* candidate Bevill wastes. EPA will address all major comments received during the 30-day comment period prior to finalizing the rule.

**III. Regulatory Impacts on This Proposal**

When this rule is promulgated in final form, mineral processing wastes that have been temporarily excluded from regulation under Subtitle C of RCRA since 1980 and that do not meet the criteria for "special wastes," as described above, may now be subject to Subtitle C requirements beginning, at the latest, six months after publication of the final rule in those states that do not have authorization to administer their own hazardous waste program in lieu of EPA (see RCRA section 3010). These requirements include determining whether the solid waste(s) exhibit hazardous characteristics (40 CFR 262.11), and, if so would require the operator to obtain an EPA identification number (40 CFR 262.34), comply with recordkeeping and reporting requirements (40 CFR 262.40-262.43), and submit an application for a treatment, storage, or disposal permit (RCRA section 3005 "Part A" permit) for interim status if the waste is managed onsite.

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Subsequently, these treatment, storage, or disposal (TSD) facilities would have to apply for a final permit under RCRA Part B provisions. Completion of Part B applications would require individual facilities to develop and compile information on their on-site waste management operations including, but not limited to the following activities: Ground-water monitoring (if waste management on land is involved); manifest systems, recordkeeping, and reporting; closure, and possibly, post-closure requirements; and financial responsibility requirements. The Part B applications may also require development of engineering plans to upgrade existing facilities.

In addition, many of these facilities will, in the future, be subject to land disposal restriction (LDR) standards. EPA will promulgate LDR standards for all characteristic hazardous wastes by May 8, 1990. Under EPA regulations, these standards must require treatment of the affected wastes to a level or by a method that reflects the use of Best Demonstrated Available Technology (BDAT) before the wastes can be disposed on the land. Thus, one future implication of today's proposal (when finalized) will be the ban on land disposal of these wastes unless they are appropriately treated prior to such disposal. Also, facilities with existing permits and permit applications that are currently treating, storing, or disposing of wastes that will be subject to Subtitle C regulation when this rule is promulgated, will have to amend or modify their permits or applications to include provisions applicable to managing these newly non-excluded wastes.

#### IV. Public Participation

Requests to speak at the public hearing should be submitted in writing to the Public Hearing Officer, Office of Solid Waste, (WH-562), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460. The public hearing is at the U.S. Environmental Protection Agency, Conference Room 13, 401 M Street SW., Washington, DC. The hearing will begin at 10:00 a.m. with registration beginning at 9:30 a.m. The hearing will end at noon unless concluded earlier. Oral and written statements may be submitted at the public hearing. Persons who wish to make oral presentations must restrict these to 15 minutes, and are requested to provide written comments for inclusion in the official record.

#### V. Effect on State Authorizations

This proposal, if promulgated, will not be automatically effective in authorized States, since the requirements will not be imposed pursuant to the Hazardous and Solid Waste Amendments of 1984. Thus, this reinterpretation will be immediately applicable only in those few States that do *not* have interim or final authorization to operate their own hazardous waste programs in lieu of the Federal program. In authorized States, the reinterpretation and the regulation of non-excluded processing wastes will not be applicable until the State revises its program to adopt equivalent requirements under State law.

40 CFR 271.21(e) requires States that have final authorization to revise their programs to adopt equivalent standards by July 1, 1990 if only regulatory changes are necessary, or by July 1, 1991 if statutory changes are necessary. These deadlines can be extended in exceptional cases (40 CFR 271.21(e)(3)). Once EPA approves the revision, the State requirements become Subtitle C RCRA requirements in that State.

States that submit an official application for final authorization less than 12 months after the effective date of the reinterpretation may be approved without including an equivalent provision (i.e., to address "special" mineral processing wastes) in the application. However, once authorized, a State must revise its program to include an equivalent provision within the time period discussed above. The process and schedule for revisions to State programs are described in the amendment to 40 CFR 271.21 published on May 22, 1984. See 49 FR 21768. (See also 51 FR 33722, Sept. 22, 1986.)

#### VI. Compliance With Executive Order 12291

Sections 2 and 3 of Executive Order 12291 (46 FR 13193) require that a regulatory agency determine whether a new regulation will be "major" and, if so, that a Regulatory Impact Analysis be conducted. A major rule is defined as a regulation which is likely to result in:

(1) An annual effect on the economy of \$100 million or more;

(2) A major increase in costs or prices for consumers, individuals, industries, Federal, State, and local government agencies, or geographic regions; or

(3) Significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

Section 8 of Executive Order 12291 exempts an agency from the requirements of the order when compliance would conflict with deadlines imposed by statute or judicial order. Accumulating the information and conducting the analyses required to fully comply with the requirements of sections 2 and 3 takes many months. Therefore, compliance with these requirements is not possible within the schedule specified by the Court for this rulemaking.

Although the Agency cannot conduct a complete economic impact analysis within the period of time allowed by the Court, several economic impact analyses conducted in support of previous Agency rulemaking activity suggest that today's proposal does not meet the criteria for a "major" rule.

In 1985, EPA conducted cost and economic impact studies to analyze the potential cost and market impacts of the proposed reinterpretation of the Bevill Amendment on metal processing sectors and to evaluate possible impacts on small businesses. These studies involved detailed compliance cost and economic impact analyses for ten major primary metal smelting and refining sectors, and less detailed impact screening analyses for 21 other metals sectors,<sup>13</sup> containing a total of 110 operating facilities that produced 97 percent of total U.S. nonferrous and ferroalloy product tonnage in 1983. The ten major sectors were aluminum, copper, lead, zinc, ferroalloys, magnesium, titanium metal, titanium dioxide, zinc oxide, and zirconium/hafnium. EPA determined that the 1985 proposed reinterpretation would impose annual compliance costs of approximately \$20 million on these ten sectors, and therefore would not constitute a "major" rule. The 1985 studies did not address risk to human health and the environment posed by the wastes generated and the waste management practices employed in these commodity sectors.

In the preamble to the 1985 reinterpretation, EPA also discussed

<sup>13</sup> Policy Planning & Evaluation, Inc. 1985. *Economic Impact Analysis of Proposed Reinterpretation of Solid Waste Exemption for the Primary Smelting and Refining Industry*. Office of Solid Waste, U.S. EPA.

Policy Planning & Evaluation, Inc. 1985. *Economic Impact Analysis of Proposed Reinterpretation of Solid Waste Exemption for the Primary Smelting and Refining Industry (Supplemental Analysis of 21 Minor Metals Industries)*. Office of Solid Waste, U.S. EPA.

ICF Incorporated. 1985. *Hazardous Waste Management Costs in Selected Primary Smelting and Refining Industries*. Office of Solid Waste, U.S. EPA.

economic impacts on the ten major nonferrous metal- and ferroalloy-producing sectors, including effects on production costs, prices, international trade, total investment requirements, return on investment, and potential for plant closures and job losses. See 50 FR 40299. The analysis indicated that the average increases in production costs or prices would be small to moderate (less than two percent) for nine of the ten sectors. On average across all ten sectors, the annualized costs of the 1985 proposed reinterpretation amounted to less than 0.4 percent of production costs or prices. Because of these very limited effects on prices, the study did not explore the possible effects of the proposed rule on international trade. To examine effects on investment, EPA estimated average capital investment costs of compliance as a percent of normal capital expenditures, and found that this ratio ranged from one percent (in aluminum and copper sectors) to 75 percent (in the zinc sector). The effect of today's rule would be significantly lower for the zinc sector than that of the 1985 proposed reinterpretation because acid plant blowdown and process wastewater (which were not proposed for continued exclusion in 1985) accounted for a large part of the estimated Subtitle C compliance costs of the 1985 proposal. The results for return on investment showed a majority of sectors with maximum impacts on profit of about two percent. Firms in the zinc, ferroalloys, and titanium dioxide sectors, however, could have experienced larger changes in return on investment had the 1985 proposed reinterpretation been promulgated. Both the zinc and titanium dioxide sectors generate high volume

waste streams (accounting for a significant fraction of any incremental RCRA waste management costs) that would be temporarily exempted from Subtitle C regulation as a result of today's proposed rule. Finally, EPA's plant closure and employment loss analysis indicated that the 1985 proposed reinterpretation might result in the closure of one plant (in the ferroalloys sector) and the concomitant loss of approximately 80 jobs.

In 1986, in response to comments regarding the 1985 impact studies, EPA made extensive revisions to its 1985 cost and impact estimates for the major primary metals sectors. Although the revisions resulted in increases in the estimated costs for most sectors, total after tax compliance costs for the facilities in aggregate were around \$25 million, still well below the \$100 million annual cost threshold. Accordingly, the Agency considered its initial judgment, that the 1985 proposed reinterpretation was not a major rule, validated.

There are a number of differences between the 1985 proposed reinterpretation and today's proposed rule. In 1985, the only processing wastes that would have been temporarily excluded from Subtitle C regulation under the provisions of the Bevill Amendment were phosphogypsum, bauxite refining muds, primary metal smelting slags, and slag from elemental phosphorus reduction. Today's notice establishes an expanded list of the wastes that would remain within the exclusion as special wastes. Waste streams that were included in the 1985 cost and impact estimates in 1985 but that would be excluded under today's proposal include process wastewater from primary copper smelting/refining,

bleed electrolyte from primary copper refining, blowdown from acid plants at primary copper smelters, blowdown from acid plants at primary zinc smelters, wastewater from primary zinc smelting, and waste acids from titanium dioxide production. These additional proposed exclusions from immediate Subtitle C regulation imply substantial reductions in costs and economic impacts from those estimated for the 1985 reinterpretation.

In 1988, EPA analyzed in depth the five major smelting and refining sectors that accounted for approximately 80 percent of total 1985 nonferrous metal production. These sectors comprise the aluminum, bauxite, copper, lead, and zinc processing industries. The 1988 estimates represent the most recent and reliable assessment of the costs and economic impacts of Subtitle C compliance for these sectors, after factoring out the effects of the listing of the six hazardous smelter wastes and of the high volume wastes identified above, which will be subject to further study and regulatory consideration.

Based on this 1988 analysis, EPA estimates that the five major metal commodity sectors would incur before-tax incremental annual costs for Subtitle C compliance of about \$11 million under today's proposal. The annual revenue requirements by sector and the number of affected facilities are displayed in Table 4. In total, the Agency estimates that the incremental compliance cost is a less than 10 percent increase over the current costs of waste management, and only 33 of 57 operating facilities would experience increased waste management costs of any kind.

TABLE 4.—COST IMPACTS OF TODAY'S PROPOSAL ON FIVE MAJOR METALLIC ORE PROCESSING SECTORS

Sector	Number of facilities	Number of affected facilities	Quantities of potentially hazardous waste (MT/yr.)	Incremental annual revenue requirement (\$1,000/yr.)	Percent of total current management costs
Copper:					
Electrowinning .....	10	0	0	0	0
Smelting and/or Refining .....	12	4	157,480	2,603	11
Zinc .....	5	4	94,712	5,646	16
Lead .....	5	4	12,780	319	11
Aluminum .....	24	21	110,246	2,574	9
Bauxite .....	4	0	0	0	0
Total .....	57	33	375,218	11,142	10

Although EPA has not updated its analyses for the remaining sectors of the metals industry, the Agency believes that the impacts in these sectors will be

roughly proportional to those predicted for the five major sectors.

In terms of economic impact, in 1988 the Agency calculated two financial ratios for the five major nonferrous

metal-producing industry sectors. These ratios are: Annual revenue requirement (incremental compliance cost) as a percentage of value of shipments, and new capital investment needed for

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regulatory compliance as a percentage of average annual investment.

The first ratio measures the maximum potential price rise if the industry is able to pass all increased costs through to consumers or the maximum amount by which before-tax profits will decline if no costs can be recovered by increasing prices. The second ratio allows a comparison between new capital

required and the amount of new investment that the industry historically undertakes.

The results are presented in Table 5 and indicate that for the five industry sectors the incremental annual revenue requirements would average 0.1 percent of the value of shipments. The only industry with a ratio greater than one percent is the zinc sector with a ratio of

1.7 percent. The average compliance capital cost would average 0.1 percent of historical capital investment across all five sectors, indicating a negligible effect on the firms' capital investment decisions. The potential impacts on several of the remaining 21 metals sectors, however, is unclear because EPA does not have sufficient data to undertake a detailed analysis.

TABLE 5.—ECONOMIC IMPACTS OF TODAY'S PROPOSAL ON FIVE MAJOR METALLIC ORE PROCESSING SECTORS

Sector	Incremental Annual Cost (\$1,000/yr.)	Total incremental capital cost (\$1,000)	Ratio of Inc. ARR to value of shipments	Ratio of Inc. Capital cost to new investment
Copper.....	2,603	8,152	0.05	0.02
Zinc.....	5,646	22,213	1.72	2.60
Lead.....	319	1,105	0.012	0.13
Aluminum.....	2,574	6,681	0.05	0.05
Bauxite.....	0	0	n/a	n/a
Total.....	11,142	38,151	0.10	0.08

The costs and impacts that EPA has estimated to date have not included considerations of the possible effects of the land disposal restrictions and corrective action requirements contained in the provisions of the Hazardous and Solid Waste Amendments (HSWA) of 1984.

In addition, EPA has little or no data on the non-metallic ore and mineral processing sectors, such as elemental phosphorous production, some of which generate wastes that would be temporarily excluded from Subtitle C under today's proposed rule. At the same time, many of these facilities also generate small volume wastes that would be affected by the proposal. Therefore, the Agency is unable to assess the impact of today's proposal on facilities and firms in the non-metallic ore and mineral processing industry sectors, and hereby requests public comment on any such sectors that might be affected by this proposal because they generate low volume, characteristic hazardous wastes.

This proposal was submitted to the Office of Management and Budget (OMB) for review as required by section 6 of Executive Order 12291. Any comments for OMB to EPA and any response to those comments are available for viewing at the RCRA Docket.

**VII. Regulatory Flexibility Analysis**

The Regulatory Flexibility Act (RFA) of 1980 (Pub. L. 96-354), which amends the Administrative Procedures Act, requires Federal regulatory agencies to consider "small entities" throughout the regulatory process. The RFA requires, in

Section 603, an initial screening analysis to be performed to determine whether a substantial number of small entities will be significantly affected by a regulation. If so, regulatory alternatives that eliminate or mitigate the impacts must be considered.

Section 608 of the Act allows an Agency head to waive or delay completion of the screening analysis in response to an emergency that makes compliance with the requirements of section 603 on a timely basis impracticable. In this instance, the court-imposed deadline for publication of this proposed rule prevents EPA from conducting a complete analysis of potential impacts of the rule on small entities in time to support this proposed rule. The Agency did, however, conduct a detailed screening analysis for all nonferrous smelting and refining and ferroalloy-producing facilities as part of the 1985 proposal to reinterpret the mining waste exclusion. Based on that analysis, the Agency determined that small business ownership (as defined by the Small Business Administration) was rare in metals processing, and further, that in those few sectors (ferroalloys, gold and silver refining) in which facilities were not all owned by large businesses or conglomerates, the small enterprises were generally of a type that would be either unaffected or not significantly affected by the proposed reinterpretation (50 FR 40300).

EPA has not studied enterprise ownership patterns or the potential cost impacts of today's rule for the non-metallic ore and mineral processing sectors. Nevertheless, based on general knowledge of the raw material

processing industries, the Agency believes that the general conclusions reached for the metals sectors should apply also to the non-metals sectors and that there would not be impacts on a substantial number of small business enterprises sufficient to warrant additional application of the Regulatory Flexibility Act. The Agency solicits comment and further information relating to this conclusion.

**List of Subjects in 40 CFR Part 261**

Hazardous waste, Waste treatment and disposal, Recycling, Reporting and recordkeeping requirements.

Dated: October 14, 1988.

Lee M. Thomas,  
Administrator.

For the reasons set out in the preamble, it is proposed to amend Title 40 of the Code of Federal Regulations as follows:

**PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTES**

1. The authority citation for Part 261 continues to read as follows:

Authority: Sections 1006, 2002(a), 3001, and 3002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912(a), 6921, and 6922).

2. Section 261.4, paragraph (b)(7), is revised to read as follows:

**§ 261.4 Exclusions.**

\* \* \* \* \*

(b) \* \* \*

(7) Solid waste from the extraction, beneficiation, and processing of ores and minerals (including coal), including

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phosphate rock and overburden from the mining of uranium ore. For purposes of this paragraph, solid waste from the processing of ores and minerals includes only the following materials:

- (i) Slag from primary copper smelting;
- (ii) Process wastewater from primary copper smelting/refining;
- (iii) Blowdown from acid plants at primary copper smelters;
- (iv) Bleed electrolyte from primary copper refining;

- (v) Slag from primary lead smelting;
- (vi) Blowdown from acid plants at primary zinc smelters;
- (vii) Process wastewater from primary zinc smelting/refining;
- (viii) Red and brown muds from bauxite refining;
- (ix) Phosphogypsum from phosphoric acid production;
- (x) Slag from elemental phosphorous production;
- (xi) Iron blast furnace slag;

- (xii) Air pollution control dust/sludge from iron blast furnaces;
- (xiii) Waste acids from titanium dioxide production;
- (xiv) Air pollution control dust from lime kilns; and
- (xv) Slag from roasting/leaching of chromite ore.

\* \* \* \* \*  
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