LIGHTWEIGHT AGGREGATE PRODUCTION AND AIR POLLUTION CONTROL WASTES

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

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TECHNICAL BACKGROUND DOCUMENT
LIGHTWEIGHT AGGREGATE PRODUCTION AND AIR POLLUTION CONTROL WASTES

This document presents EPA's rationale in withdrawing a specific waste generated in the production of lightweight aggregate from the federal Mining Waste Exclusion. This waste, which is comprised of air pollution control (APC) dust and sludge, was one of many mineral processing wastes that was made conditionally exempt from RCRA Subtitle C requirements under the Bevill Amendment. In 1990, following more detailed study of the generation rates of this waste, EPA determined that it did not qualify for the Bevill Exemption (55 FR 2340). A 1991 federal Appeals Court decision, however, requested that the Agency reexamine whether lightweight aggregate APC dust/sludge is eligible for coverage under the Mining Waste Exclusion (*Solite Corporation v. EPA* 952 F.2d 473 D.C. Cir. 1991).

The information in this document is based primarily on data collected and analyses conducted in 1989 and 1990. The major source of data used in the Agency's determination was its 1989 National Survey of Solid Wastes from Mineral Processing Facilities (SWMPF Survey). SWMPF Surveys were sent to and received from 28 lightweight aggregate facilities that the Bureau of Mines reported as actively operating at that time.[1]

1.Background and Purpose

Mineral processing wastes were required to meet two criteria in order to continue to qualify for the Bevill Exclusion: (1) the waste had to be a low hazard waste, and (2) it had to be generated in large volumes. In a final rule published on September 1, 1989 (54 FR 36592), EPA established a high volume criterion of greater than 45,000 metric tons per year per facility for solid wastes and 1,000,000 metric tons per year per facility for liquid wastes (averaged across the commodity sector).

In a NPRM issued on September 25, 1989 (54 FR 39298), EPA applied the final low hazard/high volume criteria to 20 mineral processing wastes that had been conditionally retained for Bevill status. EPA's analysis suggested that lightweight aggregate APC dust/sludge qualified for the Bevill Exemption. In a revised analysis supporting the final rule issued on January 23, 1990 (55 FR 2322), however, EPA's findings indicated that while APC dust/sludge was a low hazard waste, it was not generated in large volumes and, therefore, should be withdrawn from the Bevill Exclusion. EPA's position was challenged in court by Solite, a producer of lightweight aggregate, on grounds that the Agency had not provided the public with adequate notice of, or opportunity to comment on, its revised methodology for calculating the volume of lightweight aggregate APC dust/sludge, as well as on substantive grounds.

Most of the facilities that produce lightweight aggregate in the U.S. would be largely unaffected by EPA's 1990 determination because of the low hazard nature of APC dust/sludge waste (i.e., the waste seldom fails the Toxicity Characteristic test and is unlikely to exhibit other hazardous characteristics). Five facilities would, however, be affected because they burn hazardous waste fuels in their kilns and through application of the RCRA Subtitle C derived-from rule, any solid wastes generated by these operations would automatically be considered hazardous wastes. As of 1988, these facilities were Carolina Solite at Norwood, NC; Florida Solite at Green Cove, FL; Kentucky Solite at Brooks, KY; Solite at Arvonia, VA; and a facility in Cohoes, NY owned and operated by Norlite. Solite also operates a facility in Cascade, VA that burns hazardous

[1] Determination of Waste Volume For Twenty Conditionally Retained Bevill Mineral Processing Wastes, EPA, Office of Solid Waste, January 12, 1990.

waste fuels, but this facility generates no waste because all the APC dust that is generated is returned to the operation.[2,3]

In response to the lawsuit filed by Solite, the Court ruled that EPA's determination violated notice and comment requirements and accordingly directed EPA to revisit the issue.[4] This document revisits in detail the rationale behind EPA's determination on the lightweight aggregate waste's Bevill status. This document is organized into eight sections including this background. Section 2 briefly describes the commodity in question. Sections 3 and 4 describe the production process and the resultant waste streams, respectively. Section 5 discusses industry and market characteristics and the potential impact of EPA's decision to withdraw the Bevill Exclusion. Section 6 revisits the rationale behind EPA's decision to withdraw the Bevill Exclusion based on the high volume criterion. Section 7 summarizes and responds to Solite's arguments against EPA's high volume criterion. Finally, Section 8 presents the conclusions of the document. Attachment A comprises copies of Solite's public comments on Agency rulemaking notices addressing the RCRA regulatory status of lightweight aggregate production wastes.

2.Commodity Summary

Lightweight aggregates are minerals, natural rock materials, rock-like products, and byproducts of manufacturing processes that are used as bulk fillers in lightweight structural concrete, concrete building blocks, precast structural units, road surfacing materials, plaster aggregates, and insulating fill. Lightweight aggregates are also used in architectural wall covers, suspended ceilings, soil conditioners, and other agricultural uses. Lightweight aggregates may be classified into four groups:

(1)*Natural lightweight aggregate materials* which are prepared by crushing and sizing natural rock materials, such as pumice, scoria, tuff, breccia, and volcanic cinders.

(2)*Manufactured structural lightweight aggregates* which are prepared by pyroprocessing shale, clay, or slate in rotary kilns or on traveling grate sintering machines.

(3)*Manufactured insulating ultralightweight aggregates* which are prepared by pyroprocessing ground vermiculite, perlite, and diatomite.

(4)*Byproduct lightweight aggregates* which are prepared by crushing and sizing foamed and granulated slag, cinders, and coke breeze.

The first three types of lightweight aggregates are produced from naturally occurring raw materials, while the fourth is produced from a byproduct of iron and steel production. Production of byproduct lightweight aggregates is a distinct industrial activity associated with the ferrous metals sector. Such aggregates and the associated air pollution control residues were considered separately and explicitly during EPA's rulemaking process, outlined in Section 1 above. Consequently, they are not relevant to the discussion in this report. For a description of these processes, please refer to Identification and Description of Mineral Processing Sectors and Waste Streams, U.S. EPA, Office of Solid Waste, July 1995.

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[2] Addendum to the Technical Background Document: Development of the Cost and Economic Impacts of Implementing the Bevill Mineral Processing Wastes Criteria, EPA Office of Solid Waste, 1990, p. 3.

[3] Without the Bevill Exclusion, however, the recycled dust and the product of this facility might be considered derived-from hazardous wastes by EPA.

[4] *Solite Corporation v. U.S. Environmental Protection Agency*, Case No. 89-1629, argued September 16, 1991, decided December 31, 1991, United States Court of Appeals For the District of Columbia Circuit.

Lightweight aggregates are distinguished from other mineral aggregate materials by their lighter unit weights. Use of lightweight aggregate allows builders to install a concrete weighing 98 pounds per cubic foot, rather than the 150 pounds for regular grade concrete made with heavy aggregates. In addition to its weight savings, manufactured lightweight aggregate is valued because of its skid resistance, insulating abilities, and strength. Substitute materials that offer similar weight savings may not always be compatible with users' needs. For example, natural lightweight materials sometimes offer even greater weight savings than manufactured lightweight aggregate, but may not provide as much strength.[5]

3.Production Processes

Natural lightweight aggregates are prepared through basic operations such as mining, grinding, and sizing. Manufactured lightweight aggregate and manufactured ultralightweight aggregate products are produced by heating certain types of clay, shale, slate, or other materials in a rotary kiln, which causes the materials to expand or "bloat," resulting in a porous product. The product will retain its physical strength despite its lighter unit weight (lower density) when cooled.[6]

Naturally occurring lightweight aggregate raw materials, such as pumice and volcanic cinders, are normally mined by open pit or quarry methods, depending on the degree of consolidation of the raw materials. Shale, clay, and slate mined by open pit and quarry methods are dried in large sheds or open stockpiles to control water content in the raw feed prior to high temperature pyroprocessing in either rotary kilns or sintering machines. The resulting clinker may then be screened or crushed before screening to yield proper gradation mixes for final use. Most lightweight aggregate plants use coal as a primary source of fuel. Waste derived fuels and solvents from various industrial processes are also used as alternate fuel sources at a few locations (i.e., those operated by Solite and Norlite). Exhibit 1 presents a typical process flow diagram for manufactured lightweight aggregate production for facilities using wet scrubber air pollution control technology or a dry collection method.

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[5] Identification and Description of Mineral Processing Sectors and Waste Streams, EPA 1995.

[6] Mason, Bruce H., "Lightweight Aggregates," Industrial Minerals and Rocks, 6th edition, 1994, pp. 343-350.

Exhibit 1
Lightweight Aggregate Production Process

Graphic Not Available.

4.Process Waste Streams

Process wastes generated by lightweight aggregate production from naturally occurring raw materials may include extraction/beneficiation wastes and mineral processing wastes. The preparation of natural lightweight aggregate materials only generates extraction/beneficiation wastes since no thermal processes are involved, while the production of manufactured lightweight and ultralightweight aggregates generates both types of wastes.

4.1Extraction/Beneficiation Wastes

Overburden and screenings are generated from the extraction and beneficiation of lightweight aggregate minerals. Although EPA has no information on waste characterization or generation rates, the materials are likely left in place at the original mining site.

4.2Mineral Processing Wastes

Mineral processing wastes generated as a result of lightweight aggregate production from naturally occurring materials include APC dust, scrubber wastewater, and APC sludge. Lightweight aggregate kilns that use baghouses and other dry collection systems generate APC dust that is collected in dry form. Some facilities using dry collection systems recycle the dust to the process or use it in products (e.g., block mix).[7] Kilns that are equipped with wet scrubbers generate scrubber wastewater, which contains particulate matter from the kiln.[8] This wastewater is generally discharged to a lagoon or settling pond where dewatering occurs and the particulate matter settles out in the form of a sludge. The sludge, also known as APC sludge, is then dredged from the settling pond and disposed of in a landfill, waste pile, surface impoundment, or old quarry.[9]

Because hazardous waste fuels may be used in the production of lightweight aggregates, these waste streams would, in the absence of the Bevill Exclusion, be considered hazardous wastes through application of the Subtitle C Derived-From Rule.

5.Industry and Market Characteristics[10]

In 1988 there were 30 facilities involved in the production of manufactured lightweight aggregate.[11] Exhibit 2 presents the names and locations of and APC types used by these facilities. As noted above, in 1988, six of the 30 facilities in the exhibit (those that are shaded) burned hazardous waste fuels and would, consequently, be affected if the Bevill Exclusion

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[7] Personal communication with Solite Corporation, February 9, 1995.

[8] Solite comments, Docket No. MWRP00028, May 30, 1989.

[9] Company responses to 1989 National Survey of Solid Wastes from Mineral Processing Facilities.

[10] Most of the information in this Section has been taken from Addendum to the Technical Background Document: Development of the Cost and Economic Impacts of Implementing the Bevill Mineral Processing Wastes Criteria, EPA Office of Solid Waste, 1990.

[11] Since then, a few additional facilities have entered the industry.

Exhibit 2
Lightweight Aggregate Facilities

Facility Name	Location
Arkansas Lightweight Aggregate	*West Memphis, AR
Big River	*Livingstone, AL
Big River	*Erwinville, LA
Buildex	*Dearborn, MO
Buildex	Ottawa, KS
Buildex	Marquette, KS
Chandler Materials Co.	*Tulsa, OK
Chandler Materials Co.	*Choctaw, OK
Dakota Block Co.	Rapid City, SD
Featherlite	*Strawn (Ranger), TX
HP Brick Co.	*Brooklyn, IN
HP Brick Co.	Independence, OH
Jackson Concrete	*Jackson, MS
Kanta	Three Forks, MT
Lehigh Portland Cement Co.	Woodsboro, MD
Lorusso Corp.	Plainville, MA
Norlite	*Cohoes, NY
Parkwood Lightweight Plant	*Bessemer, AL
Porta Costa	*Porta Costa, CA
Ridgelite	Frazier Park, CA
Solite	Cascade, VA
Solite	*Arvonia, VA
Northeast Solite	*Mount Marion, NY
Carolina Solite	*Norwood, NC
Kentucky Solite	*Brooks, KY
Florida Solite	*Green Cove, FL
Strawn	Strawn, TX
Texas Industries	*Streetman, TX
Utelite	Coalville, UT
Weblite	Blue Ridge, VA

* Facilities using wet scrubbers for air pollution control.

Source: Determination of Waste Volume For Twenty Conditionally Retained Bevill Mineral Processing Wastes, EPA, Office of Solid Waste January 12, 1990, and SWMPF Survey.

were to be withdrawn.[12] These facilities, however, probably enjoy a considerable cost advantage over facilities using conventional fuels because energy costs are an important component of production costs for the industry.[13]

Demand for lightweight aggregate follows the general economy fairly closely. Demand was strong in the mid-eighties, declined for several years starting around 1988, and has been picking up over the last two years. The United States imports and exports very small quantities of lightweight aggregate and international trade does not appear to have significantly affected the domestic market.[14]

The special characteristics offered by the product in comparison with substitute materials and the cost advantage enjoyed by facilities burning hazardous wastes may both work to mitigate the impact of EPA's decision to withdraw the Bevill Exclusion. The five facilities that will be affected by the decision may be able to pass through compliance costs to consumers in the form of higher prices, or to hazardous waste generators in the form of higher tipping fees. Alternatively, these facilities could avoid compliance costs entirely by ceasing to burn hazardous wastes, though they might experience impacts in the form of unrecoverable capital previously invested in hazardous waste fuel storage and handling equipment, permitting, and site engineering activities.

6.Determination of Volume of APC Dust/Sludge[15]

As noted earlier, for a waste to qualify for the Bevill Exemption it must be a high volume waste in addition to being a low hazard waste. High volume is defined as greater than 45,000 metric tons per year per facility for a solid waste or 1,000,000 metric tons per year per facility for a liquid waste, averaged across all facilities generating a particular waste. To determine whether APC dust/sludge from lightweight aggregate production satisfied the high volume criterion, EPA used data from its 1989 National Survey of Solid Wastes from Mineral Processing Facilities (SWMPF Survey) and data from public comments submitted by affected companies, e.g., Solite.

The Survey data provided information supplied by the operators of a total of 28 lightweight aggregate facilities, of which 17 reportedly used scrubbers for air pollution control. Comments submitted by Solite (Docket No. MWEP00029) identified two additional facilities -- a Solite facility in Arvonia, VA that uses a scrubber and a Solite facility in Cascade, VA that uses a dry collection system and recycles all its APC residual material. Therefore, of the 30 facilities identified, 18 use scrubbers. The Solite facility in Cascade, VA does not generate any waste and the remaining 11 reported that they did not generate scrubber water or, therefore, scrubber solids, or any other "large volume" waste. Two of the 11 reported not being in production at the time and another facility reported that its air emissions did not require any controls to meet state requirements. The Agency presumed in 1990 that the remaining eight facilities were operating and were using some type of dry collectors and generate APC dust rather than sludge. Because APC dust is expected to be generated in proportionally lower volumes than APC

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[12] As of 1993, the five Solite facilities were still reported to be burning hazardous waste fuels, but the Norlite facility appeared to have stopped doing so. See Smith, J.D., "Industrial Furnaces 1994," EI Digest, October 1994.

[13] Addendum to the Technical Background Document: Development of the Cost and Economic Impacts of Implementing the Bevill Mineral Processing Wastes Criteria, EPA Office of Solid Waste, 1990, p. 7.

[14] Telephone conversation between ICF and John Ries, Expanded Clay, Shale, and Slate Institute, October 28, 1994.

[15] Determination of Waste Volume for Twenty Conditionally Retained Bevill Mineral Processing Wastes, EPA, Office of Solid Waste, January 12, 1990.

sludge (based on analysis of APC sludge and dust generation in other analogous sectors, such as iron and steel), the inclusion of these data would not be expected to increase the average waste generation rate based solely on data representing wet collection systems. Therefore, the Agency's analysis focuses on the 18 facilities that reported using scrubbers, and represents a determination of the maximum average quantity of APC dust/sludge generated by the lightweight aggregate industry.

In its initial analysis in support of the September 25, 1989 proposed rule, EPA indirectly estimated the volume of this waste stream by using the quantity of scrubber wastewater reported in question 2.11 of the Survey and the percentage of solids in the wastewater reported in question 2.14 of the Survey. The results of this exercise are shown in Exhibit 3 below for the 13 facilities for which data were available. Only six of the thirteen facilities, however, reported having a significant solids content in the scrubber water (i.e., greater than five percent solids content). Therefore, the Agency included only these six facilities in its analysis. Using this methodology, APC dust/sludge appeared to pass the high volume criterion. One commenter was, however, critical of this approach because the resulting estimates were significantly higher than volumes reported by the companies in comments addressing the October 20, 1988 and April 17, 1989 proposed rulemakings.

In response to comments, the Agency reviewed the data in comments provided by lightweight aggregate companies and in the 1989 SWMPF Survey. In a previous comment submitted on November 21, 1988 (Docket No. MWEP00029), the Solite Corporation had provided data on specific waste volumes for the APC dust/sludge generated at each of its facilities. These volumes turned out to be the same as the volumes the company had reported for three of its facilities in Sections 4 and 5 of the SWMPF Survey in response to the following questions:

- Question 4.18. Quantity of sludge/solid outflows from wastewater treatment in 1988.

- Question 5.6. Total amount of accumulated sludge in this surface impoundment added during 1988.

Because these waste generation rates match exactly, the Agency believes that the data reported in Sections 4 and 5 are the appropriate numbers to use directly in documenting the volume of the APC dust/sludge generated in the production of lightweight aggregate, at least for the Solite plants. For the remaining plants also, the Agency believes that the data in these sections of the Survey are appropriate because they were provided by the actual waste generators and provide the Agency with the empirical basis to estimate APC dust/sludge volumes. In addition to these sections, the response to Question 6.4 in Section 6 (inflows to the waste management unit in 1988) was also believed to be relevant.

Exhibit 3
Results of EPA's Initial Analysis

Company	Location	Scrubber Wastewater (mt/yr)	Percent Solids	Volume of Waste Stream (mt/yr)
Arkan. Ltwt-Ag	W. Memphis, AR	113,550	6	6,813
Big River	Erwinville, CA	CBI	CBI	CBI
Big River	Livingstone, AL	CBI	CBI	CBI
Buildex	Dearborn, MO	33,247	5	1,662
Carolina Solite	Norwood, NC	923,902	40	369,561
Chandler	Choctaw, OK	53,369	0.1	53
Chandler	Tulsa, OK	67,752	0.2	136
Featherlite	Ranger, TX	NA	NA	4,536
FL Solite	Green Cove, FL	478,751	40	191,500
Hydr. Press. Brick	Brooklyn, IN	1,360,778	0.7	10,070
Jackson	Cynthia, MS	NA	NA	104
KY Solite	Brooks, KY	224,541	40	89,816
Norlite	Cohoes, NY	NA	NA	NA
NE Solite	Mt. Marion, NY	348,007	40	139,203
Parkwood	Bessemer, AL	658,408	NA	8,981
Port Costa	Porta Costa, CA	NA	NA	544
Solite	Arvonia, VA	NA	NA	NA
Texas Ind.	Streetman, TX	946,250	NA	NA
Average volume (using facilities with percent of solids greater than 5%)				133,093

Source: Determination of Waste Volume For Twenty Conditionally Retained Bevill Mineral Processing Wastes, EPA, Office of Solid Wastes, January 12, 1990.

To verify that the volumes reported in Sections 4 through 6 did actually represent the quantity of solids generated annually in 1988, the Agency calculated the percent-of-solids by dividing these volumes by the annual generation of scrubber wastewater from survey question 2.11. The estimated percent-of-solids was then compared to the percent-of-solids reported in survey question 2.14. The Agency performed this calculation for only 12 of the 18 facilities with scrubbers because of the lack of volume data on scrubber water or scrubber solids for the remaining six facilities. One of the 18 facilities, the Solite facility in Arvonia, VA, was identified only through public comments and no survey data are available on its operations.

The estimated percent-of-solids data are shown in Column G of Exhibit 4. The results for two of the 12 facilities for which the calculation was done are not reported because the company (Big River) that operates them designated its waste generation data RCRA Confidential Business Information (CBI). The results for nine of the ten remaining facilities fall between 0.20 percent and 19.28 percent. The estimated percent-of-solids for the Solite facilities was quite different from the reported percent-of-solids. The former appeared to be the more accurate figure, for two reasons: (1) Solite had reported 40 percent solids for all four of its facilities in the survey, suggesting a very general approximation rather than an examination of empirical data; and (2) wastewater with 40 percent solids would likely be inordinately viscous, i.e., the estimate provided is not credible.

The result for the Buildex facility in Dearborn, MO was 334 percent. The Agency decided that it would not be appropriate to use the sludge volume in question 5.6 for this facility because: (1) the inordinately high 334 percent-of-solids value indicates that one of the inputs in the calculations is inaccurate (i.e., either scrubber water volume or the volumes in Section 4 through 6); (2) the scrubber water volume for this facility was directly reported and, therefore, represents the more accurate input (rather than the volumes in Sections 4 through 6); and (3) the percent-of-solids reported in question 2.14 for this facility falls in the range of calculated percent-of-solids reported above. Therefore, for this facility, the Agency decided to retain the original methodology used in support of the September 25, 1989 proposed rulemaking. The volumes the Agency used in its revised analysis are given in Column H of Exhibit 4 for the 13 facilities on which data were available from Survey Sections 4 through 6. The volumes in Column H are identical to those in Column F, except for the facility with the inordinately high estimated percent-of-solids.

In addition to changing the estimation procedure, EPA broadened the scope of its analysis to include all 18 facilities (i.e., the 17 facilities that reported scrubber use in surveys plus the Solite/Arvonia facility) by using different approaches to fill data gaps. As noted in its previous analysis, EPA included only six facilities that had reported significant solids content in scrubber water. Analysis of survey Sections 4 through 6, however, indicated that all 17 facilities generate solids and should be included in the calculation of the sector's average waste volume. For the Solite facility in Arvonia, Solite provided the Agency with waste generation data in its November 21, 1988 comments (Docket No. MWEP00029).

The Agency considered four different approaches to fill data gaps and to analyze whether the use of different approaches would significantly affect the estimation of the sector average. The four approaches are:

•Selected Approach. This approach only uses data reported clearly in the SWMPF Survey and requires the fewest assumptions. It only includes the 13 facilities for which data are available. The results are identical to those in Column H of Exhibit 4 and the sector average is 15,813 metric tons per year. No results are reported for the two CBI facilities, the Solite/Arvonia facility, and two facilities for which data are not complete. Including the CBI facilities would not alter the basic outcome of the analysis.

•Alternative 1. Alternative 1 includes volume estimates for the two facilities for which data are not complete. The Survey data for these two facilities contains production rates but no clear waste generation information. Waste volumes were calculated by multiplying the average waste-to-product ratio (for the 13 facilities) by the production volume for each facility. The sector average using this approach is 18,776 metric tons per year.

•Alternative 2. Alternative 2 uses the same data as Alternative 1 except for the Solite facilities in Mount Marion and Arvonia. For these facilities data reported by Solite in their November 21, 1988 comments (Docket No. MWEP00029) were used.[16] The sector average using this approach is 28,150 metric tons per year.

•Alternative 3. Alternative 3 uses the same data as Alternative 2 except for three facilities that reported operating less than 265 days in 1988 (the average number of days the 17 facilities were in operation).[17] For these facilities, the volume was adjusted upwards to reflect the volume that would have been generated had these facilities operated for 265 days in 1988. The sector average using this approach is 28,193 metric tons per year. Volume estimates are calculated using this alternative only for illustrative purposes because the Agency does not

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[16] The data reported by Solite in comments for Carolina Solite, Florida Solite, and Kentucky Solite were the same as were reported in the Survey.

[17] Three Solite facilities had also reported operating for only part of the year. The Agency did not adjust the waste volumes of these facilities, however, because Solite had confirmed these waste volumes in their comments.

consider it an appropriate manipulation of the data. The high volume criterion applies to waste volumes that were actually generated, *not* volumes that *may* have been generated.

None of the four approaches results in a volume estimate that is greater than 45,000 metric tons per year, the high volume criterion for solid special mineral processing wastes. Data from the two CBI facilities have been included in a separate analysis using all four approaches. The results, which remain confidential, are not substantially different than the results presented above. Therefore, APC dust/sludge from lightweight aggregate production is not a high volume waste and does not qualify for the Bevill Exemption.

7.Solite's Argument

In public comments on proposed rules and a brief submitted to the U.S. Court of Appeals, Solite argued against EPA's high volume criterion and the Agency's final determination regarding lightweight aggregate wastes. This section briefly summarizes these arguments and analyzes their validity.

Prior to EPA's final determination on January 23, 1990, Solite submitted comments (Docket No. MWRP00028) to address issues that had been raised in the April 17, 1989 (54 FR 15316) proposed rulemaking. As stated earlier in this document, EPA had proposed revising the high volume criterion to 50,000 metric tons per year when averaged across facilities. Solite's arguments are briefly discussed below.

1.A 50,000 ton cut off would arbitrarily screen out some wastes that satisfy the special waste criteria in every other respect. Solite urged EPA to establish alternative high volume criteria of 500,000 tons total industry volume, 10,000 tons average facility volume, and a waste-to-product ratio of 0.1.

2.If EPA insisted on maintaining a high volume criterion of 50,000 tons, they should allow aggregation of similar waste streams within facilities. In the case of lightweight aggregate facilities, three wastes can be generated -- dry fines (kiln dust), scrubber water, and wet fines (sludges). These wastes are essentially the same and differ only in the amount of water they contain. Therefore, the three wastes should be aggregated into the single category of lightweight aggregate APC residuals for Bevill purposes.

3.Establishing a different volume criterion for solid and liquid wastes is not appropriate because there is nothing in the legislative history of the Bevill amendment to indicate that Congress intended to make this distinction.

4.Mining wastes such as Solite's scrubber water have a very high solids content and the only practical way to manage them is in settling ponds. It is not practical to comply with Subtitle C permitting requirements for such surface impoundments.

5.A separate high volume criterion for liquid wastes could lead to a situation in which a liquid waste is excluded from Bevill but the residuals derived from such a waste are retained.

6.Retaining the Bevill amendment for a mining waste merely makes it eligible for study to determine whether or not it should be subject to Subtitle C. It is not permanent. Exclusion from Bevill, however, is final and limits the Agency's regulatory options because the low hazard/high volume criteria are only a crude screening device.

Based on Solite's comments, it can be argued that the company was not entirely taken by surprise at the Agency's revised estimate of APC dust/sludge published in the final rule in 1990, contrary to their petition in court. EPA's decision to withdraw the Bevill Exemption for this waste should not have been unexpected.

Following EPA's final determination, Solite submitted a brief to the U.S. Court of Appeals, D.C. Circuit, in which it set forth reasons why EPA's analysis underlying the January 1990 determination was completely inadequate. This brief, dated May 8, 1991, is a joint brief of

consolidated petitioners and intervenors that challenges several aspects of the final rule, some of which have been previously upheld by the Court (e.g., the validity of low hazard and high volume criteria). Included in the brief is an argument put forth by Solite and Norlite contending that EPA's application of the high volume criterion to lightweight aggregate residuals (APC dust/sludge) is arbitrary and capricious. The main points of the argument are summarized below.

1.EPA's survey data are unreliable. The widely different results that EPA obtained for the September 25, 1990 NPRM and the January 1990 Rule using the same data suggest that the data are unreliable. The dataset contains several inconsistencies, which is not surprising because lightweight aggregate plants do not directly monitor their scrubber water and APC dust/sludge generation rates and were required to make crude estimates for purposes of the Survey. Moreover, because EPA did not suggest a uniform method of estimating waste generation volumes, it received very different responses from similar facilities. EPA made no attempt to verify the data. Finally, Petitioners had no inkling that EPA would use a different analysis for the January 1990 Rule and were effectively denied an opportunity to comment on the new analysis.

2.EPA's second analysis contains the following inconsistencies and arbitrary assumptions, which reflect the inadequacy of the data used:

•The variances in volumes and ratios reported by the facilities are inexplicably large given that all facilities use similar processes. For example, the solids content of wastewater varied by a factor of 600 to 1 (from 0.1 percent to 60 percent) and the ratio of solid waste to lightweight aggregate produced varied by a factor of 278 to 1 (from 0.001 to 0.278). In an industry survey conducted by the Expanded Clay, Shale, and Slate Institute in 1988 (ECSSI Survey), using data from 14 facilities that account for 85 to 90 percent of total industry production, the ratio of solid waste to lightweight aggregate produced was calculated to be 0.309.[18]

•The Survey data are incomplete and not representative because three major lightweight aggregate facilities and several smaller facilities were not included in EPA's analysis.

•EPA did not adjust or omit the data from facilities operating only a portion of the year. (The Petitioners acknowledge that in one alternative approach, EPA adjusted the volumes of facilities that operated fewer that 265 days. They contend, however, that lightweight aggregate kilns operate 24 hours a day, 7 days a week so EPA should not have assumed only 265 days. They further allege that it is inappropriate to combine data from a large, multi-kiln facility operating 365 days a year with a small facility operating less than three months in a year.)

3.EPA's alternative approaches are equally unreliable because they rely on the same faulty data and assumptions as the selected approach. The arbitrariness of EPA's analysis is illustrated by the fact that other defensible methods of estimating lightweight aggregate waste volumes result in much larger quantities. These methods include the following:

•The average ratio of solid waste to lightweight aggregate production can be applied to each of the production figures reported in the Survey. The ratio obtained in the ECSSI Survey is 0.309. Applying this ratio results in an average APC dust/sludge generation of 55,830 metric tons per year.

•EPA could modify its analysis by disregarding data from five facilities because their ratio of solid waste to lightweight aggregate production is so low (0.001 to 0.012) that it is questionable. Further, the APC dust/sludge from Norlite and Texas Industries (whose data EPA did not use) could be added based on a waste to product ratio of 0.309. Using this method, the average APC dust/sludge generation is 49,042 metric tons per year.

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[18] ICF attempted to verify this information with ECSSI, but the sources there were unable to provide any information on the survey (personal communication with John Ries, Op. cit.).

•EPA's analysis included only three facilities that use hazardous waste fuels. Those three facilities were the only ones in EPA's analysis that are likely to be affected by the loss of Bevill status. EPA's Survey data indicate that these three affected facilities generated an average of 45,258 metric tons of APC dust/sludge in 1988.

The Court, in its decision, did not comment on the quality or adequacy of EPA's analysis or on the petitioners' arguments regarding EPA's analysis. Instead, the Court vacated EPA's determination on lightweight aggregate wastes strictly on the procedural grounds that EPA decided the matter without providing due notice and opportunity to comment. The Agency has, nonetheless, responded to the petitioners' criticisms of its analysis.

The Petitioners' criticisms relating to the Agency's use of Survey data are quite unreasonable. The Agency did verify the data against information submitted by commenters as part of its analysis. Further, the Agency was aware of inconsistencies in the data and adapted its analysis accordingly. For example, for one facility, the Agency decided to use its original methodology because the facility's responses to Sections 4 through 6 were inconsistent with those of the other facilities. Finally, as the petitioners acknowledged, the Agency did adjust the waste volumes of the three facilities that operated for only part of the year in Alternative Approach 3. The Agency assumed an operating year of 265 days, which was the average number of days that facilities reporting scrubber use in the Survey had been in operation in 1988. Contrary to the petitioners' contention, the Survey data indicate that not all lightweight aggregate facilities are in operation 365 days a year. Of the 17 facilities that reported scrubber use in the SWMPF Survey, two facilities operated less than 100 days in 1988, three facilities operated between 100 and 200 days, five facilities operated between 200 and 300 days (three of which reported operating for 300 days), and five facilities operated for more than 300 days.[19]

Even if the Agency had omitted the data on the three facilities that had operated for only part of the year or assumed an operating year of 365 days, as the petitioners suggest, the Agency's volume estimate would not be significantly different. If the data on the three facilities were omitted, the average APC dust/sludge estimate would be 34,582 metric tons per year. If an operating year of 365 days were used, the estimate would be 28,229 metric tons per year. In either case, APC dust/sludge from lightweight aggregate production would fail the high volume criterion of 45,000 metric tons per year. Further, as stated earlier, the Agency does not believe that adjusting waste volumes upwards is an appropriate manipulation of the data, because the high volume criterion is applied to actual, rather than potential, waste generation rates.

The petitioners have suggested using the ratio of waste-to-product obtained from the ECSSI survey[20] (0.309) to calculate waste volumes. The Agency has no knowledge of or control over how this Survey was conducted and has no reason to believe that the results are more accurate than those of the SWMPF Survey. The average waste to product ratio reported in the SWMPF Survey by the 17 facilities that use scrubbers is 0.08 and the highest was 0.278. Therefore, the Agency cannot justify using results of the ECSSI Survey over the results of the SWMPF Survey. Interestingly enough, the facilities reporting the highest waste to product ratios were the Solite facilities -- Carolina Solite and Florida Solite reported waste to product ratios of about 28 percent, Kentucky Solite reported 24.7 percent, and Northeast Solite reported 15 percent. Most of the remaining facilities reported waste to product ratios that were well under 10 percent.

Notwithstanding such discrepancies, the Agency modified Alternative 1, 2, and 3 by using the highest reported waste to product ratio (i.e. 27.8 percent) in calculating the waste volumes for Norlite and Texas Industries instead of using the average of 8 percent. There is no justification, however, for disregarding the reported (i.e., actual) waste volumes of the five facilities with the lowest waste to product ratios, as suggested by Solite. Using this modified method, the sector average waste volume is 31,359 metric tons for Alternative 1, 39,946 metric tons for Alternative

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[19] The remaining two facilities designated this information RCRA CBI.

[20] As discussed previously, this document is unavailable.

2, and 39,989 for Alternative 3. In each case, APC dust/sludge from lightweight aggregate production would still fail the high volume criterion.

The petitioners have also argued that the average waste generated by the three hazardous waste burning facilities included in EPA's analysis was above 45,000 metric tons in 1988. Although these three facilities are the only facilities included in EPA's analysis that may be affected by the removal of the Bevill Exclusion, they do not represent the entire industry. Solite has acknowledged in its own comments and brief to the Court, that it uses the same production and air pollution control methods as the other (non-hazardous waste burning) lightweight aggregate producers.

8.Conclusion

The findings of this document indicate that APC dust and sludge from lightweight aggregate production is not a high volume waste. In deference to the Court and the petitioners, the Agency used several methods to analyze data from the 1989 SWMPF Survey and data submitted in public comments by affected companies (e.g., Solite). None of these methods resulted in a volume estimate that is greater than 45,000 metric tons per year, the high volume criterion for solid special mineral processing wastes. In response to arguments made by Solite in its brief to the U.S. Court of Appeals, D.C. Circuit, EPA even modified some of its original methods of analyses to incorporate Solite's suggestions. Despite such modifications, APC dust/sludge still fails the high volume criterion.

Based on the analysis presented in this document, the Agency finds that APC dust and sludge from lightweight aggregate production is not a high volume waste and does not qualify for the Bevill exemption. Therefore, the Agency is proposing that these wastes be classified as mineral processing wastes that are no longer eligible for the Bevill exemption.