United States Environmental Protection Agency
Office of Solid Waste Washington, D.C. 2046
May 2000

Land Disposal Restrictions - Background Document to Establish the Effective Date for Amended Treatment Standards for Spent Aluminum Potliners (Proposed Rule)

Table of Contents

I. INTRODUCTION

This document provides the supporting documentation of establishing an appropriate effective date for the proposed treatment standards for spent aluminum potliner (i.e., SPL or K088). It also updates EPA's capacity-related information for K088 waste in light of several new developments since promulgation of the final land disposal restrictions (LDR) rule (61 FR 15566, April 8, 1996) and data or information received since the previous update of this document (July 1997). EPA will continue to monitor required and available treatment capacity and other facility operating issues relating to availability of treatment or recovery capacity (e.g., permit issuance, permit modification, other logistical issues), and will update this analysis as necessary in the future.

This document is organized as follows:

- **Section I—Introduction** provides (1) background on establishing the effective date for amended treatment standards, (2) summary on the effective dates of the K088 listing and LDR rules, and (3) methodology for analysis of Effective Date for proposed treatment standards.

- **Section II—Required Capacity** updates the Agency's analysis of required treatment capacity for K088;

- **Section III—Available Capacity to Meet Interim Standards** updates the Agency's analysis of available treatment capacity to meet interim standards for K088; and

- **Section IV— Analysis for the Effective Date for the Proposed Treatment Standards** provides analyses for available treatment capacity to meet the proposed treatment standards and discussion on various issues affecting the availability of new treatment capacity to satisfy the amended treatment standards.

1. Background on Establishing the Effective Date for Amended Treatment Standards

The Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA), enacted on November 8, 1984, set basic new priorities for hazardous waste management. Land disposal, which had been the most widely used method for managing hazardous waste, is now the least preferred option. Under HSWA, EPA must promulgate regulations restricting the land disposal[1] of hazardous wastes according to a strict statutory schedule. As of the effective date of each regulation, land disposal of untreated wastes covered by that regulation is prohibited unless it can be demonstrated that there will be no migration of hazardous constituents from the disposal unit for as long as the waste remains hazardous.

[1] RCRA defines land disposal "to include, but not be limited to, any placement of such hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave" (RCRA section 3004(k)).

Under the LDR Program, EPA must identify levels or methods of treatment that substantially reduce the toxicity of a waste or the likelihood of migration of hazardous constituents from the waste. Whenever possible, EPA prefers to define treatment in terms of performance (i.e., levels of treatment, expressed as a concentration of hazardous constituents in residuals from treatment) rather than in terms of specific treatment methods and thus provide the regulated community with flexibility in complying with the LDRs. EPA's standards are generally based on the performance of the best demonstrated available technology (BDAT), as documented by treatment data collected at well-designed and well-operated systems using that technology, or are based on data derived from the treatment of similar wastes that are as difficult or more difficult to treat.

Typically, prohibitions on land disposal of hazardous waste are to take effect immediately upon promulgation, but may be postponed for two years on a national basis and (potentially) two more years on a case-by-case basis[2] from the "earliest date on which adequate alternative treatment, recovery or disposal capacity which protects human health and the environment will be available." (RCRA section 3004 (h) (2).) Here, however, spent potliners are already prohibited from land disposal (as of September 24, 1998; 63 FR 51254). Thus, the period during which EPA could conceivably issue any type of variance based on the available treatment capacity is already running out (less than a year remains on the potential national capacity variance period) and could already have expired by the time EPA issues a final rule for amended treatment standards. A basic question, therefore, is whether there should be any lapse in the existing prohibition and treatment standards during the time it takes for treatment capacity to meet the amended treatment standards (assuming EPA adopts them). A second question is when is the effective data for the amended standards (again, assuming EPA adopts them).

EPA believes (subject to comment) that there should be no lapse in the existing prohibition and treatment standards, since if there were, land disposal of untreated spent potliners could resume. As EPA has explained at length, this result would be directly at odds with the central objective of the land disposal restriction statutory provisions. See 63 FR 51255-256. Moreover, EPA has already determined that there currently exists adequately protective treatment and disposal capacity for spent potliners treated to meet the existing (interim) treatment standards. See 62 FR 37696-697. Thus, EPA knows of no reason to justify eliminating the existing land disposal prohibition and treatment standards during the period before treatment capacity capable of meeting the proposed treatment standards becomes available.

Because a land disposal prohibition and interim treatment standards for K088 waste already exist (interim rule of September 24, 1998), today's rule will not change the LDR requirements until the amended treatment standards become effective. At this time, EPA is only amending the treatment standards for K088 wastes to be based on vitrification treatment performance. Furthermore, although there are no statutes to limit EPA's implementation time period for amending these treatment standards, EPA will establish an appropriate effective date

[2] RCRA also allows generators to apply for extensions to the LDRs on a case-by-case basis for specific wastes generated at a specific facility (RCRA section 3004(h)(3)). EPA may grant case-by-case extensions to applicants who can demonstrate that: (1) no capacity currently exists anywhere in the U.S. to treat a specific waste, *and* (2) a binding contractual commitment is in place to construct or otherwise provide alternative capacity, but due to circumstances beyond the applicant's control, such alternative capacity cannot reasonably be made available by the effective date (40 CFR 268.5).

based on the availability of treatment or recovery capacity capable of meeting the amended treatment standards.

2. Regulatory History of K088 in the LDR Program

Exhibit 1 summarizes previous K088 waste rulemakings and recent litigation and petitions. Additional information on the history of K088 listing and land disposal restrictions and pertinent litigations may be found in the *Background Document for Capacity Analysis for Land Disposal Restriction of Spent Potliners (Final Rule, July 1997; 62 FR 37694, July 14, 1997); and Capacity Data and Information Update - Land Disposal Restrictions; Treatment Standards for Spent Potliners From Primary Aluminum Reduction (K088), September 17, 1998.*

In July 1997, EPA announced that, Reynolds' treatment does reduce the overall toxicity associated with the waste, and, by virtue of an Enforcement Order, that disposal of treatment residues would occur only in units meeting subtitle C standards. This was an improvement over the disposal of untreated spent potliner and provided protective treatment capacity. See 62 FR 37696 (July 14, 1997). On October 8, 1997, the national capacity extension ended and the prohibition on land disposal of untreated spent potliner took effect.

However, petitions for judicial review of the April 1996, January 1997, and July 1997 rules were filed by Columbia Falls Aluminum Company, and other aluminum producers from the Pacific Northwest. The United States Court of Appeals for the District of Columbia Circuit decided in April 1998 to, among others things, vacate the prohibition on land disposal and treatment standards of K088 waste. On May 18, 1998, EPA filed a motion with the D.C. Circuit Court to stay its mandate for four months while EPA promulgated a replacement prohibition and accompanying treatment standards under its LDR program. The Court granted EPA this motion, and EPA promulgated interim replacement standards for K088 (63 FR 51254, September 24, 1998). The interim standards thus set a requirement of 26.1 mg/kg total (mineral acid soluble) arsenic as the treatment standard for arsenic K088 nonwastewater. Furthermore, the standards no longer include a nonwastewater standard for fluoride. All other treatment standards were unchanged from the LDR Phase III rulemaking.

In today's proposed rule, EPA is proposing new treatment standards for certain constituents of concern in K088 waste. This is an effort to fulfill EPA's long-term (i.e., within two years) goal to promulgate final treatment standards for spent potliners, based on performance data submitted by the public (Columbia Falls Aluminum Co., et al. v. EPA, Civ. No. 96-1234 (D.D.C.), Page 2).

Exhibit 1
Summary of Previous K088 Rulemakings and Recent Litigation and Petitions

Regulatory Event	Federal Register Notice	Date
Listed as a hazardous waste	45 FR 47832	July 16, 1980
Listing suspended	46 FR 4615	January 16, 1981
Environmental group challenged EPA's failure to complete the required studies under Sections 8002(f) and (p)	N/A	1984
Proposed relist	50 FR 40292	October 2, 1985
Withdrawal of proposal of relist	51 FR 36233	October 9, 1986
Court removed suspension of K088 listing (EDF vs. EPA)	N/A	July 1988
Re-enact original listing of K088	53 FR 35412	September 13, 1988
Proposed LDR for K088	60 FR 11702	March 2, 1995
Final LDR for K088	61 FR 15566	April 8, 1996
Reynolds challenged EPA's decision of nine months of national capacity variance and sought the court's expedited review of the case	N/A	May 1996
Generators from Northwest region petitioned for a two-year national capacity variance	N/A	July 9, 1996
EPA extended the national capacity variance for an additional six months until July 8, 1997	62 FR 1992	January 14, 1997
LDR became effective with three months of capacity variance	62 FR 37693	July 14, 1997
Court decision to vacate land disposal prohibition and treatment standards for two constituents (fluoride and arsenic)	N/A	April 1998
EPA gained four months to stay its mandate after filing a motion to move the court for a stay in May 1998 and promulgated an interim final rule	63 FR 51254	September 24, 1998

N/A Not applicable

3. Analysis Methodology of Effective Date for Proposed Treatment Standards

Because a land disposal prohibition and interim treatment standards for K088 waste already exist (interim rule of September 24, 1998), today's rule will not change the existing LDR requirements until the amended treatment standards become effective. At this time, EPA is only amending the treatment standards for K088 wastes to be based on vitrification treatment performance. Furthermore, although there are no statutes to limit EPA's implementation time period for amending these treatment standards, EPA will establish an appropriate effective date based on the availability of treatment or recovery capacity capable of meeting the amended treatment standards.

The analysis of the effective date for the amended treatment standards is guided by the overall object of section 3004 (h)[3]: treatment standards which best accomplish the object of section 3004 (m)[4] (to minimize threats posed by land disposal) should take effect as soon as possible, consistent with availability of treatment capacity. Therefore, EPA estimated how long it will take for treatment capacity to become available and satisfy the proposed treatment standards. EPA is basing the proposed effective date for the amended treatment standards on this estimate.

In evaluating available treatment capacity to satisfy the proposed treatment standards, EPA also needs to estimate the quantities of waste requiring alternative commercial management as a result of the land disposal prohibitions. By comparing the capacity demand with the available commercial capacity, EPA can identify whether there is a capacity shortfall to manage the waste and meet the proposed standards.

To determine the type of alternative capacity required to manage the affected wastes, EPA conducts a "treatability analysis" of each waste stream. Based on the waste's physical and chemical forms and information on prior management practices, EPA assigns the quantity of affected waste to the appropriate best demonstrated available technology (BDAT).

EPA identifies the quantities of waste requiring alternative treatment on a facility level basis; if the appropriate treatment technology is not available on site, or if adequate available capacity is not present to manage the waste, then the appropriate quantity of waste requiring alternative treatment is aggregated into a national demand for commercial capacity. EPA excludes from the estimates of required commercial capacity those wastes that are managed in on-site treatment systems meeting the proposed treatment standards.

---

[3] The LDRs are effective when promulgated unless the Administrator grants a national capacity variance from the otherwise applicable date and establishes a different date (not to exceed two years beyond the statutory deadline) based on "...the earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available" (RCRA section 3004(h)(2)).

[4] EPA shall promulgate regulations specifying those levels or methods of treatment, if any, which substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized. (RCRA section 3004(m)(1))

The determination of available capacity focuses on commercial facilities. Consequently, all estimates of capacity represent commercially available (not private) capacity.[5] In order to determine whether to delay the effective date (e.g., for new treatment standards), EPA analyzes available commercial capacity for alternative treatment technologies capable of meeting the LDR treatment standards. The capacity analysis generally includes estimating the maximum or design capacity for appropriate waste management systems and the amount of waste currently going to these systems (utilized capacity). Available capacity is then estimated as the difference between maximum and utilized capacity.

How soon the treatment capacity capable of meeting the proposed treatment standards becomes available depends on what activities are needed for treatment capacity coming on-line. The activities include complying with regulatory requirements such as final standards, required permits, time needed for permit application and issuance; logistical arrangements; and facility's economic and public consideration. EPA assesses the timeframe necessary for a new RCRA permit, a permit modification only, and other logistics issues by using existing examples. Since there are existing land disposal prohibition and treatment standards for the waste (K088) affected by today's proposed rule, there are no statutes to limit EPA's implementation time period for the amended treatment standards. Because adequate treatment capacity capable of meeting the proposed standards is currently not available, EPA can only estimate with uncertainty when the treatment or recovery capacity realistically becomes available. EPA will assess the timeframe necessary for a new facility coming on line with required regulatory permits or the time required to get only permit modification for an existing facility. EPA will also analyze the factors such as establishing infrastructures and making other logistical arrangements affecting the time required to make the protective treatment capacity practically available. Therefore, determining the effective date is a function of many variables, such as time for required permits to operate or construct, appropriate infrastructures surrounding the facility, other logistical arrangements to receive, store, treat and dispose of the waste, or cost to change or build the system.

[5] Available treatment capacity can be categorized by facility status into four groups: (1) *commercial capacity*—capacity at facilities that manage waste from any facility; (2) *on-site (private capacity)*—capacity at facilities that manage only waste generated on-site; (3) *captive capacity*—capacity at facilities that manage only waste from other facilities under the same ownership; and (4) *limited commercial capacity*—capacity at facilities that manage waste from a limited number of facilities not under the same ownership. For all capacity analyses, estimates on available capacity reflect available *commercial* capacity.

II. REQUIRED CAPACITY

This section updates the analysis of required capacity provided in the July 1997 Background Document using hazardous waste data contained in the 1997 Biennial Report. First, the data collection methodology is summarized. Then, a summary of the required capacity data for K088 waste is presented.

1. Data Collection Methodology

To obtain data on required capacity for K088 waste, EPA queried the 1997 Biennial Reporting System (BRS) GM and WR Forms. Queries included wastes with K088 listed as the sole waste code
as well as those that listed K088 with other waste codes. Two types of facilities were queried for the GM Form: those that generate and manage waste on site, and facilities that generate and ship waste off site for management. This information lists the generators of K088 waste (and other identification data), the tons managed, applicable waste form codes, origin codes, and system codes. Please note that for some facilities, many EPA Hazardous Waste Codes are listed. The methodology used to filter the raw BRS data included the following steps:

1. Eliminated liquids, sludges, and lab packs from the data set (Waste Form Codes B00x, B1xx, B2xx, B5xx, and B6xx).

2. Eliminated from the data set several inorganic and organic solids containing K088 because they are not considered to be spent aluminum potliner wastes. These wastes include contaminated soils, ash, dry lime or metal hydroxide solids, and spent solid filters (Waste Form Codes B301, B303, B305, and B310).

3. Eliminated EPA Hazardous Waste Codes that contain spent halogenated and non-halogenated liquids (EPA Hazardous Waste Codes F001, F002, F003, F005).

4. Eliminated K088-containing hazardous wastes with origin codes indicating that the waste was:

    a) derived from management of a non-hazardous waste (Origin Code 3);

    b) received from off site and not recycled or treated on site (Origin Code 4); or

    c) in the form of residuals from on-site treatment, disposal, or recycling of a previously existing hazardous waste (Origin Code 5).

As stated earlier, EPA also extracted data from the WR Forms. These data were screened to retain only those facilities that performed treatment, such as stabilization (System Type Codes M111, M112), and incineration (System Type Code M043). All other systems, such as landfill disposal (System Type Code M132), other disposal (System Type Code M137), and storage at a transfer facility (System Type Code M141) were eliminated from the data set.

The detailed 1997 BRS data are presented in Appendix A of this document.

2. 1997 BR Data Summary

Approximately 84,000 tons of K088 waste (spent potliners from primary aluminum reduction per 40 CFR 261.32) were generated in 1997 based on the methodology discussed above. [6] 22 primary aluminum producers reported to the BRS. There are a total of 23 primary aluminum producers in the U.S. See Figure 1 for Locations of Facilities Generating Spent Potliner. However, 22 are active aluminum smelters and identified as currently generating K088 and one remains closed.

Exhibit 2 in the following page presents K088 waste generation data from the 1997 BRS, along with any other data from previous capacity analysis for K088 wastes. This exhibit updates the 1991, 1993, and 1995 BRS and other data previously compiled in the July 1997 K088 capacity background document.

Our review of 1997 BRS data shows that the Reynolds Metals Company Gum Springs Plant continues to be the major recipient of K088 wastes shipped for treatment in the U.S. Also BR data showed that substantial amount of quantity was managed in land-based unit (i.e., sent to Subtitle C landfills only and no indication of other management reported in the 1997 BR). This might be because the land disposal prohibition did not become effective until October 14, 1997, and facilities were not required to meet treatment standards of K088 before land disposal during the capacity variance period (and 1997 BR was not due until March 1998). The data showed a shift in K088 waste generation rates among individual facilities, and the overall total in 1997 is lower than that reported in previous years (e.g., 84,000 tons of K088 wastes generated in 1997, versus 99,993 tons of K088 wastes generated in 1995, 101,200 tons generated in 1993, and 85,677 tons generated in 1991). However, there appears to have been no significant change in the required capacity for K088.

3. Conclusion

As discussed in the July 1997 K088 capacity background document,[7] accurate projection of annual generation of K088 is difficult to develop. Primary aluminum production rates—one of the key determinants of K088 generation—vary from year to year. Other factors include the differences between potliners in terms of their useful life spans, the lag time between aluminum production and waste generation, and the one-time increases in potliner generation due to production starts and stops.

For the purposes of comparing required treatment or recovery capacity to available commercial capacity, EPA combined all the data presented in previous rulemakings and updated the data using the 1997 BRS. Based on these data, EPA estimates that approximately

[6] Economic Analysis uses a total of 87,746 tons of K088 reported generated and managed in 1997 BR and includes the reported quantity of Kaiser Aluminum & Chemical Corp., Mead, WA where 1995 BR data were used. 1997 BR did not have K088 generation or managed quantities for Kaiser.

[7] Background Document for Capacity Analysis for land Disposal Restriction of Spent Potliners (Final Rule, July 1997; 62 FR 37694, July 14, 1997.

80,000–100,000 tons per year[8] of K088 generated in the United States would be prohibited from land disposal and required to meet the interim standards (effective since September 24, 1998). The quantity requiring treatment may be closer to the low-end value in recent years because most of primary aluminum producers are not in full operation capacity.[9] The equivalent amount of K088 waste is expected to require alternative management to meet the amended treatment standards if EPA adopts the proposed standards. EPA realizes that the production of primary aluminum industry may fluctuate from year to year and solicits comments on the estimates and data about more recent generation and required capacity for treatment on a facility specific basis.

[8] From a meeting on January 18, 2000 which Reynolds and ALCOA (ALCOA, et. al.) requested, ALCOA, et. al. indicated that the range of K088 generation rate could be 50,000 tons - 110,000 tons per year, depending on whether generators will separate the first cut and second cut of spent potliner (carbon portion and refractory). If facilities separate the carbon portion from refractory of spent potliner, then the generation quantity of K088 might shift to the lower end. Also see Figures C-1 and C-2 in Appendix C for schematic of the aluminum reduction process and simplified diagram of a typical pot. See Sylvia Lawrence memorandums (August 25, 1989; March 3, 1989) on K088 listing scope in Appendix F.

[9] Also see phone logs of August 27, 1999 with Kevin Earley of Vortec and of September 8, 1999 with Pat Grover of Reynolds Metals Company in Appendix B. The utilization rate of Reynolds (Gum Springs, AR) treatment capacity is in 50 percent range.

Figure 1. Locations of Facilities Generating Spent Potliner

1. Alcan—Sebree, KY
2. ALCOA—Evansville, IN
3. ALCOA—Badin, NC
4. ALCOA—Alcoa, TN
5. ALCOA—Rockdale, TX
6. ALCOA—Wenatchee, WA
7. ALCOA—Massena, NY
8. Alumax—Mt. Holly, SC
9. Alumax/Eastalco—Frederick, MD
10. Alumax/Intalco—Ferndale, WA
11. Goldendale Al. Corp.—Goldendale, WA
12. Columbia Falls Al. Co.—Columbia Falls, MT
13. Century Aluminum—Ravenswood, WV
14. Kaiser Aluminum—Tacoma, WA
15. Kaiser Aluminum—Spokane, WA
16. National Southwire—Hawesville, KY
17. Noranda Aluminum—New Madrid, MO
18. Northwest Aluminum—The Dalles, OR
19. Ormet Corp—Hannibal, OH
20. Reynolds Metals—Massena, NY
21. Reynolds Metals—Longview, WA
22. Reynolds Metals—Troutdale, OR
23. Vanalco—Vancouver, WA

Reference: U.S. Geological Survey, 1997 Minerals Information: Aluminum. (Patricia A. Plunkert)

Exhibit 2
Comparison of K088 Generation Data (tons)

Facility Owner	Location	Upper-Bound from February 1996 Background Document[a]	1991 BRS	1993 BRS	1995 BRS	1997 BRS	Data Submitted by Reynolds			NAAS Full Capacity[d]
							Full Capacity[b]	1995 Projection[b]	1997 Projection[c]	
Alcoa	Alcoa, TN	33,000 aggregate	3,920	3,700	3,473	1,069	5,000	2,160	1,750	6,612
Alcoa	Badin, NC		3,095	3,200	2,206	1,127	2,320	3,080	640	3,802
Alcoa	Massena, NY		2,930	4,200	3,318	1,583	2,060	2,880	1,750	4,199
Alcoa	Rockdale, TX		16,070	11,300	4,570	7,090	11,000	4,950	4,400	10,417
Alcoa	Wenatchee, WA		4,705	4,400	2,792	2,469	2,200	2,160	3,600	8,761
Alcoa	Warrick, IN		0	5,300	6,474	6,069	8,560	4,020	4,945	8,926
Alumax	Mt. Holy, SC	2,000	1,730	1,400	2,291	2,448	4,000	2,000	2,210	5,984
Alumax (Eastalco)	Frederick, MD	4,400	0	3,600	1,214	2,469	5,670	3,600	2,600	5,786
Alumax[e] (Intalco)	Ferndale, WA	4,300	2,600	800	6,273	8,064	7,000	4,500	7,067	8,926
Alcan	Henderson, KY	4,000	2,930	3,100	2,822	3,658	3,600	2,040	2,400	5,389
Chemical Waste Management, Inc.	Orange, TX	NA	NA	NA	NA	2,375	NA	NA	NA	NA
Columbia Falls	Columbia Falls, MT	7,200	4,130	2,800	3,966	4,558	5,400	5,400	4,500	5,554
Columbia/Goldendale Aluminum Co.[f]	Goldendale, WA	11,000	2	7,700	9,210	6,527	4,630	6,000-7,000	7,700	5,554
Kaiser	Mead, WA	3,200	0	3,400	2,275	NA	7,700	3,750-5,000	2,300	6,612
Kaiser	Tacoma, WA	5,000	5,085	3,900	4,726	2,253	2,850	2,250-3,000	1,600	2,413
NSA	Hawesville, KY	3,300	2,760	3,200	5,913	3,096	3,230	2,500	3,150	6,149
Noranda	New Madrid, MO	8,400	5,540	6,800	5,878	5,643	8,100	9,000	6,000	6,744
Northwest	Dalles, OR	8,000	5,240	5,800	3,270	2,940	2,250	3,000-4,000	3,000	2,711
ORMET	Hannibal, OH	8,000	6,410	6,100	15,960	5,170	8,100	7,000	NA	8,100
Ravenswood (Century ALuminum)	Ravenswood, WV	4,200	5,580	4,600	3,357	6,546	5,100	4,500	2,780	5,488

Exhibit 2
Comparison of K088 Generation Data (tons)

Facility Owner	Location	Upper-Bound from February 1996 Background Document[a]	1991 BRS	1993 BRS	1995 BRS	1997 BRS	Data Submitted by Reynolds			NAAS Full Capacity[d]
							Full Capacity[b]	1995 Projection[b]	1997 Projection[c]	
Reynolds	Bauxite, AR	NA	NA	NA	3	NA	NA	NA	NA	NA
Reynolds	Gum Springs, AR	NA	NA	NA	340	NA	NA	NA	NA	NA
Reynolds	Longview, WA	8,200	6,760	7,800	NA	4,987	8,200	7,800	7,800	6,744
Reynolds	Massena, NY	4,500	0	4,600	3,798	3,981	4,500	4,500	NA	4,066
Reynolds[d]	Troutdale, OR	3,500	2,320	NA	NA	NA	3,500	NA	0	4,000
Vanalco	Vancouver, WA	3,500	3,870	3,000	3,485	2,634	3,030	2,500	3,250	3,637
Other		NA	NA	500	4	NA	NA	NA	NA	NA
Total		125,700	85,677	101,200[g]	99,993[h]	84,381	118,000	89,590-93,590	73,442	136,574

[a] This estimate, provided in the February 1996 Background Document, is based on 1990 data reported in a 1991 SAIC report and updated with information and comments (in response to the 1995 ANPRM) from several aluminum facilities.

[b] Submitted in an October 25, 1994 letter to Benjie Carroll, Capacity Programs Branch, OSW, U.S. EPA, from Douglas D. Macauley of the Reynolds Metals Company.

[c] Submitted in a November 25, 1996 fax transmittal to C. Pan Lee, OSW, U.S. EPA, from Paul Webb of the Reynolds Metals Company, Gum Springs.

[d] Using the methodology and data presented in an April 10, 1996 letter to Alex Turchi, ICF Incorporated, from Timothy Butler, representative of four Northwest aluminum producers.

[e] Generation estimates for these facilities were not presented in the Proposed Rule but rather were submitted by commenters to the Proposed Rule.

[f] The 1995 BRS database identified this facility as Goldendale Aluminum Co. However, previous BRS databases identified a facility at the same location under the name of Columbus. We believe these two facilities to be the same.

[g] About 5,200 tons of these wastes are believed to be wastewaters that are not being land disposed, and thus only 95,800 tons are assumed to have been land disposed in 1993.

[h] These wastes are believed to be nonwastewaters that were land disposed in 1995.

III. AVAILABLE CAPACITY TO MEET INTERIM STANDARDS

The Reynolds Gum Springs facility in Arkansas ("Reynolds") accepts K088 wastes from numerous generators and currently provides the majority of commercial K088 treatment capacity in the United States. This facility uses a thermal system that has a K088 treatment capacity of approximately 120,000 tons per year to meet the interim treatment standards promulgated on September 24, 1998. It will continue to provide treatment capacity for K088 waste as long as the land disposal prohibition and interim standards for K088 waste are still in effect. The usage of Reynolds capacity was only about 50 to 60 percent of its maximum available capacity in each year of 1997 and 1998.[10]

Two additional U.S. facilities have available technologies to treat K088 waste to the interim standards. Chemical Waste Management of the Northwest, Inc. (CWMNW) at Arlington, Oregon employs a combination of chemical oxidation and stabilization to treat K088 waste. CWMNW is capable of increasing treatment operation shift to treat more K088 waste.[11] A primary aluminum producer, Ormet (Hannibal, Ohio) uses a Vortec vitrification system to process its own K088 waste.

Therefore, there currently exists adequately protective treatment and disposal capacity for K088 waste treated to meet the existing (interim) treatment standards.[12] Thus, EPA knows of no reason to justify eliminating the existing land disposal prohibition and treatment standards during the period before treatment capacity capable of meeting the proposed standards becomes available.

[10] Phone conversation with Pat Grover, Reynolds Metals Company on September 8, 1999 (see Appendix B).

[11] CWMNW submitted data and information (letter dated October 13, 1999) and claimed the whole submission as CBI. Also see phone logs of November 1, 9, and 19, 1999.

[12] Also see 62 FR 37696-697(July 14, 1997) for detailed discussion.

[This page intentionally left blank]

IV. ANALYSIS FOR THE EFFECTIVE DATE FOR THE AMENDED TREATMENT STANDARDS

EPA estimates that approximately 80,000-100,000 tons per year of K088 generation in the United States is expected to require alternative management to meet the amended LDR treatment standards for the next several years. Currently, there is insufficient treatment or recovery capacity to meet the proposed standards. There are also permitting issues to affect the availability of treatment or recovery capacity capable of meeting the proposed standards since EPA proposes the vitrification unit to handle K088 waste being subject to Subpart X permit in today's rule.

On September 24, 1998, we promulgated interim replacement standards for K088. These standards no longer use the TCLP as a measure of treatment performance for those constituents for which it markedly underpredicts treated K088 leaching potential, namely arsenic and fluoride. (See 63 FR 51254, September 24, 1998). The interim standards thus set a requirement of 26.1 mg/kg total (mineral acid soluble) arsenic as the treatment standard for arsenic K088 nonwastewater.

Furthermore, the standards no longer include a nonwastewater standard for fluoride, since EPA felt that it made no sense to delay a re-prohibition and interim treatment standards (and consequently to allow disposal of untreated potliners) until EPA developed a new leaching procedure for fluoride. At that time, we also concluded that it was not feasible to develop a new standard during the four months stay of the Columbia Falls mandate, in light of the lack of existing data and the difficulty of developing a test other than the TCLP to measure treatment performance. Today's notice proposes the use of a revised test for analyzing fluoride in K088 nonwastewaters as well as proposing a revised treatment standard for fluoride and this standard is significantly lower than the one established in the LDR Phase III final rule (61 FR 15660, April 8, 1996), which was vacated by the Court in the Columbia Falls case.

The proposed standards are based on vitrification performance data and are significantly lower than the interim treatment standards. The Reynolds system currently does not meet the proposed treatment standards for total and amenable cyanide and fluoride in nonwastewater for most (and perhaps all) of the K088 wastes currently being treated at the Gum Springs facility.[13] Even if Reynolds is able to reconfigure or adjust its thermal treatment process or purchase an additional treatment system to treat K088 wastes to the proposed treatment standards, it likely would take a substantial amount of time to make the necessary changes to the system and perform trial burns and other tests to demonstrate that the proposed treatment standards are met. Therefore, upon promulgation of the amended treatment standards and probably for some time afterward, it is unlikely that Reynolds will be able to provide immediate commercial treatment or recovery capacity for all K088 wastes to meet the amended treatment standards. However, Reynolds is currently evaluating various existing or potential treatment or recycling technologies for K088 waste.[14] Potentially, Reynolds may replace their furnace with a vitrification device if the

[13] See Reynolds letters and data of December 5, 1997 and January 2, 1998 in the docket for Land Disposal Restrictions; Treatment Standards for Spent Potliners From Primary Aluminum Reduction (K088); Final Rule (Interim), September 24, 1998 (63 FR 51253).

[14] Phone conversation with Pat Grover, Reynolds Metals Company on September 8, 1999 (see Appendix B).

new standards are based on vitrification.[15] Since Reynolds already has a permit to specifically process K088 wastes, the facility may take less time to do a permit modification than starting from scratch.

Although CWMNW, the other commercial treatment facility, had gone through permitting, design and construction of large containment building and treatment system for K088 waste and met the interim standards, the data submitted by CWMNW did not meet the proposed treatment standards (data are claimed as CBI[16]). There is no indication about how quickly or whether CWMNW can change the current recipes (chemical oxidation then solidification) to meet the significantly lower standards for cyanides and fluorides than the standards CWMNW could meet now (interim standards). Most likely, CWMNW would not be able to meet the new standards with its current chemical treatment if EPA adopts the amended treatment standards in the final rule unless the facility builds a new heat system (a thermal desorption or vitrification unit) which may take longer than two years to complete the necessary permit, design and construction. For their current chemical treatment system and containment building, it took them two to three years to get the necessary procedures completed. Therefore, there is uncertainty whether it will continue to provide treatment capacity to meet the proposed treatment standards for fluoride and the amended standards for total and amenable cyanide in K088 waste.[17]

At this time, among K088 generators, only ORMET appears to have on-site management (vitrification) capacity for its own K088 waste to meet the proposed treatment standards. This capacity is in the range of 10,000 tons per year and results in a recycling of the K088 residual.[18] The facility designed the system capacity based on the generation rate of its own waste. However, ORMET has no plans to expand its on-site capacity or accept K088 wastes from other generators.[19] Therefore, there is no commercial facility with vitrification capacity accepting K088 waste. Nevertheless, projects to construct several plants for recycling K088 into glass and ceramic products are currently in the planning phase. For example, Vortec and ORMET formed a joint technology development enterprise (SPL Recycling, LLC) in 1997 to assist in the development of waste recycling projects in the aluminum industry. SPL Recycling's future plan is to build regional facilities in cooperation with K088 generators to use vitrification to manage K088 wastes.[20] Based on some information,[21] SPL Recycling is currently supporting project

---

[15] In the meeting of January 18, 2000, ALCOA, et.al. indicated that sizing the needed capacity to treat K088 waste (building an on-site system to treat its own K088 only or as a commercial facility to accept K088 waste from other non-affiliated generators) depends on many factors, such as regulatory requirements (permits, final standards, residuals management, etc.), economic consideration, etc. They also noted that Reynolds at Gum Spring never reached a full capacity utilization (approximately 50% use rate for the past few years).

[16] Document Control No. ME 9900199 of Office of Solid Waste: CWMNW letter and data to C. P. Lee, USEPA, October 13, 1999. The data and information includes brief description of K088 treatment process, approximate treatment capacity, and pretreatment and post-treatment concentrations for cyanide.

[17] See phone log with CWMNW, November 19, 1999 (Appendix B).

[18] Ormet site visit report (June 15, 1999) in "Proposed Best Demonstrated Available Technology (BDAT) Background Document for Spent Aluminum Potliners - K088; USEPA, February 2000."

[19] Phone conversation with John Reggi, ORMET on September 13, 1999 (see Appendix B).

[20] Phone conversation with Kevin Earley, Vortec on August 27, 1999 (see Appendix B).

[21] A fax to Maribelle Rodriquez, ICF Consulting on October 8, 1999.

development efforts to construct a facility with 60,000 tons capacity to process SPL in the central United States and estimates that 18 months is required to complete engineering and design, permits, procurement, and construction because it envisioned that the proposed vitrification project would involve only a permit modification to an existing RCRA-permitted facility. EPA has no further details how and why SPL Recycling needs only a permit modification for its proposed vitrification project since they claimed the information regarding the plan as CBI. Therefore, there is uncertainty how fast this potential commercial facility with vitrification technology can come on line to treat K088 waste.

There are other K088 treatment or recycling technologies or processes being studied (e.g., gasification, the "Alcoa-Selca" process, Spent Potliner Test Plan by Ash grove Cement company[22]), but most of these technologies and processes have not been proven commercially, and there is considerable uncertainty about their potential to meet the proposed treatment standards for cyanide and fluoride in K088 waste.

There is another factor potentially affecting how soon the treatment capacity to satisfy the amended treatment standards becomes available. EPA proposes to regulate vitrification as a treatment technology and therefore, proposes such unit to treat K088 waste is subject to RCRA Subpart X permit (under 40 CFR 264, Subpart X – Miscellaneous Units) in today's rule. The permitting process time-line for vitrification units under the tentatively proposed option to classify them as RCRA Subpart X miscellaneous treatment units and are presumptively subject to the MACT incinerator standards as a point of departure, is likely to vary substantially based on several factors. These factors include the U.S. State the unit is located and the level to which the permit writer determines that the incinerator standards apply to the vitrification unit. For example, RCRA authorized states may require more stringent standards that result in a longer permitting process time-line than the time-line in a state in which an EPA Region is responsible for the permitting process. Similarly, the application of full incinerator standards by the permit writer would likely result in a longer process than the application of more limited standards. Thus, under a worst-case assumption that a vitrification permit is a new permit or a major (Class 3) modification of an existing permit, and if full incineration permitting standards are being applied by a permit writer in a RCRA authorized state that has adopted more stringent standards than those in the federal regulations, then this process could take many years. At the other extreme, assuming a more moderate (Class 1 or 2) modification of an existing permit is taking place in a state in which an EPA Region is responsible for the permit or in an authorized state that has adopted the permit modification rule and other federal regulations, then the process could take as little as a year or less. Please see Appendix D for more detailed discussion on RCRA permit process and permit modification classification. Also Appendix E presents an example of the time needed to build an on-site treatment system which provides alternative treatment capacity for the wastes generated on-site from the most recent case-by-case petition (July 12, 1999) of FMC (Pocatello, Idaho) and the facility provides a schedule for obtaining required operating and construction permits. It takes FMC approximately two years to get RCRA permits and the activities such as design and engineering, equipment procurement, physical on-site construction may be conducted concurrently.

In order to establish vitrification or equivalent capacity that meets the proposed treatment standards nationwide, facilities would need time to obtain permits and make design, construction,

[22] See the submission in the docket for today's rule for Ash Grove letter and data to C. P. Lee, USEPA: Spent Aluminum Potliner (K088) Test Report, August 24, 1998, Ash Grove Cement Company, Chanute, Kansas, EPA ID. No. KSD031203318.

and operational arrangements necessary to receive, store, treat or recycle, and dispose of K088 wastes. In addition, generators of K088 wastes may need time to identify and secure adequate treatment or recovery capacity for their wastes due to the newly proposed standards.

Given all of the above factors, EPA believes that adequate commercially available treatment or recovery capacity for the treatment of K088 wastes to the proposed treatment standards is not currently available. The amount of time needed to establish sufficient vitrification or equivalent capacity for all K088 wastes–which would translate into the effective date for the amended standards–is affected by the need for treatment facilities to conduct full design and engineering assessments, negotiate contractual agreements, obtain permits from appropriate regulatory agencies, construct the systems, set up the appropriate infrastructures, and make other logistical arrangements necessary to receive, store, treat, or recycle, and dispose of K088 wastes. Such a process can take years to accomplish. For example, approximately two years were needed before Ormet's vitrification system was operational. Using this example and other information noted in this background document for this analysis of the appropriate effective date for this rule, EPA is considering delaying the effective date for the amended treatment standards for two years following rule promulgation. Although two years may or may not be adequate for certain treatment systems to become operational and meet the proposed treatment standards for K088 waste, the length of time needed depends on whether the facility has an existing treatment system or will build a new system. For example, if a facility has an existing thermal system capable of treating K088 waste already, then it may replace its existing system with a vitrification device or adjust the operating parameters to meet the proposed requirements and new treatment standards if EPA adopts them.[23] EPA will consider comments and other available information to adjust the time required before treatment capacity capable of meeting the revised treatment standards will be available. In the meantime, the land disposal prohibition and interim treatment standards are still in effect during the period of delaying the effective date for the amended treatment standards.

[23] Phone log in the background document of Economic Assessment of the Revised LDR Treatment Standards for Spent Aluminum Potliner (K088), February 2000.

APPENDIX A
1997 BRS DATA

Primary Aluminum Metal Producers

Facility Name	EPA ID	Hazardous Waste Codes	Source Code	Waste Form Code	Generated Tons	Managed Tons	Waste Receiver EPA ID	Shipped Tons
ALCAN INGOT, SEBREE ALUMINUM PLANT	KYD058692526	K088	A99	B319	173.23	0	LAD000777201	173.23
ALCAN INGOT, SEBREE ALUMINUM PLANT	KYD058692526	K088	A99	B319	1743.44	0	ARD006354161	1743.44
ALCAN INGOT, SEBREE ALUMINUM PLANT	KYD058692526	K088	A99	B319	1741.33	0	IND078911146	1741.33
Alcoa Point Comfort Operations	TXD008123168	K088	A61	B116	17.84	0	OHD000724153	17.84
ALCOA Rockdale Works	TXD008091712	D002K088	A79	B108	29.44	0	LAD000777201	29.44
ALCOA Rockdale Works	TXD008091712	K088	A08	B405	39	39		0
ALCOA Rockdale Works	TXD008091712	K088	A08	B405	7049.09	0	ARD006354161	7049.09
ALCOA Rockdale Works	TXD008091712	K088	A08	B405	1.69	0	LAD000777201	1.69
ALCOA TECHNICAL CENTER	PAD004393138	D002D004D006D008D011F005K088	A94	B107	0.095	0	ILD098642424	0.095
ALCOA TECHNICAL CENTER	PAD004393138	D002D004D006D008D011F005K088	A94	B107	0.23	0	ILD000608471	0.23
ALCOA TECHNICAL CENTER	PAD004393138	K088	A94	B404	0.304	0	ILD098642424	0.304
ALCOA -WARRICK OPER	IND006366819	K088	A09	B404	5895	0	ARD006354161	5895
ALCOA -WARRICK OPER	IND006366819	K088	A09	B404	174	0	IND078911146	174
ALCOA WENATCHEE WORKS	WAD00927079	K088	A59	B316	182.75	0	ARD006354161	182.75
ALCOA WENATCHEE WORKS	WAD00927079	K088	A59	B316	2285.95	0	ORD089452353	2285.95
ALUMAX OF SC	SCD097366165	K088			2149.402	0	ALD000622464	2168.24
ALUMAX OF SC	SCD097366165	K088			281.285	0	ARD006354161	283.75
ALUMAX OF SC	SCD097366165	K088			1.16	0	NCD000648451	1.17
ALUMAX OF SC	SCD097366165	K088			16.664	0	SCD070375985	16.81
ALUMINUM COMPANY OF AMERICA	NYD002232304	F001F002F003F005K088	A69	B205	21119.1	21119.1		0
ALUMINUM COMPANY OF AMERICA	NYD002232304	F001F002F003F005K088	A69	B319	446.375	439		0
ALUMINUM COMPANY OF AMERICA	NYD002232304	F001F002F003F005K088	A69	B319	13.625	0	NYD049836679	13.4
ALUMINUM COMPANY OF AMERICA	NYD002232304	K088	A99	B404	1582.8	0	ARD006354161	1636.6
ALUMINUM COMPANY OF AMERICA /BADIN	NCD003162542	K088	A99	B404	804.68	0	ARD006354161	851.67
ALUMINUM COMPANY OF AMERICA /BADIN	NCD003162542	K088	A99	B319	253.467	0	ALD000622464	253.467
ALUMINUM COMPANY OF AMERICA /BADIN	NCD003162542	K088	A60	B507	7.5	0	TXD000838896	7.5
ALUMINUM COMPANY OF AMERICA /BADIN	NCD003162542	K088	A60	B507	7.53	0	ALD000622464	7.53
ALUMINUM COMPANY OF AMERICA /BADIN	NCD003162542	K088	A92	B119	27.034	0	ALD000622464	27.034
ALUMINUM COMPANY OF AMERICA /BADIN	NCD003162542	K088	A91	B319	7.648	0	ALD000622464	6.94
ALUMINUM COMPANY OF AMERICA /BADIN	NCD003162542	K088	A91	B319	60.734	0	IND078911146	55.11
ALUMINUM COMPANY OF AMERICA-SOUTH	TND003383551	K088			0.16	0	TND000645770	0.16
ALUMINUM COMPANY OF AMERICA-SOUTH	TND003383551	K088			1069.25	0	ARD006354161	1069.25

Primary Aluminum Metal Producers

Facility Name	EPA ID	Hazardous Waste Codes	Source Code	Waste Form Code	Generated Tons	Managed Tons	Waste Receiver EPA ID	Shipped Tons
CENTURY ALUMINUM OF WV, INC	WVD00923329	K088	A09	B404	5577.148	0	MID048090633	5578
CENTURY ALUMINUM OF WV, INC.	WVD00923329	K088	A09	B404	908.861	0	MTT270019904	909
CENTURY ALUMINUM OF WV, INC.	WVD00923329	K088	A09	B404	59.991	0	MID098011992	60
COLUMBIA FALLS ALUMINUM CO	MTD057561763	K088	A56	B404	4558.3	0	ORD089452353	3584.3
EASTALCO ALUMINUM CO	MDD99075937	K088	A59	B404	536	0	ARD006354161	536
EASTALCO ALUMINUM CO	MDD99075937	K088	A59	B404	104	0	PAD087561015	104
EASTALCO ALUMINUM CO	MDD99075937	K088	A59	B404	1829	0	IND078911146	1829
GOLDENDALE ALUMINUM CO	WAD99082864	K088	A56	B404	6527.37	0	ORD089452353	6527.37
INTALCO ALUMINUM CORP FERNDALE	WAD00948813	K088	A75	B504	616.635	616.635		0
INTALCO ALUMINUM CORP FERNDALE	WAD00948813	K088	A59	B404	7021	7021		0
INTALCO ALUMINUM CORP FERNDALE	WAD00948813	K088	A59	B404	1042.9	0	ORD089452353	1042.9
KAISER ALUMINUM TACOMA WORKS	WAD00188298	K088	A59	B319	2252.78	0	ORD089452353	2252.78
LOCKHEED MARTIN CORPORATION	ORD052221025	K088	A79	B507	1.1	0	CAT000646117	1.1
LOCKHEED MARTIN CORPORATION	ORD052221025	K088	A79	B116	5029.863	5029.863		0
LOCKHEED MARTIN CORPORATION	ORD052221025	K088	A79	B507	177.459	0	UTD991301748	177.461
NORANDA ALUMINUM INC	MOD09375096	K088	A59	B404	5642.5	0	ARD006354161	5642.5
NORTHWEST ALUMINUM COMPANY	ORD981764707	K088	A99	B405	2920.795	0	ORD089452353	2953.36
NORTHWEST ALUMINUM COMPANY	ORD981764707	K088	A99	B405	18.524	0	TXD000838896	18.73
NSA, DIVISION OF SOUTHWIRE COMPANY	KYD049062375	K088	A61	B312	441.67	0	IND078911146	447.67
NSA, DIVISION OF SOUTHWIRE COMPANY	KYD049062375	K088	A08	B319	2654.245	0	ARD006354161	2674.965
ORMET PRIMARY ALUMINUM	OHD004379970	K088	A40	B319	4284.662	0	MID048090633	3228
ORMET PRIMARY ALUMINUM	OHD004379970	K088	A40	B319	885.338	0	OHD045243706	667
REYNOLDS METALS LONGVIEW	WAD05706856	K088	A99	B409	4987.266	0	ARD006354161	4987.266
REYNOLDS METALS CO ST LAWRENCE RED	NYD002245967	K088	A08	B409	3855	0	ARD006354161	3810
REYNOLDS METALS CO ST LAWRENCE RED	NYD002245967	K088	A59	B319	126	0		0
REYNOLDS METALS HURRICANE CREEK	ARD006354187	K088	A99	B302	66.02	0	ARD006354161	66.02
VANALCO INC	WAD98176675	K088	A40	B319	567.62	0	ORD089452353	567.62
VANALCO INC	WAD98176675	K088	A40	B319	2065.87	0	ORD089452353	2065.87
VANALCO INC	WAD98176675	K088	A40	B319	0.225	0	ILD980502744	0.225

Treatment, Storage, and Disposal Facilities

Facility Name	EPA ID	Hazardous Waste Codes	Source Code	Waste Form Code	Generated Tons	Managed Tons	Waste Receiver EPA ID	Shipped Tons
CHEMICAL WASTE MANAGEMENT	LAD000777201	D002K088	A79	B107	0.0	0.0	TXD000838896	18.6
CHEMICAL WASTE MANAGEMENT	LAD000777201	D002K088		B107	0.0	15.1		0.0
CHEMICAL WASTE MANAGEMENT	LAD000777201	D002K088		B107	0.0	34.8		0.0
CHEMICAL WASTE MANAGEMENT	LAD000777201	D002K088		B107	0.0	17.3		0.0
CHEMICAL WASTE MANAGEMENT	LAD000777201	K088		B307	0.0	173.2		0.0
CHEMICAL WASTE MANAGEMENT	LAD000777201	K088		B302	0.0	1.7		0.0
CHEMICAL WASTE MANAGEMENT OF INDIANA	IND078911146	K088		B319	0.0	1,719.3		0.0
CHEMICAL WASTE MANAGEMENT OF INDIANA	IND078911146	K088		B319	0.0	184.8		0.0
CHEMICAL WASTE MANAGEMENT OF INDIANA	IND078911146	K088		B319	0.0	60.1		0.0
CHEMICAL WASTE MANAGEMENT OF INDIANA	IND078911146	K088		B319	0.0	1,861.5		0.0
CHEMICAL WASTE MANAGEMENT OF INDIANA	IND078911146	K088		B319	0.0	465.5		0.0
CHEMICAL WASTE MANAGEMENT OF INDIANA	IND078911146	K088		B319	0.0	21.8		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	D002K088	A37	B103	1.2	1.2		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	D002K088	A35	B119	0.9	0.0		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	F032F034F035K088	A94	B003	2.5	2.5		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	K088	A35	B312	1.1	1.1		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	K088	A99	B319	11.1	0.6		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	K088		B316	0.0	572.1		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	K088		B316	0.0	2,741.5		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	K088		B316	0.0	2,305.9		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	K088		B304	0.0	2,281.3		0.0
CHEMICAL WASTE MANAGEMENT OF THE NW	ORD089452353	K088LABP		B001	0.0	0.1		0.0
CHEMICAL WASTE MANAGEMENT, INC.	ALD000622464	D001D002D005D006D007 D008D018F003F005K088		B319	0.0	330.0		0.0
CHEMICAL WASTE MANAGEMENT, INC.	ALD000622464	D004D005D006D007K088	A89	B114	0.0	0.0	PAD087561015	2.5
CHEMICAL WASTE MANAGEMENT, INC.	ALD000622464	D004D005D006D007K088	A89	B114	0.0	0.0	ALD981020894	0.3
CHEMICAL WASTE MANAGEMENT, INC.	ALD000622464	D004D005D006D007K088	A89	B114	0.0	0.0	LAD000777201	0.2
CHEMICAL WASTE MANAGEMENT, INC.	ALD000622464	K008K071K088		B319	0.0	2,188.8		0.0
CHEMICAL WASTE MANAGEMENT, INC.	CAT000646117	K088		B114	0.0	1.0		0.0
CLEAN HARBORS SVCS INC	ILD000608471	D001D003K088	A89	B001	0.0	0.0	ILD098642424	0.8
CLEAN HARBORS SVCS INC	ILD000608471	D002D003D007D008K088	A58	B001	0.0	0.0	ARD069748192	0.2
CLEAN HARBORS SVCS INC	ILD000608471	D002D003K088P030	A89	B004	0.0	0.0	ARD069748192	1.2
CLEAN HARBORS SVCS INC	ILD000608471	D002D004K088	A89	B003	0.0	0.0	ILD098642424	0.0

Treatment, Storage, and Disposal Facilities

Facility Name	EPA ID	Hazardous Waste Codes	Source Code	Waste Form Code	Generated Tons	Managed Tons	Waste Receiver EPA ID	Shipped Tons
CLEAN HARBORS SVCS INC	ILD000608471	D002D007D008D010K088		B001	0.0	0.1		0.0
CLEAN HARBORS SVCS INC	ILD000608471	D002K088		B001	0.0	0.1		0.0
CLEAN HARBORS SVCS INC	ILD000608471	D004D006D011F005K088		B001	0.0	0.0		0.0
CLEAN HARBORS SVCS INC	ILD000608471	D004D006D011F005K088		B313	0.0	0.0		0.0
CLEAN HARBORS SVCS INC	ILD000608471	D005K088P015P120		B004	0.0	0.1		0.0
CLEAN HARBORS SVCS INC	ILD000608471	D006D007D008K088		B001	0.0	0.1		0.0
CLEAN HARBORS SVCS INC	ILD000608471	D006D008D011F005K088	A89	B106	0.0	0.0	ILD098642424	0.2
CLEAN HARBORS SVCS INC	ILD000608471	D006D008D011F005K088		B313	0.0	0.3		0.0
CLEAN HARBORS SVCS INC	ILD000608471	D006D011F005F010K088	A89	B506	0.0	0.0	ILD098642424	0.4
CLEAN HARBORS SVCS INC	ILD000608471	D009D011F005F007K088	A89	B107	0.0	0.0	ILD098642424	0.4
CLEAN HARBORS SVCS INC	ILD000608471	K088	A89	B315	0.0	0.0	ILD098642424	0.3
CLEAN HARBORS SVCS INC	ILD000608471	K088		B316	0.0	0.2		0.0
CLEAN HARBORS SVCS INC	ILD000608471	K088		B001	0.0	0.2		0.0
CWM CHEMICAL SERVICES, L.L.C.	NYD049836679	F001F002F003F005K088		B319	0.0	13.4		0.0
EI DUPONT-CHAMBERS WORKS	NJD002385730	D004D005D006D007D008 D009D010D011F002F019 F039K021K022K088		B116	0.0	3,910.8		0.0
EI DUPONT-CHAMBERS WORKS	NJD002385730	D004D005D006D007D008 D009D010D011F002F019 F039K022K088		B116	0.0	188.9		0.0
ENSCO INC	ARD069748192	D002D003D007D008K088		B001	0.0	0.0		0.0
ENSCO INC	ARD069748192	D002D003D007D008K088		B001	0.0	0.2		0.0
ENSCO INC	ARD069748192	D002D003K088P030		B312	0.0	0.0		0.0
ENSCO INC	ARD069748192	D002D003K088P030		B312	0.0	1.4		0.0
ENSCO INC	ARD069748192	D004D006D011F005K088		B312	0.0	0.0		0.0
ENSCO INC	ARD069748192	D006D007D008K088		B312	0.0	0.1		0.0
ENVIROSAFE SERVICES OF OHIO INC	OHD045243706	K088		B305	0.0	684.6		0.0
ENVIROTROL INC DARLINGTON	PAD987270725	D004D005D006D007D008 D018D019D020F001F002 K062K088P021P030P031		B404	0.0	75.3		0.0
LAIDLAW ENV SVS OF SC INC	SCD070375985	K088			0.0	16.8		0.0
LAIDLAW ENV. SERVICES (LONE & GRASSY MTN	UTD991301748	K088		B113	0.0	180.2		0.0
LAIDLAW ENVIRONMENTAL SERVICES	ILD980502744	K088	A99	B305	0.0	0.0	MIT270019904	0.3
LAIDLAW ENVIRONMENTAL SERVICES	ILD980502744	K088	A99	B312	0.0	0.0	MIT270019904	0.7

Treatment, Storage, and Disposal Facilities

Facility Name	EPA ID	Hazardous Waste Codes	Source Code	Waste Form Code	Generated Tons	Managed Tons	Waste Receiver EPA ID	Shipped Tons
LAIDLAW ENVIRONMENTAL SERVICES	ILD980502744	K088	A99	B316	0.0	0.0	MIT270019904	0.5
LAIDLAW ENVIRONMENTAL SERVICES	ILD980502744	K088		B305	0.0	0.3		0.0
LAIDLAW ENVIRONMENTAL SERVICES	ILD980502744	K088		B316	0.0	0.5		0.0
LAIDLAW ENVIRONMENTAL SERVICES	ILD980502744	K088		B312	0.0	0.2		0.0
LAIDLAW ENVIRONMENTAL SERVICES	ILD980502744	K088		B312	0.0	0.3		0.0
LAIDLAW ENVIRONMENTAL SERVICES	ILD980502744	K088		B312	0.0	0.2		0.0
LAIDLAW ENVIRONMENTAL SERVICES	MDD980554653	K088			0.0	0.8		0.0
LAIDLAW ENVIRONMENTAL SERVICES (TS), INC	NCD000648451	K088		B404	0.0	1.2		0.0
LAIDLAW ENVIRONMENTAL SERVICES,INC	OKD065438376	D002D004K088		B115	0.0	1,036.8		0.0
LAIDLAW ENVIRONMENTAL SERVICES,INC	OKD065438376	K088		B319	0.0	16.7		0.0
LAIDLAW ENVIRONMENTAL SERVICES,INC	OKD065438376	K088		B319	0.0	6.4		0.0
LAIDLAW ENVIRONMENTAL SERVICES,INC	OKD065438376	K088		B301	0.0	2.7		0.0
MICHIGAN DISPOSAL WASTE TREATMENT	MID000724831	K088			0.0	2.3		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	D002D004K088	A79	B116	1,481.0	0.0	OKD065438376	1,481.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088	A92	B114	139.2	139.2		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088	A91	B319	2.7	0.0	OKD065438376	2.7
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088	A91	B319	19.7	0.0	OKD065438376	19.7
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088	A78	B304	34.9	0.0	OKD065438376	34.9
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088	A74	B304	38,008.6	38,008.6		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	5,044.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	3,748.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	5,912.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	2,158.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	1,741.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	1,150.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	848.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	1,590.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B119	0.0	7,201.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	5,862.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B119	0.0	124.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	5,340.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	2,664.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	143.0		0.0

Treatment, Storage, and Disposal Facilities

Facility Name	EPA ID	Hazardous Waste Codes	Source Code	Waste Form Code	Generated Tons	Managed Tons	Waste Receiver EPA ID	Shipped Tons
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	169.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	66.0		0.0
REYNOLDS METALS CO GUM SPRINGS PLANT	ARD006354161	K088		B319	0.0	2,379.0		0.0
SAFETY-KLEEN (TS) INC	TND000645770	K088			0.0	0.2		0.0
SPRING GROVE RESOURCE RECOVERY INC	OHD000816629	D001D003D004D005D006 D007D008D009D010D011 K088P030	A58	B001	0.2	0.0	ILD000608471	0.2
SPRING GROVE RESOURCE RECOVERY INC	OHD000816629	D006D007D008D009D011 F001F002F003F005K088 U188U219	A99	B319	20.6	0.0	ILD000608471	24.9
SPRING GROVE RESOURCE RECOVERY INC	OHD000816629	D006D007D008D009D011 F001F002F003F005K088 U188U219	A99	B319	0.2	0.0	MAD053452637	0.2
SPRING GROVE RESOURCE RECOVERY INC	OHD000816629	D006D007D008D009D011 F001F002F003F005K088 U188U219	A99	B319	2.5	0.0	MND981190242	3.0
SPRING GROVE RESOURCE RECOVERY INC	OHD000816629	D006D007D008D009D011 F001F002F003F005K088 U188U219	A99	B319	1.6	0.0	NYD049836679	1.9
TRADE WASTE INCINERATION INC	ILD098642424	K088		B319	0.0	0.1		0.0
WAYNE DISPOSAL, INC.	MID048090633	K088	A	B	6,033.4	6,033.4		0.0
WAYNE DISPOSAL, INC.	MID048090633	K088			0.0	232.0		0.0
WAYNE DISPOSAL, INC.	MID048090633	K088			0.0	1,549.4		0.0
WAYNE DISPOSAL, INC.	MID048090633	K088			0.0	199.5		0.0
WAYNE DISPOSAL, INC.	MID048090633	K088			0.0	1,563.9		0.0
WAYNE DISPOSAL, INC.	MID048090633	K088			0.0	5,801.4		0.0
WAYNE DISPOSAL, INC	MID048090633	K088			0.0	5,575.6		0.0

Source codes describe the type of process or activity (i.e., source) from which a hazardous waste was generated.

FORM CODES

Form codes describe the general physical and chemical characteristics of a hazardous waste-

Code	Waste description
CLEANING AND DEGREASING	
A01	Stripping
A02	Acid cleaning
A03	Caustic (alkali) cleaning
A04	Hush rinsing
A05	Dip rinsing
A06	Spray rinsing
A07	Vapor DEGREASING
A08	Physical scraping and removal
A09	Clean out process equipment
A19	Other cleaning and DEGREASING (Specify in Comments)
SURFACE PREPARATION AND FINISHING	
A21	Painting
A22	Electroplating
A23	Electroless plating
A24	Phosphating
A25	Heat treating
A26	Pickling
A27	Etching
A29	Other surface coating/preparation (Specify in Comments)
PROCESSES OTHER THAN SURFACE PREPARATION	
A31	Product rinsing
A32	Product filtering
A33	Product distillation
A34	Product solvent extraction
A35	By-product processing
A36	Spent catalyst removal
A37	Spent process liquids removal
A38	Tank sludge removal
A39	Slag removal
A40	Metal forming
A41	Plastics forming
A49	Other processes other than surface preparation (Specify in Comments)
PRODUCTION OR SERVICE DERIVED ONE TIME AND INTERMITTENT PROCESSES	
A51	Leak collection
A53	Cleanup of spill residues
A54	Oil changes
A55	Filter/battery replacement
A56	Discontinue use of process equipment
A57	Discarding off-spec material
A58	Discarding out-of-date products or chemicals
A59	Other production-derived one-time and intermittent processes (Specify in Comment)
A60	Sludge removal
REMEDIATION DERIVED WASTE	
A61	Superfund Remedial Action
A62	Superfund Emergency Response
A63	RCRA Corrective Action at solid waste management unit
A64	RCRA closure of hazardous waste management unit
A65	Underground storage tank cleanup
A69	Other remediation (Specify in Comments)
POLLUTION CONTROL OR WASTE TREATMENT PROCESSES	
A71	Filtering/screening
A72	Metals recovery
A73	Solvents recovery
A74	Incineration/thermal treatment
A75	Wastewater treatment
A76	Sludge dewatering
A77	Stabilization
A78	Air pollution control devices
A79	Leachate collection
A89	Other pollution control or waste treatment (Specify in Comments)
OTHER PROCESSES	
A91	Clothing and personal protective equipment
A92	Routine cleanup wastes (e.g., floor sweepings)
A93	Closure of management unit(s) or equipment other than by remediation specified in codes A61-A69
A94	Laboratory wastes
A99	Other (Specify in Comments)

FORM CODES

Form codes describe the general physical and chemical characteristics of a hazardous waste-

Code	Waste description
	LAB PACKS
	LAB PACKS - Lab packs of mixed wastes, chemicals, lab wastes
B001	Lab packs of old chemicals only
B002	Lab packs of debris only
B003	Mixed lab packs
B004	Lab packs containing acute hazardous wastes
B009	Other lab packs (Specify in Comments)
	LIQUIDS
	INORGANIC LIQUIDS - Waste that is primarily inorganic and highly fluid (e.g., aqueous), with low suspended inorganic solids and low organic content
B101	Aqueous waste with low solvents
B 102	Aqueous waste with low other toxic organics
B 103	Spent acid with metals
B 104	Spent acid without metals
B 105	Acidic aqueous waste
B 106	Caustic solution with metals but no cyanides
B 107	Caustic solution with metals and cyanides
B 108	Caustic solution with cyanides but no metals
B 109	Spent caustic
B110	Caustic aqueous waste
B111	Aqueous waste with reactive sulfides
B112	Aqueous waste with other reactives (e.g., explosives)
B113	Other aqueous waste with high dissolved solids
B 114	Other aqueous waste with low dissolved solids
B115	Scrubber water
B116	Leachate
B 117	Waste liquid mercury
B 119	Other inorganic liquids (Specify in Comments)
	ORGANIC Liquids - Waste that is primarily organic and is highly fluid, with low inorganic solids content and low-to-moderate water content
B201	Concentrated solvent-water solution
B202	Halogenated (e.g., chlorinated) solvent
B203	Nonhalogenated solvent
B204	Halogenated/Nonhalogenated solvent mixture
B205	Oil-water emulsion or mixture
B206	Waste oil
B207	Concentrated aqueous solution of other organics
B208	Concentrated phenolics
B209	Organic paint, ink, lacquer, or varnish
B210	Adhesives or epoxies
B211	Paint thinner or petroleum distillates
B212	Reactive or polymerizable organic liquid
B219	Other organic liquids (Specify in Comments)
	SOLIDS
	INORGANIC SOLIDS - Waste that is primarily inorganic and solid, with low organic content and low-to-moderate water content; not pumpable
B301	Soil contaminated with organics
B302	Soil contaminated with inorganics only
B303	Ash, slag, or other residue from incineration of wastes
B304	Other "dry" ash, slag, or thermal residue
B305	"Dry" lime or metal hydroxide solids chemically "fixed"
B306	"Dry" lime or metal hydroxide solids not "fixed"
B307	Metal scale, filings, or scrap
B308	Empty or crushed metal drums or containers
B309	Batteries or battery parts, casings, cores
B310	Spent solid filters or adsorbents
B311	Asbestos solids and debris
B312	Metal-cyanide salts/chemicals
B313	Reactive cyanide salts/chemicals
B314	Reactive sulfide salts/chemicals
B315	Other reactive salts/chemicals
B316	Other metal salts/chemicals
B319	Other waste inorganic solids (Specify in Comments)
	ORGANIC SOLIDS - Waste that is primarily organic and solid, with low-to-moderate inorganic content and water content; not pumpable
B401	Halogenated pesticide solid
B402	Nonhalogenated pesticide solid
B403	Solid resins or polymerized organics
B404	Spent carbon
B405	Reactive organic solid
B406	Empty fiber or plastic containers
B407	Other halogenated organic solids (Specify in Comments)
B409	Other Nonhalogenated organic solids (Specify in Comments)

Code	Waste description

SLUDGES

INORGANIC SLUDGES - Waste that is primarily inorganic, with moderate-to-high water content and low organic content; pumpable

B501 Lime sludge without metals
B502 Lime sludge with metals/metal hydroxide sludge
B503 Wastewater treatment sludge with toxic organics
B504 Other wastewater treatment sludge
B505 Untreated plating sludge without cyanides
B506 Untreated plating sludge with cyanides
B507 Other sludge with cyanides
B508 Sludge with reactive sulfides
B509 Sludge with other reactives
B510 Degreasing sludge with metal scale or filings
B511 Air pollution control device sludge (e.g., fly ash, wet scrubber sludge)
B512 Sediment or lagoon dragout contaminated with organics
B513 Sediment or lagoon dragout contaminated with inorganics only
B514 Drilling mud
B515 Asbestos slurry or sludge
B516 Chloride or other brine sludge
B519 Other inorganic sludges (Specify in Comments)

ORGANIC SLUDGES - Waste that is primarily organic with low-to-moderate inorganic solids content and water content; pumpable

B601 Still bottoms of halogenated (e.g., chlorinated) solvents or other organic Liquids
B602 Still bottoms of Nonhalogenated solvents or other organic Liquids
B603 Oily sludge
B604 Organic paint or ink sludge
B605 Reactive or polymerizable organics
B606 Resins, tars, or tarry sludge
B607 Biological treatment sludge
B608 Sewage or other untreated biological sludge
B609 Other organic sludges (Specify in Comments)

GASES

INORGANIC GASES - Waste that is primarily inorganic with a low organic content and is a gas at atmospheric pressure

B701 Inorganic gases

ORGANIC GASES - Waste that is primarily organic with low-to-moderate inorganic content and is a gas at atmospheric pressure

B801 Organic gases

APPENDIX B
PHONE LOGS
(including SPL Recycling letter)

SUBJECT: Phone conversation with Kevin Earley of Vortec
phone: 610-489-2255 (Pennsylvania)
RE: Vitrification capacity

FROM: C. Pan Lee
OSW/HWMMD/AIB

TO: The Docket

DATE of PHONE CALL: August 27, 1999

Mr. Early described its vitrification unit at ORMET:

- ORMET purchased Vortec's vitrification process to recycle SPL waste and used this technology in its facility at Hannibal, OH; and there is no plan to expand its on-site capacity or accept K088 from other primary aluminum producers.
- They started engineering assessment in 1995 at ORMET and operating in late 1997.
- Vitrification unit at ORMET is a legitimate recycling technology approved and authorized by Ohio EPA and the permit is pretty specific to ORMET and not able to accept K088 from other generators (there is no need to gain approval of recycling from USEPA based on reg language in CFR part 261 according to his interpretation).
- System was built based on ORMET's generation of K088 (5,000-6,000 tons per year), so ORMET's system can handle 6,000-7,000 tons per year of its own K088 only.

Mr. Early also discussed Vortec's future plan as follows:

- It usually takes two years or less for Vortec to get the system operating, but they need supply of K088 and capital commitment from other primary aluminum producers, and work out a business arrangement to get generators' cooperation on building a regional facility and operated by Vortec and these aluminum producers.
- If forming such a business arrangement among Vortec and generators of K088, a regional facility will be built, owned, and operated by all participants at a mutually agreed location.
- A lot of variables may be involved in forming such business arrangement, e.g., contract negotiation, sharing capital commitment, issuing facility permit, etc.
- Vortec plans to operate such regional facilities in Quebec, Canada and USA as well.

As to annual K088 generation quantity, Mr. Early indicated that K088 generation is generally about 2.5% of primary aluminum production capacity. There is about 3.7 million metric tons aluminum production currently.

3.7 million mtons x 2.5% = 92,500 mtons of K088 generation

He indicated that it's fair to say average around 80,000 mtons of K088 generation annually, and that 120,000 tons generation of K088 is really overestimate because most of producers are not in full operation capacity.

As to cells used in the industry, there are usually thousands of cells in each facility and some fails every year. Life of cell is average about 5 years.

For primary aluminum industry, some mergers are negotiated currently. For example, if Alcan, Canada (also has facility in US) merges with Pechiney of France and Swiss, they will become the largest aluminum producer. Now Alcoa is the largest (in USA), but merging of Alcoa and Reynolds becomes the second, if Alcan's merging is successful. (Alumax was not existed any more, they were bought by Alcoa.)

SUBJECT: Phone Conversation
Pat Grover of Reynolds Metals company, (804) 281-2072
re: Reynolds Metals Co. at Gum Spring (RMC)

FROM: C. Pan Lee
OSW/HWMMD/AIB

TO: The Docket

DATE of PHONE CALL: September 8, 1999

Mr. Grover indicated the following:

- RMC will continue to operate and meet the interim final standards for K088 waste until the new treatment standards for K088 waste become effective. Although it is hard to predict what Alcoa wants to do with RMC, if the merging with Alcoa succeeds in the first or second quarter of next year, it is to their advantage (and makes common sense) to continue operation to treat K088 waste until the new treatment standards become effective. In addition, currently, Alcoa is RMC's largest customer.

- The Reynolds - Alcoa merger will take place if: (1) DOJ approves it and (2) Reynolds does not get a higher offer than that of Alcoa.

- Currently RMC accepts K088 waste from all Alcoa facilities (nine facilities, including three Alumax facilities), Reynolds' facilities in the US (three facilities), and Reynolds' facilities in Canada (two facilities). Thus, the only facilities that generate K088 and do not send their waste to RMC are ORMET and aluminum smelters in northwestern region (two facilities in WA, one in OR, and one in MT), and two Kaiser facilities in WA.

- The usage rate of RMC's rotary kilns: 50 to 60 percent in both 1997 and 1998 (i.e., approximately 50,000 to 60,000 tons, definitely less than 70,000 tons per year). The total treatment capacity of RMC is still around 120,000 tons per year.

- Currently, RMC is looking into recycling technologies or other new treatment technologies. For example, RMC has talked to Vortec; however, there is no concrete agreement between them yet. Alcoa is exploring recycling of potliners into steel mills. RMC may decide to use another technology to manage K088 wastes once they know what the new treatment standards for K088 are.

- If the new treatment standards are as low as the performance results from ORMET, RMC may not meet the standards based on ORMET data. It will cost a lot to reconfigure the operating parameters to meet the new standards (maybe another $60 - 70 million) and whether to reconfigure the current system is a question of cost.

- Mr Grover also pointed out that it's very risky to establish new treatment standards only based on one source of data (ORMET data) and Reynolds' situation may happen again. He

indicated that he was not certain Vortec's vitrification at ORMET could handle different sources of K088 waste, which could have very different matrices and wide range of concentrations for constituents of concern.

- Whether they continue to operate the current system is a function of many things – such as regulatory, technical, and economical issues. RMC also continues to evaluate different treatment or recycling technologies for managing K088 waste.

Company Name: ORMET

Contact Name: Mr. John Reggi

Telephone Number: (740) 483-2659

Fax Number: (740) 483-2782

Subject: Use of Vitrification for the Management of K088 Wastes

ICF Contact Name: Maribelle Rodríguez

September 13, 1999

Mr. Reggi indicated that it took a total of between two and three years to design, construct, and set up the vitrification system used by ORMET for the management of K088 wastes. Some of the activities were conducted concurrently. ORMET designed the system and Vortec provided the "Vortec unit," which had to be modified (scaled) to work with ORMET's design. It took ORMET approximately two years to design the system, between three and six months to obtain an air permit for potential emissions and a water permit for non-contact cooling water. ORMET's system was approved under a recycling determination. Thus, a RCRA permit was not required. Construction of the system took approximately 20 to 24 months. It took approximately six months to make sure that the system was working adequately. Logistical arrangements necessary to receive, store, treat or recycle, and dispose of K088 wastes were not needed since ORMET only manages its own K088 waste. Additional time would be required to make logistical arrangements, and type of transportation (i.e., rail or truck) need to be considered. Mr. Reggi believes that, if the building is already available on site, it would take approximately three years to design, construct, and make operational a vitrification system.

ORMET's vitrification system was designed to manage the waste they generate: 5,000 to 6,000 short tons per year. The system is permitted for 4,400 pounds per hour of throughput (approximately 60 percent K088 wastes and 40 percent of a mix of sand and limestone). However, the maximum management capacity is less than that permitted because they only work one to two shifts, five days a week. ORMET does not plan to expand or become commercial in the near future.

Mr. Reggi indicated that the product of the vitrification process is not considered hazardous wastes and, thus, the product is sold to other companies. Public notice for the sale of their product was not necessary. Mr. Reggi will send to us a description of the vitrification process used by ORMET.

Most of the baghouse dust generated during the vitrification process is composed of sodium fluoride. Hence, the dust has a high concentration of fluoride. Currently, ORMET tries to recycle the dust as much as possible. However, operations does not currently like to use it because of its dusty nature. Dust that is not recycled is land disposed since there are no standards for fluoride in K088 wastes. If ORMET were not able to land dispose the dust because of the fluoride concentration, one option would be to recycle the dust in another form and another would be to sell the material as a product, which they have done before.

In April 1994, ORMET submitted a petition to USEPA Region 5 for exclusion of vitrified products. ORMET believes that the delisting of vitrified products as hazardous wastes will broaden their ability to market glass products.

For example, selling off-spec glass as raw material for concrete and asphalt. They also want to raise awareness on the benefits of recycling K088 wastes. Mr. Reggi indicated that ORMET is ready to submit a second body of data for review to USEPA Region 5.

Mr. Reggi indicated that for information on SPL Recycling, LLC, Mr. Wayne Smith, Vice President of Aluminum Operations should be contacted at (304) 234-3925. We submitted a set of questions regarding SPL Recycling, LLC's future plans in developing waste recycling projects, and the time it would take to implement vitrification systems to manage K088 wastes. (An October 8, 1999 one-page response from Mr. Reggi was received, which states that SPL Recycling is supporting project development efforts for a 60,000 ton/year SPL recycling facility in the central U.S., and that approximately 18 months is required to complete engineering and design, procurement, and construction). See attachment—one pager from Mr. Reggi in the end of this Appendix.

November 2 and December 3, 1999

These calls were follow-ups to the September 13, 1999 phone conversation. Mr. Reggi indicated that he talked to several people at ORMET to verify that the designing, permitting, and construction timeline provided to ICF Consulting in the September 13, 1999 conversation was accurate. That timeline is as follows:

- Design, permitting, and construction of the vitrification unit were conducted concurrently. These activities took approximately 30 months to complete.

- Design of the vitrification unit took approximately two years. Some of the design phase took place as the vitrification unit was being constructed.

- Permitting of the vitrification unit took place during the design period. ORMET submitted preliminary designs of the vitrification unit to the corresponding regulatory agency (i.e., Ohio State regulatory agency) in order to obtain air and water permits. The air permit was needed for potential emissions and the water permit was needed for non-contact cooling water. Both permits were issued by the regulatory agency in a period of four months. Only air and water permits were needed because the vitrification unit is covered by a recycling determination.

- Construction of the recycling facility took approximately 20 to 24 months. As stated earlier, some design activities also were conducted during this time period.

- Final design refinements and adjustments to the vitrification unit took approximately six months.

Mr. Reggi noted that, if vitrification were regulated as a treatment technology (i.e., under 40 CFR Part 264, Subpart X – Miscellaneous Units), ORMET's vitrification unit would be operated as an interim-status unit until the corresponding permit is issued by the State of Ohio.

Mr. Reggi also indicated that all regulatory issues related to the vitrification unit itself are addressed directly with the State of Ohio. For issues related to the delisting petition for the waste residual, ORMET deals directly with EPA Region 5.

Regarding SPL Recycling, Mr. Reggi indicated that, under the recycling determination, it is estimated that design, permitting, and construction of the vitrification facility will take approximately 18 months. Permitting activities associated to the vitrification facility (i.e., obtaining an air permit) are included in this estimate. Initial startup activities are expected to take an additional two to three months.

Mr. Reggi noted that the time difference (i.e., nine months) between the design, permitting, and construction of ORMET's vitrification unit (i.e., 30 months) and SPL Recycling's vitrification facility (i.e., 18 to 21 months) is due to the fact that research and development activities (e.g., false starts, re-design) have already been conducted for the vitrification unit at the ORMET facility. Thus, less time is needed to design and construct SPL Recycling's vitrification facility.

In addition, Mr. Reggi noted that the estimates provided above for SPL Recycling's vitrification facility are estimates under the recycling determination scenario. If EPA decides to regulate vitrification as a treatment technology (i.e., under Subpart X), the time needed to obtain the necessary permits for SPL Recycling's vitrification facility might deviate from the estimates presented above. At this time, SPL Recycling has not looked into the time that would be needed to obtain a RCRA Subpart X permit or a RCRA permit modification for a vitrification unit.

Finally, Mr. Reggi indicated that SPL Recycling and other primary aluminum producers have discussed the possibility of using K088 wastes for energy recovery. However, this idea was not pursued because the BTU value is not high enough.

SUBJECT: Phone conversation with
Sam (Samir) Jiries, Environmental manager, 541-454-3201
Chemical Waste Management of the Northwest, Inc. (CWMNW), Arlington, OR

FROM: C. Pan Lee
OSW/HWMMD/AIB

TO: The Docket

Date of Phone Call: October 1, 1999

The reason I called CWMNW is to find out whether the facility's "Cashman" process for treating K088 wastes becomes available. Mr. Jiries indicated that CWMNW currently uses a different treatment process from "Cashman" process to treat K088 wastes. The facility uses chemical oxidation and stabilization to treat K088 wastes and meet the existing standards. He suggested to call Mr. Steve Seed, Arlington facility manager (541-454-3301) to get the data or information regarding capacity, treatment process, and untreated vs. treated K088 wastes.

SUBJECT: Phone conversation with
Steve Seed, District Manager, 541-454-3301
Chemical Waste Management of the Northwest, Inc. (CWMNW), Arlington, OR

FROM: C. Pan Lee
OSW/HWMMD/AIB

TO: The Docket

Date of Phone Call: October 5, 1999

Mr. Seed indicated that CWMNW is currently treating K088 wastes and EPA should not rule out its treatment capacity when I mentioned that Reynolds's Gum Spring facility is the only one we know is treating K088 wastes and we have not heard from CWM since we asked for data from them in early 1999. Mr. Seed emphasized that EPA should count CWMNW's treatment capacity for K088 wastes since the facility is treating the wastes and currently meets the interim treatment standards (September 24, 1998 Interim Final Rule). He will send EPA the data or information on (1) treatment capacity of the facility; (2) constituents concentration for pre- and post-treatment of K088 wastes; and (3) description of treatment process. He planned to send the above information in the week of October 12 and might need to claim the information as CBI due to confidentiality of clients information and proprietary recipes of treatment process.

DATE: November 1, 1999

SUBJECT: Phone conversation with
Steve Seed, District Manager, 541-454-3301
Chemical Waste Management of the Northwest, Inc. (CWMNW), Arlington, OR

FROM: C. Pan Lee
OSW/HWMMD/AIB

TO: The Docket

I received five pages of CBI from CWMNW, one page of cover note and four pages of information regarding treatment capacity, treatment process, and cyanide levels of untreated and treated K088. [24]

I handed the CBI to OSW CBI officer, Regina Magbee on the same day I received the information.

[24] Mr. Seed left me a voice message late afternoon of October 29, 1999 (Friday). He indicated that the information package (dated October 13, 1999) I requested was returned to him that Friday from Federal Express.

DATE: November 8, 1999

SUBJECT: Phone conversation with
Steve Seed, District Manager, 541-454-3301
Chemical Waste Management of the Northwest, Inc. (CWMNW), Arlington, OR

FROM: C. Pan Lee
OSW/HWMMD/AIB

TO: The Docket

I left Mr. Seed a voice message on November 5, 1999 and asked the possibility of declassify the information package (see phone log of November 1, 1999) as non-CBI due to my Division Director's request. Mr. Seed left me the voice message on November 8, 1999 (my day off) and indicated that CWMNW would need to obtain their written approval to release clients' names and data on untreated/treated constituents levels of K088 wastes since the contract between CWMNW and clients includes the condition of treating its clients' information as CBI. However, Mr. Seed agreed that the compliance information for facilities are probably available publicly.[25]

I also asked Mr. Seed the question of whether CWMNW has any problem for EPA to put some language in the proposed rule on its capability of treating K088 waste. He replied that CWMNW would not mind EPA to mention CWMNW is currently treating K088 waste and meeting interim standards.

[25] Region 10 also sent Oregon Department of Environmental Quality (ODEG) a letter requesting information about CWMNW. Please see attached note and letter of data request from Dave Bartus of Region 10. However, Region 10 has not confirmed the receipt of any information from ODEQ by the date of completing this background document.

From: <Bartus.Dave@epamail.epa.gov>
To: DCCS01.DCCSPO2(LEE-CPAN)
Date: 11/5/99 11:02pm
Subject: Re: K088 info

Dave Bartus of Region 10 sent the following memo to Oregon DEQ to request data and information on K088 waste.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Reply To
Attn Of: WCM-127

Brett McKnight
Oregon Department of Environmental Quality
2146 NE 4th Street, Suite 104
Bend, OR 97701

Dear Brett:

Thank you for your assistance in discussing issues related to storage and treatment of spent potliner, hazardous waste code K088, at Chemical Waste Management in Arlington, OR. As a follow-up to our verbal discussions, Region 10 seeks your assistance in quantifying K088 storage and treatment capacity at this facility. More specifically, we are interested in evaluating the following:

18) Current quantity of untreated K088 in storage;
19) Current and projected treatment capacity, identifying both physical and permitted capacity;
20) Quantities treated to date using the existing treatment technology;
21) Current and projected generation rates of potliner to be accepted for treatment;
22) Projections relating to the time required to treat and remove from storage backlogged K088;
23) Data on wastes currently in storage establishing whether or not the waste is fully amenable to treatment in the current treatment process.
24) Sampling data demonstrating compliance with current LDR treatment standards.

Please let me know if you have any questions or comments regarding these data needs. You may reach me at (206) 553-2804 or bartus.dave@epa.gov.

Sincerely,

Dave Bartus, Senior Policy Analyst
Office of Waste and Chemicals Management

cc: Mike Slater, EPA OOO
bcc: Mary Andrews, OECA
John Austin, OSW
Sheila Eckman

DATE: November 9, 1999

SUBJECT: Phone conversation with
Brian S. Dalby, Senior Waste Fuel manager, Ash Grove Cement Company
(913)451-8900

FROM: C. Pan Lee
OSW/HWMMD/AIB

TO: The Docket

I asked whether his company has any problem for EPA to use Ash Grove as an example in the proposed rule on its potential of treating K088 waste. He replied that they would not mind EPA to mention Ash Grove's K088 Test Plan in the proposed rule.

DATE: November 19, 1999

SUBJECT: Phone conversation with
Steve Seed, District Manager, 541-454-3301
Chemical Waste Management of the Northwest, Inc. (CWMNW), Arlington, OR

FROM: C. Pan Lee
OSW/HWMMD/AIB

TO: The Docket

CWMNW is currently using chemicals to oxidize cyanide (actual reaction happens according to Mr. Seed) and solidify the resulting material in tanks after they check the oxidized material to meet total and amenable standards for cyanide.

Since chemical treatment won't work for organics, PAHs in K088 wastes which CWMNW accepts from primary aluminum producers in Northwest Region is already lower than the promulgated standards, therefore, the facility does not need to treat PAHs.

CWMNW has added a second shift to treat K088 wastes. By July or August 2000, CWMNW will complete the treatment of stockpiled K088 at Arlington facility.

CWMNW could meet fluoride standard set in the LDR Phase III final rule (48 ppm) and maybe to somewhat lower level (e.g., 25–30 ppm) but may not be any lower. For cyanides in K088, they will have difficulty in achieving any lower level than what they could have achieved currently (the data are CBI).

Mr. Seed indicated that using additional chemicals may somewhat lower the levels they can achieve and it certainly incurs additional cost for treatment. He said that CWMNW cannot meet the levels for cyanide and fluoride as Ormet could achieve unless they build a new heat treatment system such as a thermal desorption or vitrification unit which requires a new permit to proceed. Mr. Seed also said that they would need more than two years for a permit, research and design, and construction for such a new system. He also indicated that it took them two to three years to get the original permit, design and construction of the containment and treatment facilities at Arlington site (first tried other process but unsuccessful, then design the current chemical treatment).

Ms. Maribelle Rodriquez
ICF Consulting
9300 Lee Highway
Fairfax, VA 22031 - 1207

Dear Ms Rodriquez:

October 8, 1999

The following information was obtained from discussions with Mr. Smith with Ormet Corporation and from Vortec Corporation. The, information should answer your questions presented to Ormet regarding SPL Recycling LLL.

1. *Does SPL Recycling plan to build any facilities in which vitrification is used to manage K088 wastes?*

SPL Recycling LLL is a development company established by Ormet and Vortec to develop projects that utilize Vortec's vitrification technology to manage spent potliner. Based on the success at the Hannibal full-scale SPL vitrification facility, we are currently working on developing several projects worldwide, including the US and Canada. Our company is currently supporting project development efforts to construct a 60,000 ton capacity SPL recycling facility in the central United States, among others.

2. How long do you think it would take to implement a commercial SPL facility?

SPL Recycling LLL via Vortec Corporation has conducted Business Confidential detailed engineering and schedule analyses for a commercial SPL recycling facilities in the US. The proposed comimitmen2d regulatory approval. Their estimate indicates that 18 months is required to complete engineering and design, procurement, and construction. Supplier negotiations, logistics and infrastructure issues would be resolved during this period. Because we envision that the proposed vitrification project would involve only a permit modification to an existing RCRA-permitted facility, we anticipate that regulatory approvals could also be obtained during this period.

Sincerely,

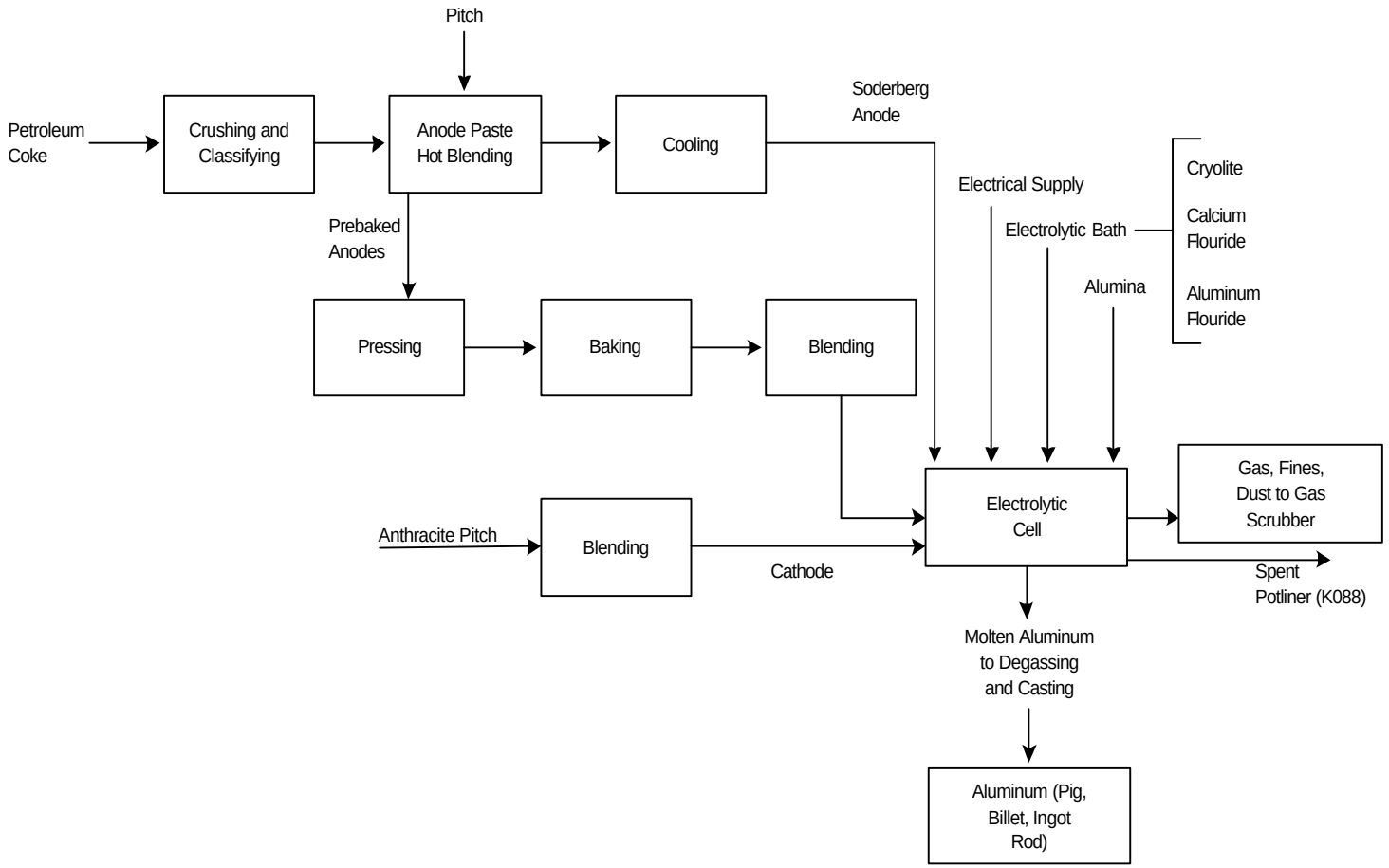
J.D. Reggi, Director
Corporate Environmental Services

JDR;ds
Hannibal Reduction
Division P-0. BOX 176 / State Route 7 ***(740) 483-1361***
Hannibal. Ohio 43931 ***(740) 483 2622 FAX***

APPENDIX C

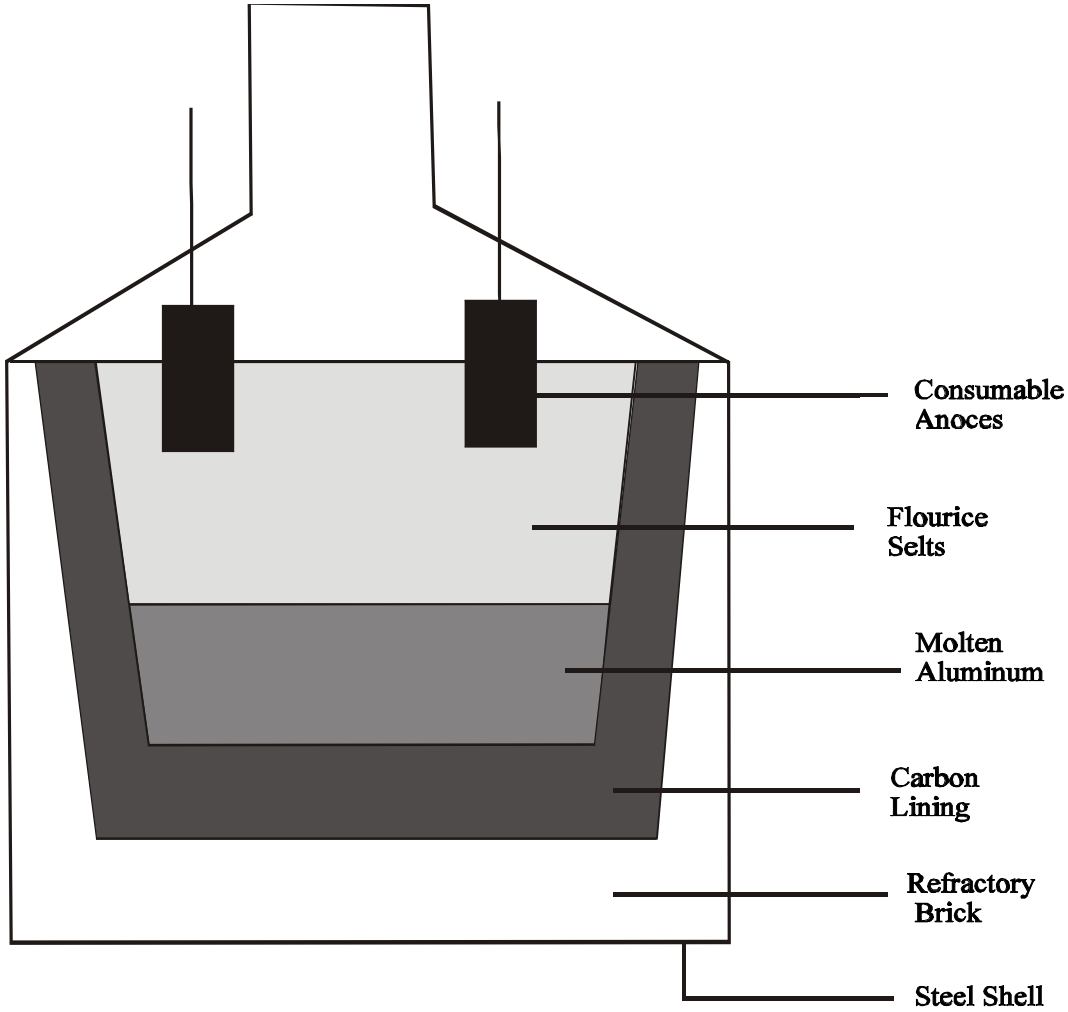
Schematic of the Aluminum Reduction Process and
Simplified Diagram of Typical Pot

Figure C–1. Schematic of the Aluminum Reduction Process



Reference: U.S. Environmental Protection Agency, Office of Water, *Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Primary Aluminum Smelting Subcategory of the Aluminum Segment of the Nonferrous Metals Manufacturing Point Source Category*. U.S. Environmental Protection Agency, Washington, DC, March 1974

Figure C–2. Simplified Diagram of Typical Pot



Reference: U.S. Environmental Protection Agency, Office of Water, *Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Primary Aluminum Smelting Subcategory of the Aluminum Segment of the Nonferrous Metals Manufacturing Point Source Category*. U.S. Environmental Protection Agency, Washington, DC, March 1974

APPENDIX D

RCRA Permitting Process and Classification of Permit Modification

RCRA Permitting Process: Incineration and Subpart X

I. Methodology

We evaluated the permitting process expected for K088 vitrification units under the tentatively proposed option that they should be classified as RCRA Subpart X miscellaneous treatment units and be presumptively subject to the Maximum Achievable Control Technology (MACT) incinerator standards as a point of departure, irrespective of whether the facility engages in recycling of K088 (Section III.C of the 12/9/99 draft of the K088 preamble). We conducted three steps for this analysis: (1) compile and review documents on the RCRA permitting process; (2) compile and review information on the Hazardous Waste Combustion MACT Rule; and (3) obtain information on the Subpart X permitting process from the EPA Regions.

The results of the first and third steps are presented in the following sections. The second step was essentially replaced with a review of the RCRA incineration permitting process because data on the MACT rule yielded very little relevant information. This focus on the RCRA incineration permitting process may in fact be more appropriate because the presumptive assumption of using incineration standards as a point of departure within a RCRA permitting framework might skew the process for vitrification units toward a RCRA, rather than a MACT incineration permitting process time-line, the latter of which—as discussed in the draft K088 preamble (Section III.C.3.d)—generally takes much less time than a RCRA permit prior to beginning construction. Nevertheless, a RCRA incineration permitting time-line probably should be viewed as the worst case scenario for the time-line that could actually occur for vitrification units. To further ensure that we capture the worst case, and because of the limited data and resources available for this analysis, we have primarily addressed new permits rather than permit modifications.

II. Overview of RCRA Permitting Process for Hazardous Waste Facilities

To treat hazardous waste, a facility must obtain an operating permit that establishes administrative and technical conditions for waste management. Operating permits are issued by EPA or authorized states[26].

The stages involved in obtaining a RCRA permit for a hazardous waste facility are as follows:

- *Informal Public Meeting Prior to Permit Application*: The facility must explain to the public the plans for the facility, the proposed processes it will use, and wastes it will handle. During this meeting, owners and operators of the proposed facility address questions asked by the public.

- *Submission of Part A and Part B Permit Applications*:
  (180 days before physical construction is to begin)

  Part A: Contains basic facility information such as location, owner, waste management processes, and hazardous waste types handled at the facility.

[26] Under RCRA section 3006(b) and (c), Congress authorized EPA to delegate primary responsibility for RCRA program implementation to qualified states, in lieu of EPA, and to issue and enforce permits for the treatment, storage, or disposal of hazardous waste. States that implement the RCRA program in lieu of EPA are known as "authorized states."

Part B: Contains detailed site specific information associated with waste management activities, including geologic, hydrologic, and engineering data.

- *Permit Application Review:* Permitting agency reviews the application for completeness. During this stage, the permitting agency may issue notices of deficiency if additional information is needed. Once the application is complete, the permit is evaluated based on technical requirements. The permitting agency then decides whether to issue or deny the permit application.

- *Preparation of the Draft Permit:* The permitting agency issues a draft permit that specifies all of the technical requirements and operating conditions under which the facility would be allowed to operate.

- *Taking Public Comment:* The public has 45 days to comment on the permitting agency draft permit.

- *Finalizing the Permit:* The permitting agency responds to the public comments and makes a final permit decision. The final permit is effective for a fixed term of 10 years.

III. Incineration Permitting Process

An incinerator is any enclosed device that uses controlled flame combustion and does not meet the criteria for classification as a boiler, sludge dryer, carbon regeneration unit or industrial furnace. Typical incinerators include rotary kilns, liquid injectors, controlled air incinerators and fluidized bed incinerators. The 40 CFR Part 264, Subpart O standards primarily regulate the emissions that result from hazardous waste combustion.

Once facility permit approval is received (see Section II), construction of the incineration facility can begin. After facility construction is completed, the following must occur to ensure the facility can operate in accordance with the operating conditions in the permit:

- *Pre-Trial Burn (Shake-down period):* The facility brings the unit to the status of normal operating conditions in preparation for the trial burn (not to exceed 720 hours of operations).

- *Trial burn:* The facility conducts these burns under a range of operating conditions and measures facility emissions. The trial burn conditions are to be representative of the intended day-to-day operations. This period may last several months.

- *Post-trial burn period:* Permitting agency evaluates all data from trial burn period. The facility may operate under conditions specified in the draft permit until the final operating permit is established.

- *Final operating period:* The permitting agency can modify the draft permit conditions to ensure that the incinerator will operate in compliance with all state and federal health and environmental standards. The final operating permit is issued.

The time needed to complete the permitting process, construct the incineration unit, conduct test burns of the unit, and final implementation, depends on various factors. These factors include state and federal regulations and technical constraints. This section presents time-lines obtained from four different sources for new facilities: 1992 Report on a 1990 survey of selected treatment firms, 1990 ICF presentation, 1999 Virginia DEQ web site, and 1998 Texas Natural Resources Commission web site. These time-lines

indicate that the permitting process for a new incinerator can range (or at one time did range) from about one to seven years, with a mid-range of about two to four years.

1990 Survey of Selected Firms [27]

- Ten incineration facilities reported that the permitting process took between one and seven years for each facility.
- The average time required for an incineration permit was about three and a half years.
- The September 28, 1988 permit modification rule (53 *Federal Register* 37912) resulted in a great deal of relief in terms of minor or moderate (Class 1 or 2) permit modifications for firms operating in RCRA unauthorized states or states that have adopted the regulation. [28]

ICF Presentation: Time-line for Constructing a New Incineration Facility [29]

- Preliminary Design and RCRA Permit Application Period : 6-9 months
- Permit Application Review: 6-12 months
- Public comment Period: 1-2 months
- Comment Review Period: 2 months
- Permit Appeals: 1-7 years
- Detailed Design and Physical Construction: 12-24 months
- Shake-Down and Trial Burn: 4-7 months
- Trial Burn Data Collection and Analysis: 2-3 months
- Permit Modification: Less than 1 month
- Without appeals, the entire permitting process: 3-5 years
- Appeals are common: Add 1-7 years

Virginia Hazardous Waste Incineration Facility Permitting Time-line [30]

RCRA Part A
- Completeness review: 30 days
- Processing of Application: 60 days

RCRA Part B
- Completeness review: 60 days
- Processing of complete application: 120 days

---

[27] U.S.EPA, 1992. Survey of Selected Firms in the Hazardous Waste Management Industry, 1990, Office of Policy Analysis.

[28] This relief is not likely to be significantly reflected in the previous two bullets because the survey was conducted between the first and second years after the rule was promulgated. On the other hand, the previous bullets pertain more to new and major (Class 3) modifications of permits, which would not be affected by the permit modification rule.

[29] 1990 presentation given to ICF staff by Gary Light. See Attachment A.

[30] Virginia DEQ, 1999. Available at: www.deq.state.va.us/permits/t-waste.html. This site does not indicate whether any of these time periods were concurrent.

- Public comment: 90 days

Incineration: Trial Burn
- Completeness review: 60 days
- Processing of complete application: 250 days
- Public comment: 135 days
- Remarks: Includes 60 days for EPA review and 45 days for public comment

Incineration: Final
- Completeness review: 60 days
- Processing of complete application 120 days
- Public comment: 135 days
- Remarks: Includes 60 days for EPA review and 45 days for public comment.

Texas Hazardous Waste Facility Permitting Time-line [31]

- Hazardous Waste Permit Application Received
- Administrative Review: 100 days
- Technical Review: 375 days
- Initial Draft Permit: 40 days
- Receive Comments from Applicant, EPA, Texas Natural Resource Conservation Commission: 40 days
- Final Draft Permit: 25 days
- Notice Published: 53 days
- Issue or Deny Final Permit

IV. RCRA Subpart X: Miscellaneous Units

EPA is planning to propose vitrification units as thermal treatment units (miscellaneous units) under 40 CFR Part 264, Subpart X. Thermal treatment units use elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of hazardous waste. Examples are carbon regeneration units and devices that use processes such as calcination, molten salt pyrolysis, wet-air oxidation, and microwave destruction.

Currently, a vitrification unit is being operated by ORMET for the management of K088 wastes. This vitrification unit was designed in conjunction with Vortec. In April 1995, ORMET received a recycling determination by the State of Ohio Environmental Protection Agency that Vortec's patented vitrification technology "is a legitimate recycling process excluded from Ohio's hazardous waste requirements." Additionally, Vortec has received a recycling determination from the State South Carolina.

The ORMET vitrification unit was designed, constructed, and finalized in a period of two to three years. Some of the activities were conducted concurrently. ORMET designed the system and Vortec provided the “Vortec unit,” which had to be modified (scaled) to work with ORMET’s design. It took

[31] Texas Natural Resource Conservation Commission, 1999. Available at: www.tnrcc.state.tx.us/permitting/wasteperm/ihwperm/new.pdf. This site appears to imply that these time periods occur in consecutive order.

ORMET approximately two years to design the system, between three and six months to obtain an air permit for potential emissions and a water permit for non-contact cooling water. ORMET's system was approved under a recycling determination. Thus, a RCRA treatment permit was not required. Construction of the system took approximately 20 to 24 months. It took approximately six months to make sure that the system was working adequately. Logistical arrangements necessary to receive, store, treat or recycle, and dispose of K088 wastes were not needed since ORMET only manages its own K088 waste. (For further information, see the ORMET Phone Logs in ICF's December 23, 1999 K088 report. Also, Attachment B to today's memorandum contains ORMET's response to the Phase III LDR proposed rule.)

One caveat to the direct application of the ORMET situation to a new vitrification unit is that the new unit apparently would be classified as a treatment unit rather than an excluded recycling unit. Thus, the permitting process for the new unit may take longer than it did for ORMET (depending on state regulations, etc.). On the other hand, the new unit may result in only a modification to an existing permitted RCRA facility, which could result in a shorter permitting process.

V. Summary

The permitting process time-line for vitrification units under the tentatively proposed option to classify them as RCRA Subpart X miscellaneous treatment units and are presumptively subject to the MACT incinerator standards as a point of departure, is likely to vary substantially based on a several factors. These factors include the U.S. state the unit is located and the level to which the permit writer determines that the incinerator standards apply to the vitrification unit. For example, RCRA authorized states may require more stringent standards that result in a longer permitting process time-line than the time-line in a state in which an EPA Region is responsible for the permitting process. Similarly, the application of full incinerator standards by the permit writer would likely result in a longer process than the application of more limited standards. Thus, under a worst-case assumption that a vitrification permit is a new permit or a major (Class 3) modification of an existing permit, and if full incineration permitting standards are being applied by a permit writer in a RCRA authorized state that has adopted more stringent standards than those in the federal regulations, then this process could take many years. At the other extreme, assuming a more moderate (Class 1 or 2) modification of an existing permit is taking place in a state in which an EPA Region is responsible for the permit or in an authorized state that has adopted the permit modification rule and other federal regulations, then the process could take as little as a year or less.

Permit Modification Classification for Treatment, Storage, and Disposal Facilities (TSDFs)

This review covers only the permitting regulations that might pertain to the TSDFs subject to prior permitting requirements. If a TSDF is already permitted to manage hazardous waste, promulgation of the final rule for the new treatment standards may only require the facility to modify its permit as set forth in §270.42.

The permit modification regulations differ depending upon what classification is required. There are three different classes of modification. The higher the class, the more major the modification. To establish what class is required of the TSDF, the owner/operator can typically look to Appendix I of §270.42 (Appendix I classifies the different types of permit modifications into either the Class 1, 2, or 3 permit modification categories). Special permit modification regulations for units at permitted facilities that become subject to regulation when a new hazardous waste listing is promulgated are established at §270.42(g).[32]

[32]Under this provision, the permittee must submit a Class I permit modification before the effective date, then submit a Class 2 or 3 permit modification within 180 days of the effective date. Until a final decision is made on the permit modification, the permittee must comply with Part 265 standards. In addition, land disposal units must certify compliance of the groundwater and financial responsibility requirements within one year of the effective date.

The requirements of each classification are summarized below:

Class I

The permittee must:

- Send a notification to the Director within seven days after the change. This notification must detail the changes that will be made and any modifications needed for the permit to account for new permit conditions.
- Send notice of the modifications to all persons on the facility mailing list and appropriate units of government (this list must be maintained under §124.10(c)).
- The Director must review the modification if a particular request is made.
- If a Class 1 modification is noted with an asterisk (*) in the regulations, the TSDF must request prior approval of the modification to the Director.

Class 2

- Submit a request for modification to the Director. This request must detail the changes that will be made and any modifications needed for the permit to account for new permit conditions.
- Submit notice of the modification to all persons on the facility mailing list and appropriate units of government. Also, publish this notice in a major local newspaper of general circulation. The notice must be sent or published within seven days before or after the request for modification is sent to the Director.
- Place the request and any supporting information in a location accessible to the public.
- Hold a public meeting no later than 15 days after publication of the notice.
- Provide 60 days to comment on the modification after publication of the notice. Comments should be submitted to an agency contact identified in the public notice.
- The Director has 90 days after receipt of the request for modification to either approve, deny the request, require a Class 3 modification, issue a temporary authorization, or notify the permittee of a 30 day extension to make the decision. If no decision is made within those time periods, the permittee is automatically authorized to conduct the activities in the modification for the life of the permit.

Class 3

The Class 3 permit modification has very similar requirements to a Class 2 modification. The permittee must comply with all the requirements of a Class 2, and in addition:

- After the 60 day comment period, the Director must initiate the permit issuance procedures of 40 CFR Part 124. These procedures include preparation of a draft permit modification, publication of a notice allowing a 45-day comment period, and holding a public hearing if requested.

- The Agency must consider and respond to all comments received by the Agency during the 60 day comment period.

- After the comment period, the Agency can approve or deny the draft permit.

Attachment A

ICF Presentation on Permitting Hazardous Waste Incinerators

THE RCRA PERMITTING PROCESS FOR HAZARDOUS WASTE INCINERATORS

Presented to members of the ICF capacity team

By Gary Light

February 23, 1990

AGENDA

- Permitting Existing Facilities
- Steps to Developing a New Hazardous Waste Incineration Unit
- Some Specific Cases
- Relevant Questions and Answers Regarding Permitting Requirements
- Summary of the Total Time Required to Develop a New Incinerator Facility

Permitting Existing Facilities

- Existing facilities on November 19, 1980 obtained interim operating status by submitting general facility information according to part A of the permit application. Requirements for interim status operation were less stringent than those for final permitted operation.

- Statutory deadline resulted in termination of interim status for incinerators on November 8, 1989 (270.73). As of this date, permitting decisions were made for all existing incinerators: final. permits were either issued or denied.

- Existing facilities who enter the regulated community in the future must submit part A of the permit application within six months of publication of regulations that first require them to comply with standards from Parts 265 of 266; or thirty days from the date they first become subject to standards set forth in Part 265 or 266; which ever comes first.

- As of January, 1990, final RCRA permits were approved for 14 commercial hazardous waste incinerators, and 107 private facilities, 37 permit requests were denied, and 17 incinerators were allowed to continue operation under interim approval.

Steps to Developing a New Incineration Unit

STEP 1: Preliminary Design and RCRA Permit Application Period (6 to 9 months)

- Firm conducts preliminary facility design.

- Firm prepares and submits parts A and B of RCRA permit application.

- Firm may acquire land and address zoning obstacles.

- Firm may also apply for required CAA Permit.

- Firm must submit complete permit application at least 180 days before physical construction is expected to begin.

Contents of The RCRA Permit Application

Application is divided into two parts. Part A (270.13) requests general facility information in a standard form. Part B (270.14) requests specific process information in narrative form.

Part B of the application must include:

a) Analysis of wastes/waste mixtures to be burned during trial burn.
b) Detailed engineering description of the system.
c) Detailed description of sampling and monitoring procedures.
d) Detailed test schedule for each trial-burn waste.
e) Detailed test protocol for each waste (operating parameters).
f) Description of emission control system and its operation.
g) Procedures to be followed in event of malfunction.
h) Other information at permitting agencies discretion.

STEP 2: Permit Application Review (6 to 12 months)

- Permitting agency may be either Regional EPA Administrator or Authorized State Program Director.
- Permitting Agency reviews permit application for completeness and technical soundness.
- Permitting agency initiates one to two month cycles of identifying permit application deficiencies, and requesting additional information from firm.
- As a result of the review process, permitting agency drafts either a permit or a notice of intent to deny permit.

Scope of The RCRA Incinerator Permit

Draft permit specifies operating conditions (e.g., waste constituent restrictions, waste feed rates, temperatures, combustion gas velocity as specified in 264345) for four periods of operation:

a) Pre-trial.
b) Trial burn.
c) Post trial.

d) Operating.

Draft permit also specifies 3 to 5 principal organic hazardous constituents (POHCs) for *which* destruction and removal efficiencies OREs) must be determined during the trial burn.

Permits may Unit physical form of waste feeds but usually not constituents (e.g., maximum containerized waste feed rates).

Occasionally annual processing capacity estimates specified in Part A are indirectly required by sweeping permit clause that limits operation to all parameters specified in permit.

Permit specifies *which* waste codes the facility may burn based on tested POHCs and the wastes specified in the application. In nearly all cases the applicant (and the permit if issued) specifies all conceivable waste codes.

RCRA Permits are effective for a maximum of 10 years, but some states issue permits with shorter effective periods.

STEP 3: Public Comment Period (1 to 2 months)

- If and when permitting agency deems application adequate, it issues draft permit and places notice in local newspaper; thus opening a comment period of at least 45 days (60 days for dioxins or dibenzofurans).
- A public hearing must be held if requested in writing; and in most cases a hearing is requested.

STEP 4: Comment Review Period (2 months)

- Permitting agency reviews comments received and if satisfied that operating requirements can be adequately met, issues final Permit.

STEP 5: Permit Appeals (1 to 7 or more years)

- Fifty to sixty percent of applicants appeal permit specifications.
- About 60% of permits appealed by objectors for zoning or other reasons.

- Appeals require about 1 year to be heard (Administrative Review).

- Judicial review can take several years. No appeal has ever been resolved without judicial review.

STEP 6: Detailed Design and Physical Construction (12 to 24 months)

- The time required to construct a facility is largely dependent on the size of the facility.

- Physical construction cannot begin until final permit is issued.

- In newly an cases, construction is delayed during permit appeals.

STEP 7: Shake-Down and Trial Burn (4 to 7 months)

- Initial test bums of clean fuel/sand.

- Permit allows up to 720 hours of operation on hazardous wastes to prepare for trial burn (may be extended one time for up to 72o hours).

- Facility conducts trial burn of hazardous wastes as specified in permit.

STEP 8: Trial Bum Data Collection and Analysis (2 to 3 months)

- Following trial bum, facility must determine:

  a) Quantities of POHCs, in waste feed.
  b) Levels of POHQ, 02, and HCI in exhaust gas.
  c) Levels of POHCs in ash and scrubber water.
  d) DRE for each POH~C (as specified in 264-343).
  e) HCl removal efficiency if HCl flow exceeds 1.8 kg/hr.
  f) Particulate emissions.
  g) Sources of fugitive emissions.
  h) Average, minimum, and maximum temperature.
  i) Average, minimum, and maximum combustion gas velocity.

j) Continuous levels of CO in exhaust during trial.
k) Other information requested by Director.

- Applicant must certify completion and compliance of trial bum within 90 days unless additional time requested.
- Applicant must certify and submit all data to the permitting agency.
- During this period, facility may be allowed to operate under post-trial conditions specified in permit.

STEP 9: Permit Modification (less than 1 month)

- If the unit meets the DRE requirement of 99.99% for POHCs ("four nines") the permitting agency modifies the permit to allow' full operation of the unit.
- Minor modification to permit reflect any changes in operating conditions (264345) as a result of the trial burn.
- Minor modifications are carried out according to 27OA2, and public notice is not required.

Some Specific Cases

- Over the last 10 years only 2 or 3 green-field incinerators have reached construction (e.g. Chemical Waste Management's Port Arthur, Texas, Facility).
- Chemical Waste Management's Port Arthur facility took 3 years from inception to construction.
- IT facility in Louisiana was one of the first permitted, but has been in litigation judicial Review) for 7 years and has nearly been abandoned.

General Questions and Answer

1. Do reuse as fuel facilities (i.e., industrial furnaces and boilers) require RCRA Permits?

   No, but RCRA requires a facility to provide EPA with specific hazardous fuel activity notification, and the facility must have an EPA Facility identification number. RCRA also imposes limitations on the duration of storage for hazardous wastes to be used as fuel, and

requires that cement Uns who burn hazardous waste as fuel within the boundary of a city of 500,000 or more to meet the more stringent requirements of hazardous waste incinerators.

2. Is the permitting process the same for new units at existing facilities?

   Yes, RCRA permits are issued in an identical manner to each individual incinerator unit.

3. Is the permitting process the same for captive incinerator facilities?

   Yes, the only difference might be specification of fewer POHCs if the captive facility will be burning a limited number of wastes.

4. What happens if the unit fails the initial trial burn?

   Trial bums may be repeated if initial tests are failed, but only if design or operation is modified in a manner that the permitting agency believes will allow incinerator to pass the test.

5. Does the RCRA permitting process evaluate facility siting?

   No, RCRA Permits do not address facility siting, but are issued for a specific location.

Summary of Total Time Required to Develop a New Incineration Facility

— Preparation and review of permit applications requires 12 to 21 months depending on the ability of the firm to prepare an adequate application and the speed of the permitting agency.

—The public review process requires 3 to 4 months and provides insight into the likelihood of appeals.

— Detailed design and construction require 12 to 24 months depending on the ability of the firm and the size of the facility.

—The shakedown, trial bum, and trial bum review requires between 7 and 11 months.

—Without appeals, the entire development process requires from just under 3 years to about 5 years.

— Appeals are common, and may add 1 to 7 years to the development process.

Attachment B

ORMET's Response to the Phase III LDR Proposed Rule: Construction Schedule

ORMET K088 RECYCLING FACILITY CONSTRUCTION SCHEDULE

Complete Vortec design and engineering	**July 1995**
Complete material handling equipment design and engineering	**November 1995**
Procure glassmaking and materials handling equipment	**March 1995 to July 1996**
Commence construction including site preparation	**April 1995**
Complete construction	**November 1996**
System check–out/start–up	**December 1996**

APPENDIX E
Schedule for Obtaining Required Operating and Construction Permits for Providing Alternative Capacity
(FMC Case-by case petition)

FMC CORPORATION

CASE-BY-CASE EXTENSION APPLICATION

FOR

FMC POCATELLO

Submitted July 12, 1999

Schedule for Obtaining Required Operating and Construction Permits or for Providing Alternative Capacity (40 C.F.R. Section 268.5(a)(5))

FMC Pocatello is subject to a RCRA Consent Decree that, among other requirements, establishes schedule milestones for designing and constructing the LDR Treatment Plant. ne schedules address several permit requirements. Design, construction, and operation of the LDR Treatment Plant may require that FMC Pocatello obtain certain additional permits (i.e., additional environmental regulatory permit requirements may attach to the project under other environmental statutes).

FMC has developed a detailed project schedule that is designed to assure compliance with the Consent Decree requirements for designing and building the LDR Treatment Plant. This project schedule anticipates all of the potentially applicable permit requirements and obligations. The key dates in the schedule are as follows:

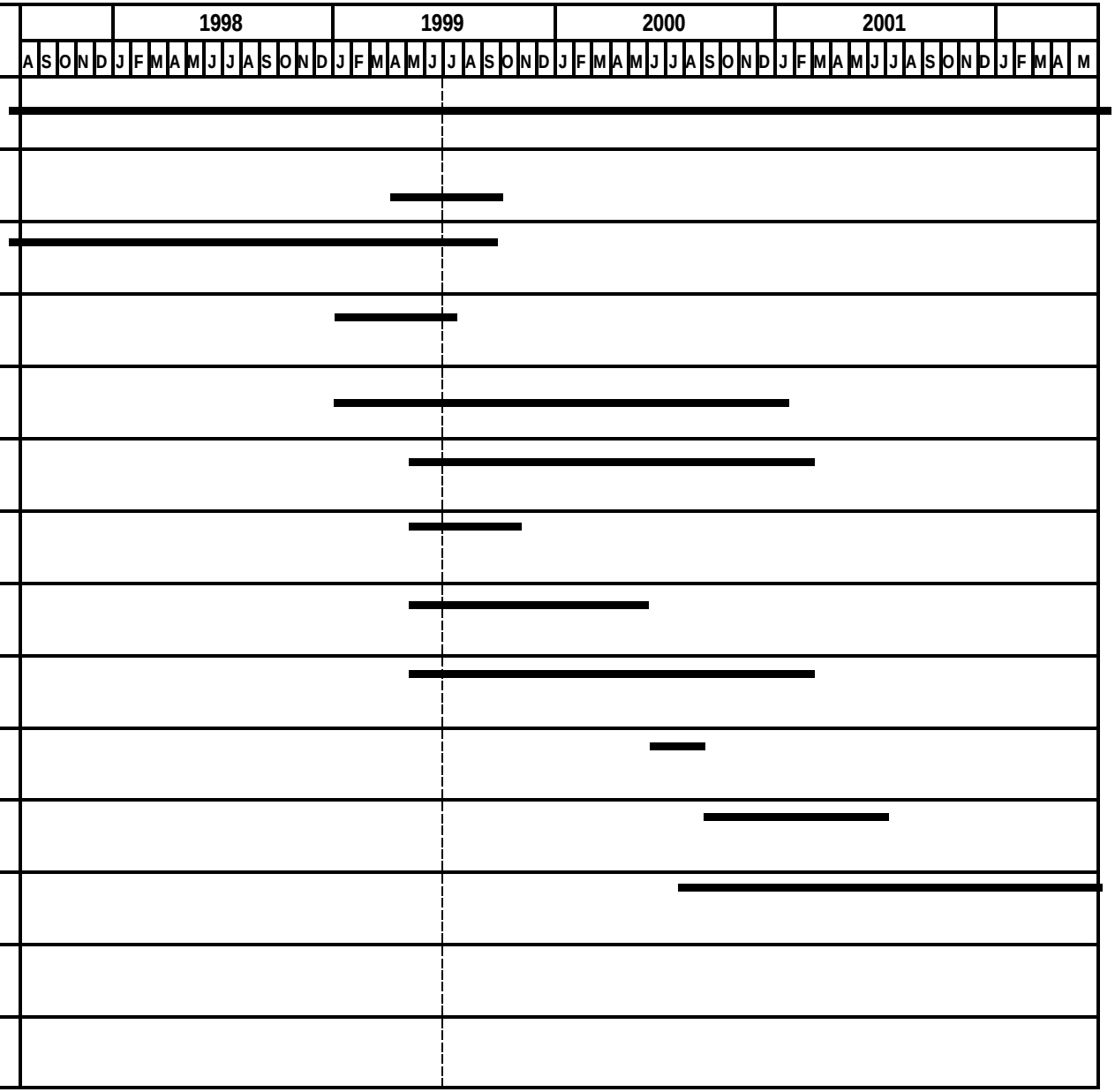
Milestone	Scheduled Performance and Deadline
Finalize Technology/Process Development	May 26, 1998 - September 1999
Design and Engineering	January 25, 1999 -January 11, 2001
RCRA Permitting Submittal Dates*	November 1, 1999 (Part A); March 3 1, 2000 (Interim. Status Plans); March 3 1, 2001 (Part B)
Equipment Procurement	June 1, 2000 - July 17, 2001
Physical On-Site Construction	July 1, 2000 -April 30, 2002
Begin Startup*	May 1, 2002
Begin Normal Operation	May 26, 2002

* - Dates specified by RCRA Consent Decree.

Other significant steps in the completion of the LDR Treatment Plant include: preliminary engineering, technology and process development; pilot testing; design work (concrete,

LDR Treatment Plant Project Schedule
Major Milestones
FMC Corporation, FMC Pocatello

TASK #	END DATE	START DATE	TASK
1	5/26/02	8/4/97	LDR Plant Project Duration
2	10/01/99	4/30/99	Preliminary Engineering
3	10/01/99	8/4/97	Technology and Process Development
4	7/15/99	1/25/99	Pilot Testing
5	1/11/01	1/25/99	Design Work (concrete, structural, electrical, P&ID)
6	3/31/01	5/1/99	RCRA Permitting
7	11/01/99	5/1/99	Part A initial
8	3/31/00	5/1/99	I/S Plans
9	3/31/01	5/1/99	Part B
10	9/01/00	6/01/00	Procure Equipment
11	7/17/01	9/15/00	Deliver Equipment
12	4/30/02	7/01/00	Construction
13	5/01/02	5/01/02	Startup
14	5/25/02	5/01/02	Process Shakedown



APPENDIX F
Memoranda from Sylvia Lowrance
the former Director, Office of Solid Waste
on K088 Listing Scope

Faxback 11462

9441.1989(47)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

AUG 25 1989

Mr. Jack H. Goldman
Manager, Environmental Services
The Aluminum Association, Inc.
900 19th Street, Northwest
Washington, DC 20006

Dear Mr. Goldman:

This is in response to your letter of August 4, 1989 concerning your request that the Agency: (1) adopt
your November 9, 1988 proposed exclusion for spent potliner in place of the Agency's definition in the March 3, 1989 letter to Kaiser Aluminum; and (2) adopt the characteristic test per your November 1988 petition for those portions of spent potliner that are not excluded from Subtitle C regulation by your
proposal.

In your letter you state that you partially agree with the Agency's March 3, 1989 letter to Kaiser in which EPA determined that only the carbon portion of the material contained inside the electrolytic reduction cell constituted the "potliner" and identified by Kaiser Aluminum as contained in the "pot" (i.e., the cell's steel shell, steel collector bars, cast iron used to place steel collectors bars in pre-baked carbon blocks, thermal insulation composed of insulating brick or alumina, the silicon carbide brick side walls and end walls of the pot, and frozen
aluminum metal pad and electrolytic bath). However, you indicated that by excluding the insulation from the scope of the potliner listing, this material would "thereby not be regulated as a hazardous waste under Subtitle C of RCRA". It appears that you have misinterpreted the March 3, 1989 letter to Kaiser
Aluminum.

The purpose of the March 3, 1989 letter was to clarify the scope of the K088 listing only and provided no interpretation regarding the regulatory status of these other materials under Subtitle C. In fact, these wastes would be considered hazardous if they exhibit any of the characteristics of hazardous wastes as defined in 40 CFR 261. Specifically, the Agency's clarification of the K088 listing would not exclude portions of the pot containing "significant levels of free cyanide" since such waste would be expected to exhibit the characteristic for reactivity.

Your request for adoption of the Association's proposed exclusion under 261.4 and a characteristic test for materials not covered by the exclusion was made in your comments to the September 13, 1988 final rule to list six smelting wastes as hazardous. This request will be

addressed in the near future in a Federal Register notice in which we will respond to all of the issues raised in petitions submitted on the smelting waste listing rule. To address these issues, however, the Agency must propose to grant or deny the petitions and take public comment on our proposed response before a final action can be taken.

I hope this letter has clarified our earlier determination on the scope of K088 and the status of materials not covered by the listing. Should you have any additional questions, please feel free to call Denise Wright at 245-3519.

Sincerely,

/signature/

Sylvia K. Lowrance
Director
Office of Solid Waste

FaxBack # 11400

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

MARCH 3, 1989

Jack Goldman, Ph.D.
Manager, Environmental Services
The Aluminum Association
900 19th Street, Northwest
Washington, D.C. 20006

Dear Mr. Goldman:

This in response to your letter of January 19, 1989, concerning the recent listing of spent potliners from primary aluminum reduction (K088). In your letter, you requested a response to your petition of November 19, 1988. The Agency is currently evaluating all comments and petitions received on the six smelting wastes which were listed as hazardous on September 13, 1988 (53 FR 35412). As soon as we complete this evaluation, we will provide you and the other petitioners with our response.

One issue raised in your petition and recent letter concerned the applicability of the land disposal restrictions to newly listed wastes. Under Section 3004(g)(4) of RCRA, EPA must determine whether hazardous wastes identified or listed after the date of enactment of HSWA shall be prohibited from one or more methods of land disposal, and establish treatment standards at the same time. The statute requires the Agency to make this determination within six months after the date of such identification or listing. If EPA fails to meet the six month deadline, there are no immediate land disposal restrictions (i.e., no hammer). The land disposal of spent potliners (K088) can therefore continue until such time as treatment standards (i.e., BDAT) are established. The Agency is in the process of developing a priority scheme for setting land disposal restriction standards for newly listed wastes.

Although land disposal of spent potliners may continue beyond the effective date of the listing, the Agency encourages the continued practice of beneficial reuse and recycling of spent potliners. In your letter you alleged that the listing of potliners will discourage reuse and recycling. We have found that when the Agency lists wastes as hazardous, recycling/reuse has often increased.

You also requested a response to your October 21, 1988, letter concerning the storage of spent potliner in secure buildings under interim status. A separate letter addressing this issue has been prepared and was sent to you on February 7, 1989.

As you may know, the Agency met with one of your association's members, Kaiser Aluminum, on February 14, 1989 to discuss some of their concerns. In that meeting we agreed to send Kaiser Aluminum a letter clarifying the scope of the K088 listing. The Agency basically agreed with Kaiser Aluminum's interpretation that the K088 spent potliner listing only includes the carbon

portion of the material contained inside the electrolytic reduction cell. Other materials contained in the "pot" are not considered "spent potliner" such as:

(1) the cell's steel shell
(2) steel collector bars
(3) cast iron used to place steel collector bars in pre-baked carbon blocks
(4) thermal insulation composed of insulating brick or aluminum
(5) the silicon carbide brick side walls and end walls of a pot
(6) frozen aluminum metal pad and electrolytic bath

Kaiser Aluminum also provided a proposed definition for "spent" as it applies to potliners. We currently have a regulatory definition for "spent materials" in 40 CFR 261.l(c)(l). A spent material is defined as ". . any material that has been used and as a result of contamination can no longer serve the purpose which it was produced without processing."

I hope this letter has answered your questions. The Agency is working to address the additional concerns raised in your petition as soon as possible.

Sincerely,

/signature/

Sylvia K. Lowrance
Director
Office of Solid Waste

The Aluminum Association Incorporated
900 19th St., N.W. Phone (202) 862-5100
Washington. D.C. 20006 Telex 710 822-1129
FAX (202) 862-5164
Writer's Direct Dial No: (202) 862-5129

January 19, 1989

Ms. Sylvia Lowrance
Director
Office of Solid Waste
U.S. EPA (WH-562)
401 M Street, SW
Washington, D.C. 20460

Dear Ms. Lowrance:

On September 13, 1988, the U.S. EPA listed spent potliner from primary aluminum operations as a hazardous waste. 53 Fed. Reg. 35412. In response to the notice, the Aluminum Association has submitted a petition to the Agency, dated November 9, 1988, requesting that 1) a characteristic test for spent potliner, based on free cyanide content, be established, 2) spent potliner that is reclaimed or reused not be subject to Subtitle C regulations, and 3) an administrative stay of the effective date be granted pending the completion of the Agency's review of the issues.

In footnote 8 of page 24 of the November 9, 1988 submission, we pointed out an error by the Agency and requested a correction. The Agency stated that Section 3004 (g) (4) of RCRA mandates a land disposal ban for spent potliner unless EPA develops pretreatment standards within six months of the listing. 53 Fed. Reg. 35416 col. 3. We wish to point out that for wastes listed as hazardous after the date of passage of the 1984 amendments to RCRA (November 8, 1984), Section 3004(g)(4) of RCRA states only that the Administrator shall determine, within six months of listing, whether wastes listed shall be prohibited from one or more methods of land disposal. There is no automatic prohibition of land disposal if the Agency takes no action, as is mandated by the Act in Section 3004 (g) (6) for wastes listed on or before November 8, 1984.

The Agency's language in the Preamble to the September 13 rule thus creates the impression that spent potliner cannot be land disposed after March 13, 1989. With no apparent activity by the Agency to address spent potliner pursuant to RCRA Section 3004 (g) (4), the misstatement creates problems for the industry, which is being forced to abandon reuse and reclamation, and instead increasingly rely on land disposal for managing the waste. We have discussed the disincentives to recycling posed by the imminent listing on pages 17-18 of the November 9, 1988 petition.

Many land disposal facilities believe that they will be unable to accept spent potliner after March 13, 1989.

We therefore request that the EPA issue a notice in the Federal Register before March 13, 1989 correcting the mistake in the preamble to the September 13, 1988 rule. If a notice cannot be published in time, we request a timely letter from the Agency that accurately states the chain of events mandated by the statute.

It should also be pointed out that, with the March 13, 1989 deadline approaching, we are yet to receive responses to our letter to you of October 21, 1988, which asked the Agency for assistance in allowing storage of spent potliner in secure buildings under interim status, or our petition of November 9, 1988. We would be happy to meet with you to further discuss this and the other two submissions. Thank you very much for your attention to this matter.

Sincerely yours,

/signature/

Jack H. Goldman, Ph.D.
Manager, Environmental Services