EPA/ESD/R10-94/090
1994

EPA Superfund
Explanation of Significant Differences:

MARTIN-MARIETTA ALUMINUM CO.
EPA ID: ORD052221025
OU 01
THE DALLES, OR
09/28/1994

EXPLANATION OF SIGNIFICANT DIFFERENCES

FOR

MARTIN MARIETTA SUPERFUND SITE

THE DALLES, OREGON

SEPTEMBER 1994

1.0 INTRODUCTION

1.1 SITE NAME AND LOCATION

Martin Marietta Aluminum Reduction Facility
The Dalles, Oregon

1.2 LEAD AND SUPPORT AGENCIES

U.S. Environmental Protection Agency (EPA)
Oregon Department of Environmental Quality (ODEQ)

1.3 APPLICABLE STATUTES REQUIRING AN EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 117 (c), 42 U.S.C. § 9617 (c), as amended by the 1986 Superfund Amendments Reauthorization Act, and National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. § 300.435 (c) (2) (i).

1.4 NEED AND PURPOSE FOR AN ESD

On September 29, 1988, EPA, with ODEQ concurrence, signed the Record of Decision (ROD) for remedial action at the Martin Marietta Superfund site ("Site"), located in The Dalles, Oregon. The significant circumstances that warrarnt the need for this ESD are largely a result of several changes that occurred during the construction phase of the remedial action.

1.4.1 MODIFICATIONS TO REMEDIAL ACTIONS ANTICIPATED IN THE ROD

The ROD identified consolidation of cathode wastes from the facility into a landfill and on-Site treatment for cyanide and fluoride of the leachate generated from the landfill. The ROD anticipated a gradual reduction in the volume of leachate generated from the landfill from an average of 10 gallons per minute to a negligible flow within five years. However, since the signing of the ROD, the leachate flow rate has not decreased significantly, potentially due to leakage of perched water into the landfill through bedrock fractures beneath the landfill.

The ROD also required treatment of contaminated groundwater in an area known as the Unloading Area. Additional groundwater information has been collected since the ROD, which raises questions regarding the necessity for treatment of groundwater in the Unloading Area.

1.4.2 ADDITIONAL REMEDIAL ACTIONS NOT ANTICIPATED IN THE ROD

During the remedial action activities, three units of operation were taken out of service: (1) the Lined Pond, (2) the Discharge Channel, and (3) the Recycle Pond. Remedial actions for these units were not included in the ROD or the Scope of Work (SOW), which was attached to the Consent

Decree, because they were active components of the Martin Marietta Aluminum Reduction facility at the time the ROD was signed. However, the Feasibility Study (FS) did discuss remedial actions for these areas, when and if these units were temporarily or permanently taken out of operation.

Based upon the information obtained since the ROD, a number of changes warrant an ESD but do not fundamentally alter the basic features of the remedy selected for the Site. The following narrative will present the changes and describe the differences in relation to the ROD.

1.5 ADMINISTRATIVE RECORD

The ESD will become part of the Administrative Record for the Martin Marietta Superfund site. The Administrative Record is available at the following two locations:

U.S. Environmental Protection Agency
1200 Sixth Avenue
7th Floor Superfund Records Center
Seattle, Washington 98101

The Dalles/Wasco County Library
722 Court Street
The Dalles, Oregon 97058

In addition, an information repository is maintained at:

Oregon Department of Environmental Quality
811 SW Sixth Avenue
Portland, Oregon 97204-1390

2.0 SITE BACKGROUND

2.1 SUMMARY OF SITE HISTORY AND CONTAMINATION PROBLEMS

The Martin Marietta Reduction Facility (MMRF) Superfund site (Site) is located in The Dalles, Oregon, Wasco County, just west of the Columbia River and east of the Union Pacific Railroad tracks, as shown in Figure 1. Operations were begun at the Site by Harvey Aluminum, Inc. in 1958. Harvey Aluminum, Inc. became a wholly owned subsidiary of Martin Marietta Corporation (MMC) in 1970. The MMRF continued operations until 1984, when the plant was shut down. In September of 1986, MMC leased a portion of the MMRF to Northwest Aluminum Company (NWA), which resumed primary aluminum operations in late 1986. In October 1991, MMC sold the portion of the MMRF not affected by EPA's deed restrictions to NWA. The NWA plant still produces aluminum by electrolytic reduction of alumina.

During facility operation, waste constituents were stored, treated and disposed of at the MMRF. Hazardous substances generated by the MMRF included fluoride, sodium, sulfate, cyanide, and polynuclear aromatic hydrocarbons (PAHs). The waste included spent potliner (cathode waste) from the alumina reduction cells. The cathode wastes contain cyanide compounds which form during the reduction process. Fluoride compounds were also present in the waste generated from the alumina reduction process.

A landfill located in the northern portion of the MMRF was used to dispose of, primarily construction debris from the plant (Figure 2). Other materials disposed of in this landfill included asbestos insulation, coke, pitch, and cathode waste. In 1980 MMC installed a surface water drainage ditch and a leachate collection ditch and sump to try and control runoff and

leachate from this landfill. After the signing of the ROD, this landfill was known as the "CERCLA Landfill" or "Landfill".

In the spring of 1983, the presence of cyanide compounds was detected in the ground water. EPA ranked the MMRF for inclusion on the National Priorities List (NPL). The MMRF was proposed for inclusion on the NPL in October 1984. In 1987 the Site was formally listed on the NPL

In September 1985 MMC and EPA entered into a Consent Order to conduct a remedial investigation/feasibility study (RI/FS) for the Site. Twenty-three areas were initially designated as potential contaminant source areas at the MMRF. The RI/FS conduded that thirteen source areas and a portion of the shallow ground-water bearing zone had contaminant concentrations that exceeded federal or state applicable relevant and appropriate requirements (ARARs) or acceptable lifetime non-cancer or cancer risk levels.

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On September 29, 1988, EPA signed a Record of Decision (ROD) that addressed the potential sources of contamination as identified in the RI/FS. Remedial action objectives for the MMRF included both source control and ground-water management for the protection of human health and the environment. Specific objectives for source control at the Site included:

- Minimization of the migration of contaminants from the source areas to the ground-water system, surface water, or soils;
- Protection of human health and the environment from potential adverse effects caused by direct contact with contaminants; and
- Protection of human health and the environment from potential adverse effects due to exposure to airborne contaminants.

2.2 SUMMARY OF THE REMEDIAL ALTERNATIVE SELECTED IN THE ROD:

The ROD addressed source control of the on-Site contamination through excavation and consolidation of contaminated soils into two former scrubber sludge pond areas and into the existing Landfill.

The remedial activities required by the ROD included the following:

- Consolidate the residual cathode waste material and underlying fill material from the former Cathode Waste Management Areas into the existing Landfill;
- Consolidate the cathode waste material from the Unloading Area into the existing Landfill;
- Cap the existing Landfill in place with a multi-media cap meeting Resource Conservation and Recovery Act (RCRA) performance criteria;
- Place a soil cover over the Scrubber Sludge Ponds 2 and 3;
- Plug and abandon nearby production wells and connect users to the City of The Dalles water supply system;
- Collect and treat leachate generated from the Landfill, and perched water from

east of River Road and from the former Cathode Waste Management Areas;

- Recover and treat contaminated groundwater from the Unloading Area;

- Prepare ground-water quality monitoring and contingency plans to perform additional recovery of ground water in the event that further contamination is detected above ARARs or health-based standards; and

- Implement institutional controls, including deed restrictions and fencing, to assure that the remedial action will protect human health and the environment during and after implementation.

- Indicates remedial action was not fully implemented.

3.0 DESCRIPTION AND EXPLANATION OF SIGNIFICANT DIFFERENCES

3.1 MODIFICATIONS TO LEACHATE COLLECTION SYSTEM

The Landfill Leachate Collection System (LCS) was constructed by MMC in the summer and fall of 1990. Leachate collection commenced in December 1990. The ROD anticipated that leachate from the Landfill would gradually decrease to negligible levels within 5 years after construction of the Landfill due to the dry climate at the site. Construction of the Landfill cap was completed by MMC in April 1991. The initial leachate volume decreased after cap completion from approximately 1,750 gallons per day down to 570 gallons per day by late fall 1991. However, with the onset of wet weather, leachate levels began to rise again, to as much as 3,100 gallons per day. The source of the increased leachate flow was believed to be perched ground water infiltrating through fractured basalt bedrock from south of the Landfill into the LCS. The presence of ponded water on the Landfill surface in the southwestern portion of the Landfill appeared to offer a contnual source for recharge. Fluoride concentrations of the leachate ranged from 1,490 - 2,440 parts per million (ppm) prior to completion of construction of the Landfill cap. Free cyanide concentrations ranged between 0.01 - 4.7 ppm, and total cyanide concentrations ranged between 0.11 - 31.0 ppm. Current post-Landfill cap concentrations have decreased to dry season averages of 22.7 ppm fluoride, 0.60 ppm free cyanide, and 15.7 total cyanide. Concentrations of fluoride, free cyanide, and total cyanide during the wet season are more dilute. This indicates that surface water infiltration to the LCS through the cap is unlikely, and that the cap is functional.

Based on the conclusion that the perched and ponded waters were the driving force behind the infiltration to the LCS, several activities were undertaken by MMC from the fall of 1992 through 1993, in response to the increased leachate flow. In October 1992 a dewatering trench was constructed to prevent perched water from flowing into the LCS while an underground pipe was installed to lower and divert ponded surface water around the Landfill. In addition, the surface-water drainage system was modified to increase drainage. Despite these initial modifications to the Landfill, infiltration of precipitation to the LCS continued to be a problem.

In March 1993 MMC conducted a dye tracer study to investigate potential pathways and sources of the infiltration. The two pathways studied were surface water runoff above the LCS percolating through the soils and entering the LCS through fractures in the basalt and perched water flow in the vicinity of the LCS infiltrating via basalt fractures.

Based on the findings of the dye tracer study and a review of the Landfill construction diagrams, MMC determined that the modified surface water drainage system intersected a basalt ridge in the southern portion of the Landfill. The backfill material in this area was sand. In

the summer of 1993, MMC replaced the sand backfill with concrete, and expanded the surface water drainage system to include a new surface water drainage ditch parallel to and upslope of the dewatering trench. This ditch collects surface water runoff from the south and diverts it into the existing surface water drainage pipe. In addition, the existing surface water ditch liner was extended to prevent infiltration of surface water from the ditch.

The above modifications to the Landfill surface water drainage system still had minimal impact on the quantity of leachate generated by the Landfill. However, cyanide and fluoride concentrations in the leachate have decreased since construction of the Landfill, and ground-water quality in the vicinity of the Landfill has not been impacted. The results of the dye-tracer studies and the leachate and ground-water quality studies have all indicated that the source of the additional water is not a failed landfill cap. Although leachate and ground-water quality have not been negatively impacted, it is now expected that the volume of leachate will not decline to negligible levels by April 1996, as per the ROD. Therefore, EPA has determined that an upgrade of the current leachate treatment system is necessary to accommodate the excess leachate volume caused by the infiltration of water into the Landfill.

3.1.1 LEACHATE TREATMENT VIA CYANIDE DESTRUCT SYSTEM

The ROD specified that the treatment system would include a chemical oxidation unit for destruction of cyanide followed by a chemical precipitation unit to remove fluoride to an approximate concentration of 9.7 milligrams per liter (mg/l). The 9.7 mg/L fluoride concentration is the altemate concentration limit (ACL) for ground water established pursuant to the ROD. While the ROD did not specify a performance standard for the treatment of cyanide, the ROD did specify that the treated leachate must meet the standards established pursuant to existing NPDES requirements prior to discharge of the treated leachate to surface water. Therefore, the performance standard for the treatment of free cyanide was established at 0.1 mg/l when an NPDES permit was issued in 1989.

During the remedial design stage, MMC determined that treatment and destruction of cyanide via chemical oxidation would not meet the "free" cyanide performance standard of 0.1 mg/l. Based upon bench-scale treatability studies, MMC proposed and EPA concurred that destruction of cyanide by heating the cyanide and water in a controlled reaction vessel to form an acid and base ("hydrolysis") would be the most technically feasible means of achieving the established performance standard. EPA believes that this type of treatment system represents a process modification for cyanide destruction and does not constitute a fundamental change in technology. The hydrolysis treatment system, which is called the Cyanide Destruct System (CDS), was constructed by MMC during Phase I remedial action construction activities in 1989. Start-up and performance evaluation of the CDS was conducted during Phase II construction activities in 1990. Currently, the CDS is treating leachate at a nominal rate of 2 gallons per minute (gpm) and is meeting the 0.1 mg/l performance criteria. Due to the increase in tne volume of leachate caused by infiltration of surface water into the Landfill, EPA determined that the capacity of the CDS should be increased. Therefore, the CDS will be upgraded to increase the capacity to 10 gpm. EPA anticipates that a new CDS unit will be designed and installed by the end of 1994. The cost of the new unit has been estimated by MMC to be $153,000. The performance standard for the upgraded CDS will remain at 0.1 mg/l "free" cyanide.

3.2 GROUNDWATER TREATMENT IN THE UNLOADING AREA

Recovery and treatment of groundwater in the Unloading Area was an element of the selected remedy. The groundwater in this area contained elevated concentrations of fluoride above the 9.7 mg/L ACL which was established for the Site by the ROD. The ROD called for one recovery well to be drilled in the area of existing monitoring well 5S (MW-5S).

As part of the actual remediation, contaminated soil in the Unloading Area was removed. The purpose of tne removal in the unloading area was to remove a potential source to ground-water contamination, which was the potlining material known to have been placed in the area. The soil and potlining material were removed down to the basalt bedrock. Approximately 2,000 cubic yards of potlining material and affected soil were removed and transported to the on-Site Landfill. Upon completion of the removal, verification sampling was conducted for fluoride along the exposed excavation faces, and the area was backfilled to the existing grade.

Based upon removal of the potential source material, it was anticipated that the concentrations in the ground-water at MW-5S would decrease over time. The sample results from MW-5S have varied seasonally and were statistically analyzed in September 1992 to determine if ground-water treatment was still necessary in the Unloading Area. As shown in Table 1, sampling analyses of MW-5S indicate that groundwater recovery and treatment is not currently necessary at the Unloading Area because the fluoride concentrations have statistically been at or near the ACL. Based on the evaluation of results in Table 1, EPA believes that active recovery and treatment is no longer required in this area. However, the need for future recovery and treatment in the Unloading Area will be analyzed by EPA during the mandatory 5-year review of the selected remedy. This analysis will incorporate an historical and statistical evaluation of chemical concentrations in well MW-5S. EPA anticipates that this evaluation of well MW-5 and the mandatory 5-year review of the selected remedy will occur in September 1995.

3.3 REMEDIATION OF FORMER OPERATING UNITS

Remediation of the Lined Pond, Recycle Pond, and Discharge Channel was not required in the ROD because these units were part of the operating facility when the ROD was signed. However, these areas were investigated as part of the RI/FS. The location of these units is shown in Figure 2. Analysis of soil and sediment samples collected from these operating units during the RI indicated the presence of elevated amounts of fluoride and polyaromatic hydrocarbons (PAHs). The RI/FS concluded that under existing conditions, the operating units would not pose an unacceptable risk to human health and the environment. Nonetneless, the FS evaluated remedial alternatives for these areas when and if the units were taken out of operation.

TABLE 1

SUMMARY OF FLUORIDE CONCENTRATIONS FOR WELL MW-5S

SAMPLING DATE	FLUORIDE CONCENTRATION (mg/L)
Sep-1991	19.0
Dec-1991	10.0
Mar-1992	14.8
Jun-1992	12.0
Aug-1992	10.1
Sep-1992	11.0
Nov-1992	7.9*
Nov-1992	7.7*
Feb-1993	13.0
Mar-1993	7.4
May-1993	15.0
Aug-1993	9.7
Dec-1993	7.4
Mar-1994	9.0

mg/L = milligram per liter

*Duplicate samples were analyzed on this sampling date

In 1989 the Lined Pond was taken out of service by NWA. In 1991, upon completion of this element of the remedial action, the Discharge Channel and the Recycle Pond, which is now called the Storm Water Surge Pond, were returned to use as part of NWA's modified wastewater treatment system. Consistent with tne remedial alternatives evaluated by MMC in the FS, the following remedial actions were conducted by MMC on the three former operating units since the signing of the ROD:

3.3.1 LINED POND

In 1980 the Lined Pond (Pond) was constructed to supplement tne capacity of the scrubber sludge ponds. The Pond was lined with a 45 mil Hypalon fabric. The capacity of the Pond was 542,944 cubic feet. The Pond was used through 1984 when MMC temporarily closed the plant. The Pond was reactivated in 1986 as part of NWA's treatment operations.

The Lined Pond was taken out of service in 1989. As part of Phase I activities, under the Remedial Design/Remedial Action (RD/RA) Work Plan, the Lined Pond was remediated in the fall of 1989. The remediation included removal of approximately 5,300 cubic yards of sludge and placement of the sludge into the Landfill. The Hypalon liner was also trimmed and removed for consolidation into the Landfill.

Verification sampling of soils beneath the Lined Pond was conducted to determine If contamination had leaked into the underlying soil. The verification sampling indicated that the remaining chemical concentrations were below the concentrations established in the ROD and the RD/RA Statement of Work. Regrading of the Lined Pond area was completed on February 1, 1990.

3.3.2 DISCHARGE CHANNEL AND RECYCLE POND

When the plant was built in 1958, the Discharge Channel was constructed as a means to discharge water generated during plant operations. The Discharge Channel was located in the east-central portion of the Site. Waters which entered the Discharge Channel included rectifier cooling waters, roof scrubber waters, storm runoff, landfill leachate, sewage treatment plant outfall, castehouse cooling waters, alumina unloading compressor cooling water, and cathode pad leachate discharge.

The Discharge Channel was an open ditch that ran from the sewage treatment plant to the Recycle Pond.

In 1974 the Recycle Pond was constructed to be used as a settling basin for the solids from the secondary scrubber waters and to provide the capability to recycle water back to the plant for reuse. The Recycle Pond was not lined. The only flow to the Recycle Pond was from the plant through the Discharge Channel. The Recycle Pond was located between River Road and Columbia River in the southeast portion of the Site. The pond occupied approximately three acres and had a capacity of 8 million gallons. It contained approximately 16,000 cubic yards of saturated sediments.

The FS evaluated certain remedial actions to be taken should operation of the Recycle Pond and the Discharge Channel no longer be required by the facility. In 1990, NWA modified their wastewater treatment system and removed the Recycle Pond and Discharge Channel from their original wastewater treatment functions.

In the fall of 1991, the Recycle Pond and the Discharge Channel were remediated by MMC as part of the RD/RA Phase II activities.

The remediation of the Discharge Channel and Recycle Pond included the following:

- flushing of sediments in the upper portion of the Discharge Channel to the Recycle Pond;
- removal of surface waters by discharging to the Columbia River under the existing National Pollutant Discharge Elimination System (NPDES) permit criteria;
- dewatering of the sludge within the Recycle Pond followed by excavation of the sludge from the Recycle Pond and lower portion of the Discharge Channel; and
- consolidation of the sludge in the northern portion of Scrubber Sludge Pond Number 3 (SSP3).

Approximately 28,000 cubic yards of sludge were excavated and consolidated. A 6-inch layer of crushed rock was placed over the exposed areas of the Recycle Pond and Discharge Channel. The Recycle Pond has continued in use as part of the process wastewater treatment system for the NWA plant. The Recycle Pond has been renamed the Storm Water Surge Pond and now serves as a surge basin for storm water run-off. Storm water run-off collected in the Discharge Channel is diverted during periods of heavy rainfall from NWA's NPDES outfall to the Stomm Water Surge Pond where it is metered back to the NPDES outfall to avoid exceeding NPDES discharge limits. A 2-foot thick soil cover was placed over SSP3. The SSP3 cover was then graded and compacted after which it was tilled and seeded.

4.0 SUPPORT AGENCY COMMENTS

ODEQ has been informed of these significant changes to the ROD and concurs with this ESD.

5.0 AFFIRMATION OF STATUTORY DETERMINATION

Under CERCLA, EPA's primary responsibility is to ensure remedial actions are undertaken which protect human health, welfare, and the environment. In addition, Section 121 of CERCLA, 42 U.S.C. §9621, establishes cleanup standards which require that the selected remedial action complies with all applicable or relevant and appropriate standards established under federal and state environmental law, unless such requirements are waived by EPA in accordance with established criteria. The selected remedy must also be cost-effective and must utilize permanent solutions, alternative treatment technologies, or resource recovery technologies to the maximum extent practicable. Finally, CERCLA regulations include a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous waste.

Considering the new information developed during the remedial action and the resulting changes made to the selected remedy, EPA and ODEQ believe that the remedy remains protective of human health and the environment. Principal sources of contamination such as the contaminated soil and sediment in the Recycle Pond, Lined Pond, Discharge Channel, and Unloading Area have been reduced or eliminated.

Treatment of landfill leachate complies with the CERCLA requirement for cleanup remedies that employ treatment which permanently reduce the volume, toxicity, or mobility of hazardous waste. The revised remedy remains cost effective in that the need for pump and treat in the Unloading Area is not currently necessary. Costs associated with the upgrading of the CDS are estimated to be less than $200,000.

The revised remedy complies with the NCP and other federal and state requirements that are applicable or relevant and appropriate to this remedial action. The requirements include RCRA and the NPDES regulations under the Clean Water Act.

6.0 PUBLIC PARTICIPATION ACTIVITIES

This ESD, supporting information, and EPA's response to any comments from the public will become a part of the Administrative Record for the site. EPA invites the public to view the Administrative Record at the information repositories listed in Section 1.5. For additional information regarding this ESD, please contact the Superfund Site Manager for the Martin Marietta Reduction Facility site:

Howard Orlean
1200 Sixth Avenue, HW-113
Seattle, Washington 98101
(206) 553-6903

_____ _____
Howard Orlean, Superfund Site Manager Date

Approved by:

_____ _____
Carol Rushin, Chief, Superfund Remedial Branch Date

Oregon
DEPARTMENT OF
ENVIRONMENTAL
QUALITY

September 22, 1994

Catherine Krueger
Environmental Protection Agency
Region 10
1200 SW Sixth Avenue
Seattle, Washington 98101

Re: Martin Marietta Reduction Facility
Draft Final ESD Concurrence

Dear Catherine:

My staff has reviewed the Draft Fina1 Explanation of Significant Differences for Martin Marietta Superfund Site, The Dalles, Oregon, which Howard Orlean submitted to DEQ for review on August 23, 1994. Our comments that we had on the previous version of the draft ESD have been addressed. We have no additional comments on this document.

The DEQ concurs with the Draft Final Explanation of Significant Differences.

Please let me know if we can be of further assistance on this matter.

Sincerely,

Thomas Miller
Manager, Site Response Section
Waste Management and Cleanup Division

cc: Howard Orlean, EPA
Jill Kiernan, DEQ

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