UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON

RECORD OF DECISION, DECISION SUMMARY AND RESPONSIVENESS SUMMARY

FOR

FINAL REMEDIAL ACTION
MARTIN MARIETTA SITE
THE DALLES, OREGON
SEPTEMBER, 1988

RECORD OF DECISION

[redacted]

Site

Martin Marietta site - The Dalles, Oregon.

Purpose

This decision document presents the selected remedial action for the site, developed in accordance with the Comprehensive Environmental

[redacted]

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION
REMEDIAL ACTION
MARTIN MARIETTA SITE
THE DALLES, OREGON

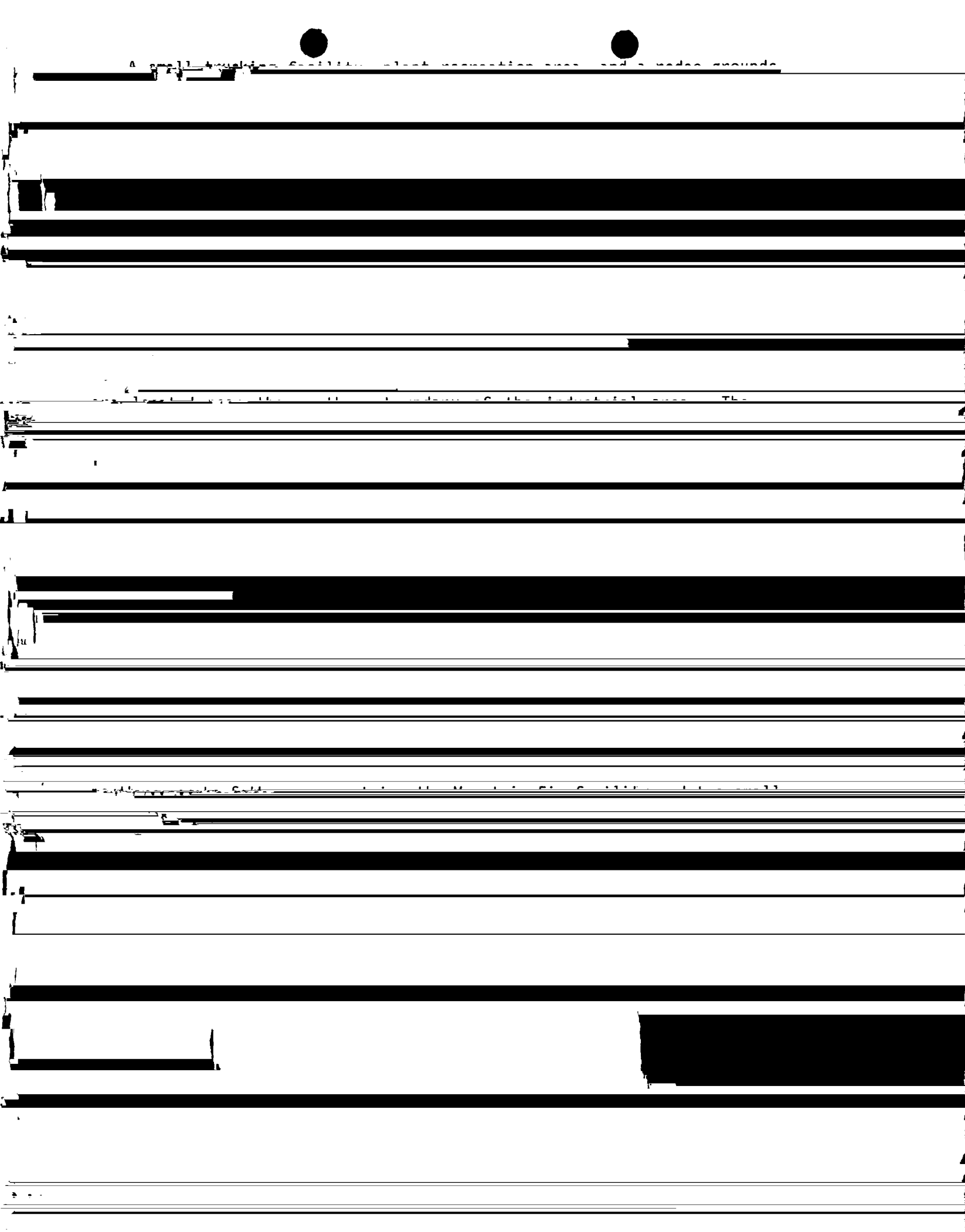
I. SITE DESCRIPTION AND BACKGROUND

The Martin Marietta Reduction Facility (MMRF) site is located in The Dalles, Wasco County, Oregon, west of the Columbia River and east of the Union Pacific Railroad line. The site occupies approximately 350 acres within an 800-acre area zoned for heavy industry and manufacturing. The area of the site used for industrial purposes encompasses approximately 110 acres in sections 21,28,33 and parts of sections 20 and 29 in T.2N, R.13E., Willamette Meridian. The MMRF is bounded near the Mountain Fir wood hauling and chip mill on the north, Webber Street to the south, the Second Street to the west.

Land-surface elevations at the MMRF range from about 100 ft msl at the

the site is level with the exception of distinct man-made and natural features. These features include: man-made ponds, the landfill, drainage ditches, stream channels, and road beds. These site features are shown in Figure 1.

The topography at the MMRF largely controls the direction of



Natural Resources. Groundwater is an important source of water supply in The Dalles area for domestic, industrial, and agricultural uses. The primary aquifer in the area is the Dalles Groundwater Reservoir (DGWR), the

Shelter.

The Columbia River and its tributaries represent the major

II. ENFORCEMENT SUMMARY

[redacted]

the groundwater and the EPA ranked the facility for inclusion on the NPL. The [redacted]

placed on the NPL.

MMC has been identified as a Potentially Responsible Party for the site. MMC entered into a Consent Order with EPA in September 1985 that directed MMC [redacted]

to perform an RI/FS for specific areas at the site that might have been impacted during plant operations. The Final FS report was submitted in July, 1988. MMC is in compliance with the terms of the order.

Special Notice has not been issued in this case to date.

III. COMMUNITY RELATIONS

IV. NATURE AND EXTENT OF PROBLEM

Site Characterization

The site consists of a number of areas of contamination that have resulted from past practices at the site. These areas are shown on Figure 1 and include:

Landfill

Landfill Runoff Areas
- Area A
- Area B
- Area C
- Area D

Bath Recovery Pad Area
Old Cathode Waste Pile Area
Salvage Area
Potliner Handling Area
Cathode Wash Area

Duck Pond

Lined Pond

Recycle Pond

Table 1 shows a chronology of significant events at this site that have contributed the present state of these areas. The chronology shows that many

of the past practices, particularly those involving disposal of cyanide containing waste, have been corrected prior the initiation of the RI/FS. In this respect the selected remedy is considered as a supplement to corrective actions that have already been performed.

Table 1 Chronological History of MMRF Operations

Dates	Event
1957 through 1960	Plant construction debris placed in the Landfill.
1958	Process operations initiated by Harvey Aluminum, Inc. Plant air emissions collected in a wet primary fluoride scrubber system (known as the "Old Tower" system) and discharged to Scrubber Sludge Ponds 2 and 3.
1960	Old Cathode Waste Pile started at northeast corner of the plant. Old Cathode Wash Area constructed east of plant and

Waste Characterization of Areas Investigated

Landfill

Shown in Figure 1, the landfill occupies approximately 15 acres just north

area correspond to the landfill runoff areas.

Wastes at the landfill were placed randomly on the ground surface and piled to the current configuration; total waste volume is estimated to be about 200,000 cubic yards. Wastes present in the landfill as a result of the reduction process and construction operations consist of: construction debris (primarily basalt fragments); "target wastes" such as spent cathode waste

boulders. Samples from the five test pits indicate the presence of the following contaminants:

° EP Toxicity - Barium	0.234 mg/L (one sample)
° Total cyanide	0.32 - 70 mg/kg
° Free cyanide	0.27 - 54 mg/kg
° Sodium	3,400 - 82,200 mg/kg
° Fluoride	204 - 2,880 mg/kg
° PAHs	276 - 2,406 mg/kg

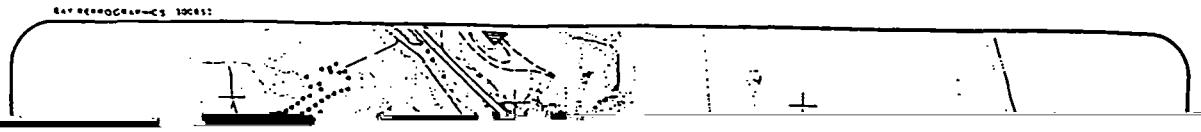
Scrubber Sludge Ponds

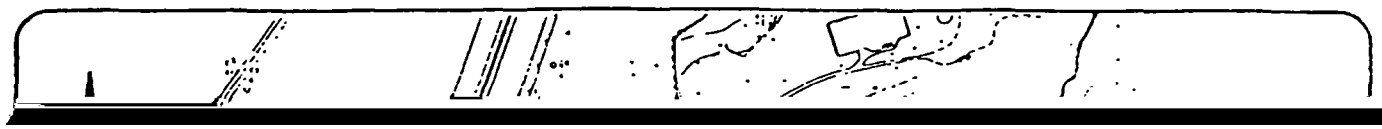
The scrubber sludge ponds (SSPs) consist of four surface impoundments (numbered 1 through 4) located south of the reduction buildings and west of River Road. The large surface area and retention capacity of the SSPs allowed for particulate settlement of slurry waters from the air pollution control system prior to discharge of accumulated water to the Columbia River.

Collectively, the lateral extent of the SSPs is approximately 14.8 acres. SSP1 and SSP4 have soil covers and established vegetation which currently precludes direct contact with the wastes. SSP2 and SSP3 are not covered. The material present in the SSPs can be divided into three categories: (1) soil cover, (2) sludges, and (3) contaminated subsoils. The volumes for each SSP by category are presented below:

Pond	Cover	Sludge	Subsoil	Subtotal
SSP1	7,970	63,730	-	71,700
SSP2		6,820	2,760	9,580
SSP3		43,600	14,500	58,100
TOTAL				167,880

collected and pumped range from 0 to 50,000 gallons per day (gpd) with peak





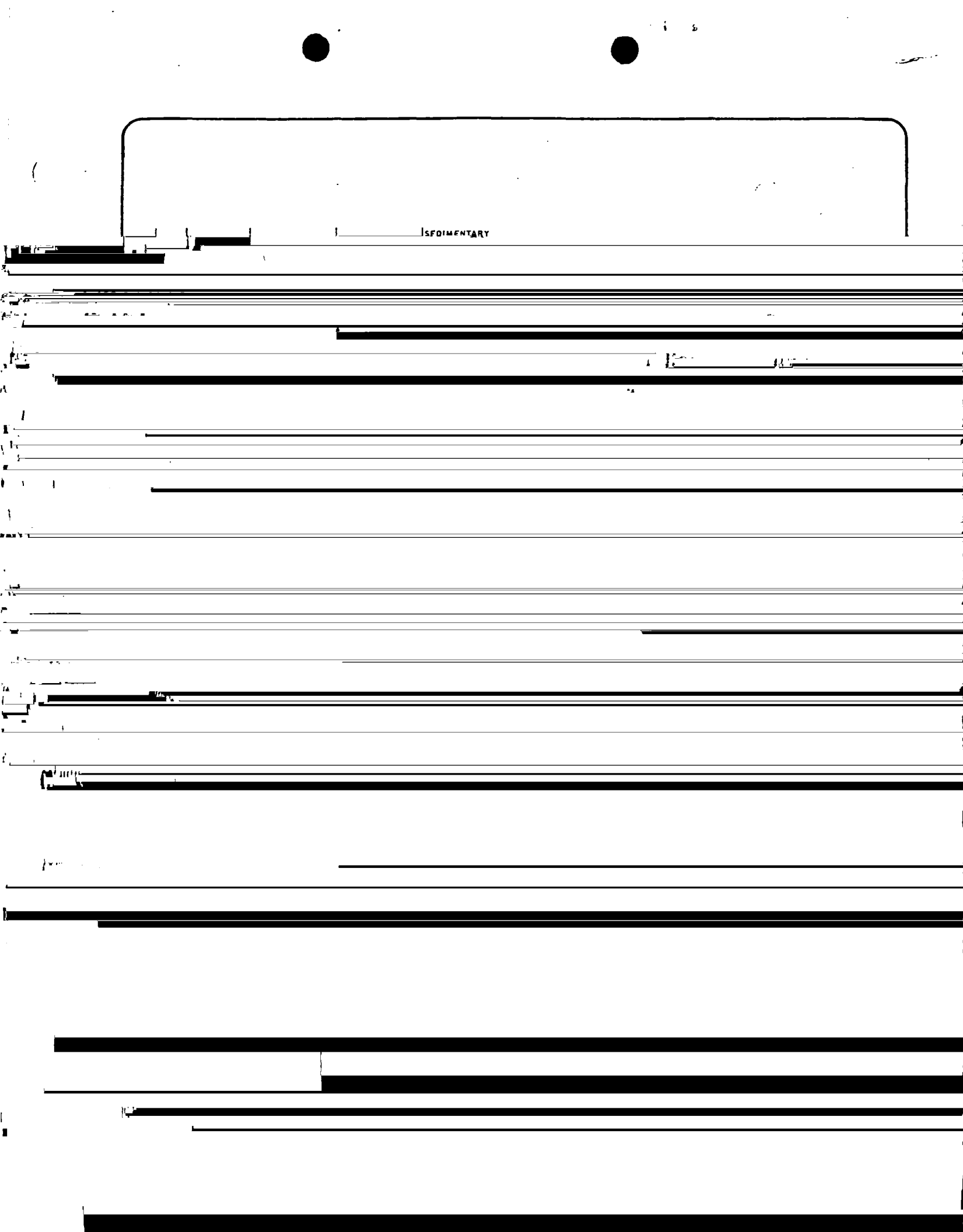
Groundwater Characterization

General Hydrogeology

aquifer) overlying a series of confined aquifers (A and B aquifers and

DGWR). Figure 3, a site specific stratigraphic column, shows the vertical relationship between the principle aquifers at the site. Zones of perched water near the surface of the old cathode waste pile and an alluvial aquifer are also present locally.

Distribution of Main Aquifers. The unconfined S aquifer is present within the relatively low permeability areas of the basalt south of the landfill,


SEDIMENTARY

Chemical Characterization of Groundwater

The constituents of concern identified in the groundwater system include total and free cyanide, fluoride, sodium, and sulfate. The highest constituent concentrations are present in the perched water with progressively lower concentrations identified within the S, A, and B aquifers. Concentrations of constituents in wells tapping the DGWR are well below health based standards. Table 2 lists potential ARARs and other health based standards for groundwater to be considered in selecting a remedy.

Localized Groundwater. Perched water samples from the old cathode waste pile show elevated concentrations of free cyanide (3.01 mg/L), fluoride (3,000 mg/L), and sodium (10,500 mg/L). No free cyanide or fluoride was detected in

wells in the alluvial aquifer were above detection limits but below health based standards.

TABLE 2

POTENTIAL ARARS AND OTHER GUIDANCE TO BE CONSIDERED

Chemical	Federal MCL (SMCL) [a]	Federal MCLG [b]	Oregon MCL [c]	Other
Bicarbonate	---	---	---	---
Calcium	---	---	---	---
Carbonate	---	---	---	---
[redacted]				
				770 ug/L (adult) [e]
[redacted]				
Lead	50 ug/L	(20 ug/L)	---	---

[redacted]

ponds. Sodium ranges from 44.7 to 84.8 mg/L, sulfate from 23 to 153 mg/L, and fluoride from <0.1 to 1.0 mg/L.

[redacted]

The only surface-water potentially affected by groundwater which contains elevated levels of fluoride or sulfate is the Columbia River. The Columbia River currently receives discharges from the MMPF via a single discharge point

regulated under a NPDES permit. The mass of fluoride currently discharged

under the NPDES permit from the site is 123 pounds/day during the dry season and 246 pounds/day during the wet season.

Estimated Increase in Concentration at the Point of Entry. Fluoride and sulfate are both naturally occurring in the groundwater and surface-water environment. Background concentration of fluoride in the Columbia are reported to range from 0.24 mg/l to 0.7 mg/l. Background concentrations of

Contaminant Transport

Air

In order to assess fugitive dust from the site, soil sieve analyses and fugitive particulate modeling was carried out. The results of this modeling indicated that the potential for significant risks from windblown dust were minimal.

Groundwater

Based on the hydrostratigraphy of the site, the principal route of concern for contaminant migration to Chenoweth irrigation wells involves horizontal

[redacted]

migration to the B aquifer, and from there to the DGWR. A mathematical model was also developed to estimate the impacts on Chenoweth irrigation wells using this scenario. Using that model and including conservative assumptions, estimated concentrations of free cyanide at the wells were estimated as shown below. These can be compared to the health advisories shown in Table 2.

[redacted]

CONSTITUENT CONCENTRATION (mg/l)

Initial B-Aquifer Production Well

Risk Assessment

Exposure Evaluation

[redacted]

first identifying the exposure pathways by which human and environmental populations could be exposed under either current land use or hypothetical future land use of the MMRF and surrounding areas. Many pathways involving human exposure to contaminated soils and dust were possible; therefore, for

each category of exposure to soils (i.e., industrial or general population exposures, with and without soil disturbance at the site), the exposure scenario selected for evaluation was that which would result in the highest exposure, and therefore highest potential risk (worst case). This resulted in several exposure scenarios related to potential future uses of the site and surrounding areas, by both future industrial and residential populations, being evaluated. For each exposure scenario evaluated, an average case (populations exposed to average site chemical concentrations at average exposure frequencies, etc.) and a maximum exposure case (maximum reported concentration was used with upper-bound exposure scenarios) were evaluated.

Risk from these exposures were characterized in several ways. Because groundwater was the only exposure medium for which ARARs or health advisories were available for all chemicals of potential concern, risks associated with groundwater were assessed by comparing concentrations of chemicals in groundwater at points of potential exposure (both on and off site) to ARAR-

V. ALTERNATIVES EVALUATION

Summary of Alternatives and Evaluation Criteria

This section summarizes the detailed evaluation of the final candidate remedial action alternatives. First, alternatives are subject to a screening

screening of cost effectiveness is then done to ensure the selected remedy is cost-effective and. These that pass the screening are then evaluated

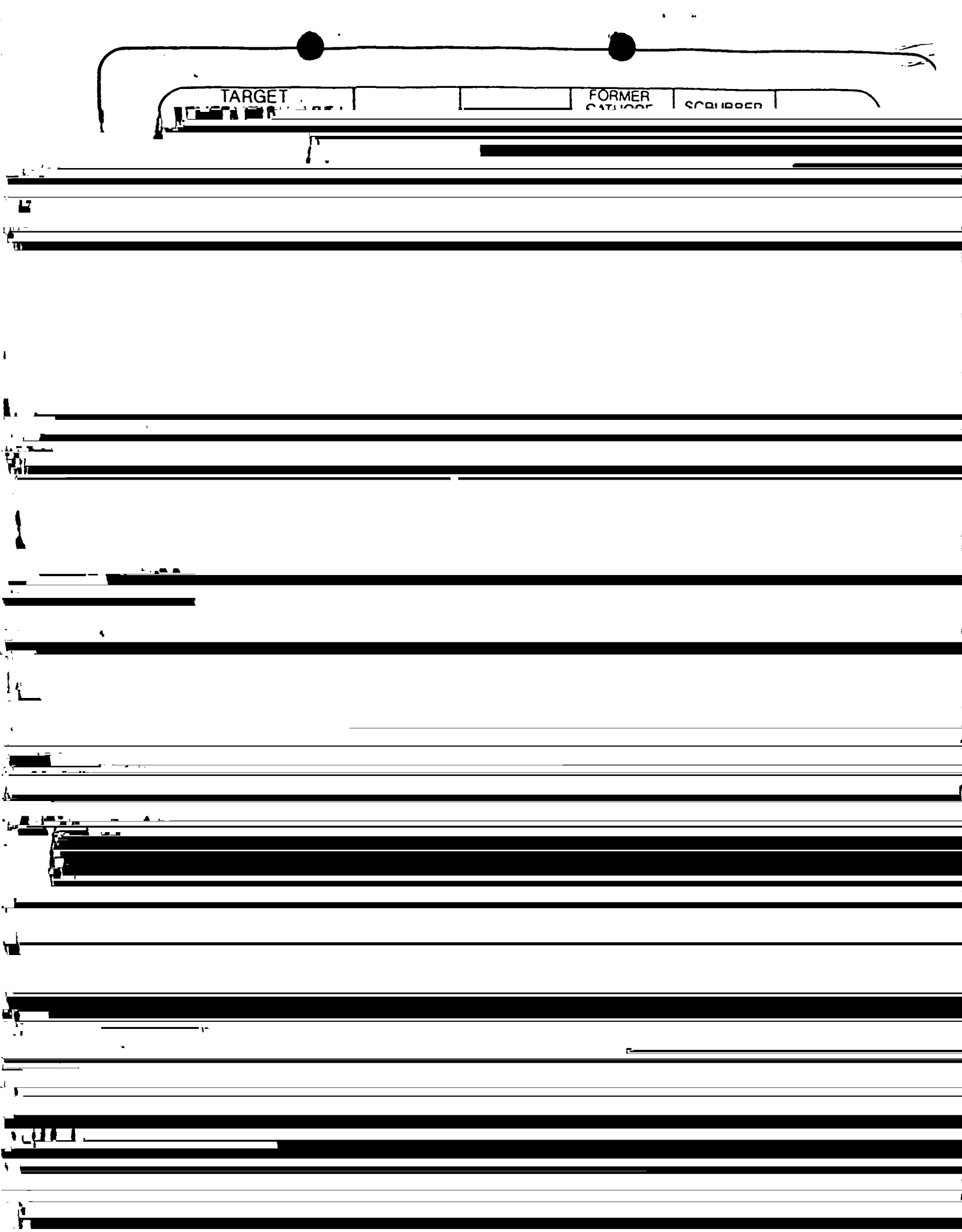

TARGET
FORMER

TABLE 4

Summary of Assembled Remedial Alternatives and Component Remedial Measures
Feasibility Study: Martin Marietta Reduction Facility
Martin Marietta Corporation
The Dalles, Oregon

Remedial Type	Alternative	Target Remediation Areas: Landfill	Unloading Area	Management Areas	Scrubber Sludge Ponds	Ground Water
Containment	Alternative 2	LF2: Cap in Place,	UA2: Consolidate	FCW2: Cap in Place	SP2: Soil Cover over	GW3: Ground-water Controls with

Nine factors were be considered in evaluating the Final Candidate Alternatives:

- Long-term effectiveness and permanence;
- Reduction in toxicity, mobility, or volume;
- Short-term effectiveness;
- Implementability;
- Cost;
- Overall protection of human health and the environment;
- Compliance with applicable or relevant and appropriate requirements (ARARs) that are shown in Appendix A;
- State acceptance; and
- Community acceptance.

The process begins by applying the protectiveness and ARAR factors to each of the candidate alternatives. Alternatives that do not satisfy these requirements will be screened out. Then a cost effectiveness screening is done to ensure that each of the alternatives would be a cost effective solution to the problems at the site. Finally, for the remaining alternatives which have passed these screening steps, all of the factors are weighed in determining the best overall solution to be applied at this site.

Screening of Alternatives

Potential ARARs and TBCs

Table 2 and Appendix A lists the potential ARARs and federal and state

Alternative 2

it involves only an asphalt cap over the landfill. Since the landfill has been identified as a potential source of leachate, the use of a cap that relied only on the integrity of an asphalt coating was not considered to

Screening for Cost Effectiveness

TABLE 5
SUMMARY OF COST EFFECTIVENESS SCREENING

Alternative	Cost	Effectiveness	Reduction in Toxicity, Mobility or Volume
[redacted]	[redacted]	[redacted]	[redacted]

of fluoride contamination

Alternative 3 Evaluation

Remedial Alternative 3 includes the following actions:

° Consolidation of the residual cathode waste material and underlying fill material from the Former Cathode Waste Management Areas into the existing Landfill;

° Consolidation of the cathode waste material from the Unloading Area into the existing Landfill;

° Capping the existing Landfill in place with a multi-media cap meeting RCRA performance standards;

[redacted]

° Plug and abandon nearby production wells and connect users to the City of The Dalles water supply system;

° Collection and treatment of leachate generated from the Landfill and perched water east of River Road and from the Former Cathode Waste Management Areas;

° Recovery of groundwater from the Unloading Area;

° Institutional controls such as access and deed restrictions; and

° Groundwater quality monitoring and a contingency plan to recover and treat additional groundwater if further contamination in the A or B-aquifers is detected.

Short-Term Effectiveness

Implementation of Remedial Alternative 3 should reduce risks to the community and would pose minimal threats to on-site construction workers. The only potential risks to on-site workers would result from handling the waste materials from the Unloading Area, Former Cathode Waste Management Areas and

Reduction of Toxicity, Mobility or Volume

Remedial Alternative 3 treats the leachate generated from the Landfill, perched water collected east of River Road and from the Former Cathode Waste Management Areas which reduces the toxicity of these waste streams. However,

Landfill and Scrubber Sludge Ponds are not treated.

Implementability

The technologies associated with Remedial Alternative 3 are implementable at the MMRF. Potential fugitive dust emissions may result from waste handling activities at the Landfill, Former Cathode Waste Management Areas and

Unloading Area. However, dust suppressants would be utilized to minimize gas t

Overall Protection

Alternative 3 provides protection to the community of The Dalles, on-site

In addition to these actions that would be implemented under Alternative

3, Remedial Alternative 4 adds the following actions:

° Capping the Scrubber Sludge Ponds in place with a multi-media cap meeting RCRA performance standards and creating a hydraulic barrier to minimize contact between the waste and the groundwater;

Short-Term Effectiveness

Like Alternative 3, implementation of Remedial Alternative 4 should reduce risks to the community and would pose minimal threats to on-site construction

implement upon initiation of remedial actions.

The equipment, materials, specialists and work force necessary to implement this remedial alternative are available. Also, the technologies associated with this alternative have been proven at other waste sites and could be implemented at the MMRF. A bench scale study would be required to evaluate the aqueous treatment system prior to the final design of the full scale system. The hydraulic barriers would require permanent maintenance, however.

Compliance with ARARs

Remedial Alternative 4 meets all action and location specific and most chemical-specific ARARs for the areas of contamination. However, groundwater beneath the Landfill, Former Cathode Waste Management Areas, Scrubber Sludge Ponds and Recycle Pond will remain in excess of the ARARs for fluoride and

[redacted]

sulfate. With the development of an ACL for the fluoride and sulfate ARARs

[redacted]

discussed in Section IV, Remedial Alternative 4 would meet all

[redacted]

chemical-specific ARARs.

Overall Protection

[redacted]

Alternative 5 Evaluation

In addition to the remedial actions contained in Alternative 3, Remedial

Alternative 5 adds the following actions:

- Consolidation of the scrubber sludge material and underlying soils from Scrubber Sludge Ponds 1 through 4 into the existing Landfill;

Short-Term Effectiveness

Implementation of Remedial Alternative 5 would pose more potential short term on-site risk than Alternative 3 due to the movement of material from the scrubber sludge ponds to the landfill. It is expected that implementation of this remedial alternative would take approximately two years, somewhat longer

Long-Term Effectiveness

Overall Protection

Remedial Alternative 5 provides protection to the community of The Dalles, on-site workers and the environment similar to that provided in Alternatives 3 and 4. In addition, the potential for leachate generation at the scrubber sludge ponds is reduced under this alternative.

Cost

The capital cost of Remedial Alternative 5 is $9,807,100. The annual O&M costs for years 1 through 5 will be $146,000. The annual O&M costs for years 6 through 30 will be $57,400. The total present worth value of this alternative using a discount rate of 8% is $10,807,100.

Alternative 7 Evaluation

In addition to the remedial actions contained in Alternative 3, Remedial Alternative 7 consists of the following actions:

° Consolidation of the Scrubber Sludge material and underlying fill from Scrubber Sludge Ponds 1 through 4 into the existing Landfill rather than placing a soil cover over Scrubber Sludge Ponds 2 and 3;

° Groundwater recovery and treatment for all areas which exceed ARARs, in addition to the Unloading Area;

Short-Term Effectiveness

Like Alternative 5, implementation of Remedial Alternative 7 would pose more potential short term on-site risk than Alternative 3 due to the movement of material from the scrubber sludge ponds to the landfill. It is expected

In addition to those areas covered in Alternatives 3 through 5, Remedial Alternative 7 recovers groundwater from the Scrubber Sludge Ponds and Recycle

Pond. The toxicity of these waste streams is therefore, greatly minimized. However, the contaminated soils, sediments and waste materials contained in

Short-Term Effectiveness

Like Alternatives 5 and 7, implementation of Remedial Alternative 9 would pose more potential short term risk on-site than Alternative 3 due to the movement of material during the solidification process. It is expected that implementation of this remedial alternative would take approximately two years, somewhat longer than either Alternative 3 or 4.

Long-Term Effectiveness

Like Alternatives 3 to 5, Alternative 9 would effectively mitigate the existing risks associated with direct contact with contaminated perched water

leachate and/or waste. In addition to those areas covered in Alternative 3,

Compliance with ARARs

Like Alternative 7, Remedial Alternative 9 would also meet applicable chemical specific, location specific, and action specific ARARs without

requiring the establishment of an ACL.

Overall Protection

Like Alternative 7, Remedial Alternative 9 provides protection to the community of The Dalles, on-site workers and the environment similar to that provided in Alternatives 2 through 5. In addition, the potential for

groundwater contaminants migrating is minimized under this alternative.

Costs

The capital cost of Remedial Alternative 9 is $14,530,700. The annual O&M costs for years 1 through 5 will be $312,000. The annual O&M costs for years 6 through 30 will be $53,800. The total present worth value of this alternative using a discount rate of 8% is $16,167,400.

Evaluation of Alternatives Against State Acceptance Criteria

VI SELECTED ALTERNATIVE

Description of Selected Remedy

The selected remedy is based on Alternative 3 and comprises 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 RCRA performance standards;

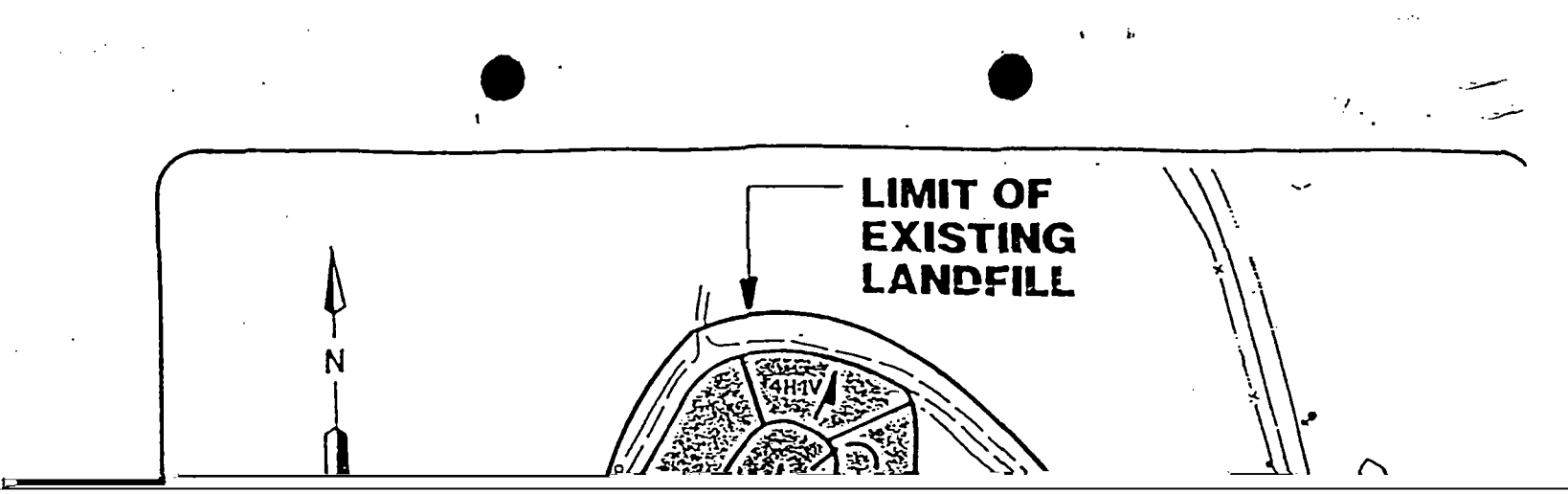
[redacted]

- Place a soil cover over 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 east of River Road and from the Former Cathode Waste Management Areas;

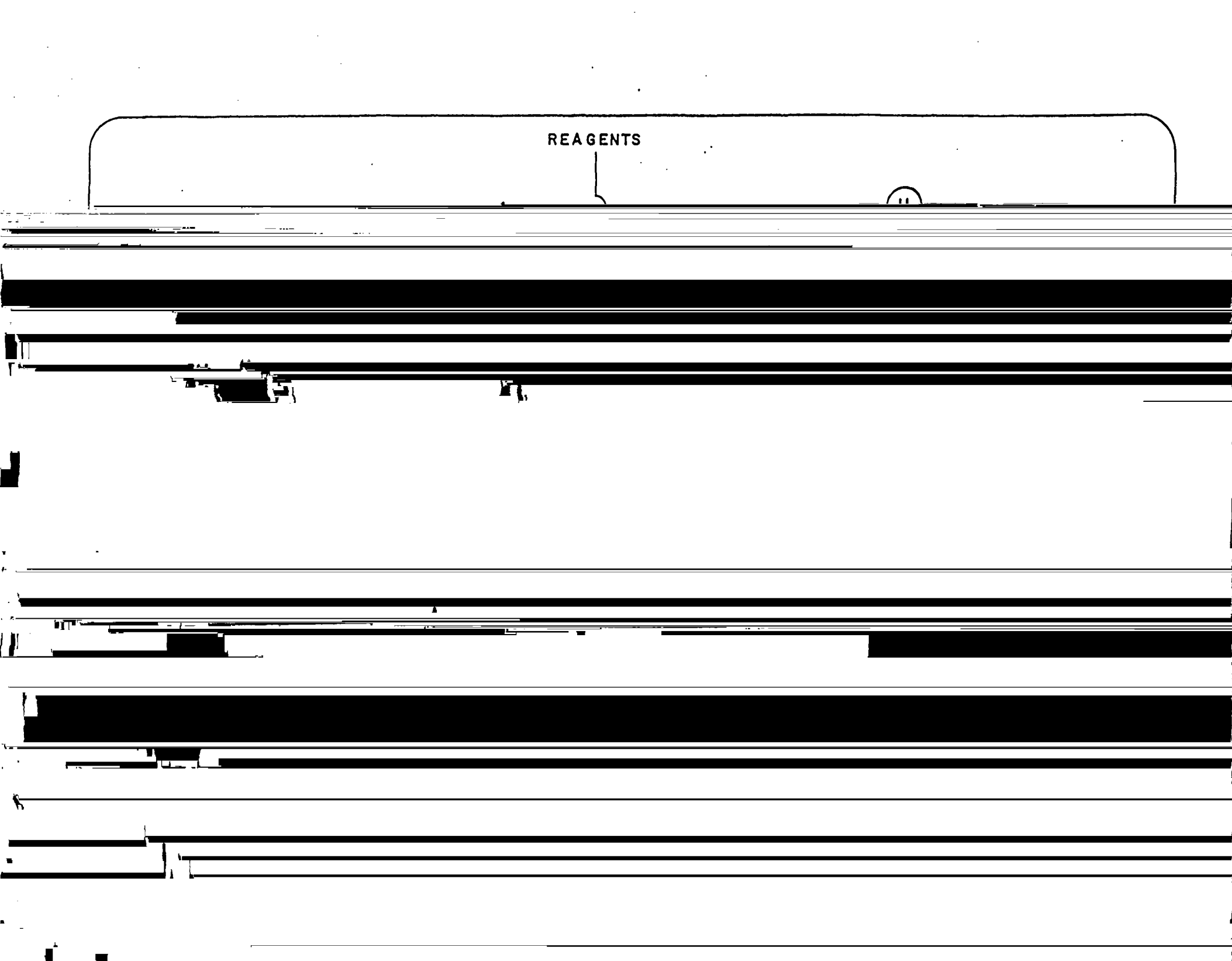
[redacted]

The Unloading Area will be excavated resulting in the removal of approximately 200 cubic yards of cathode waste residuals and placement into the existing Landfill prior to its capping. Backfilling will be performed to promote drainage.

The cathode waste residuals and underlying soils from the Former Cathode


LIMIT OF
EXISTING
LANDFILL
N
4H:1V

The cover system will be a multi-media cap designed to meet RCRA performance standards. The multi-media cap shown in Figure 6 would consist of


REAGENTS

Recovery of perched water east of River Road will be limited to a one time extraction during remedial activities. The use of the roof scrubber return line beneath the former Cathode Waste Management Areas would require temporary disruption of flows to relocate the line or replace it during remedial activities. Any damaged lines will be repaired as part of this process.

Scrubber Sludge Ponds 2 and 3 with a soil cover. A cross-section of the proposed cover system is illustrated in Figure 8. The soil cover consists of two feet of soil and a vegetative cover placed on the Scrubber Sludge Pond sludge. The top and side slopes of the cover system will be constructed to

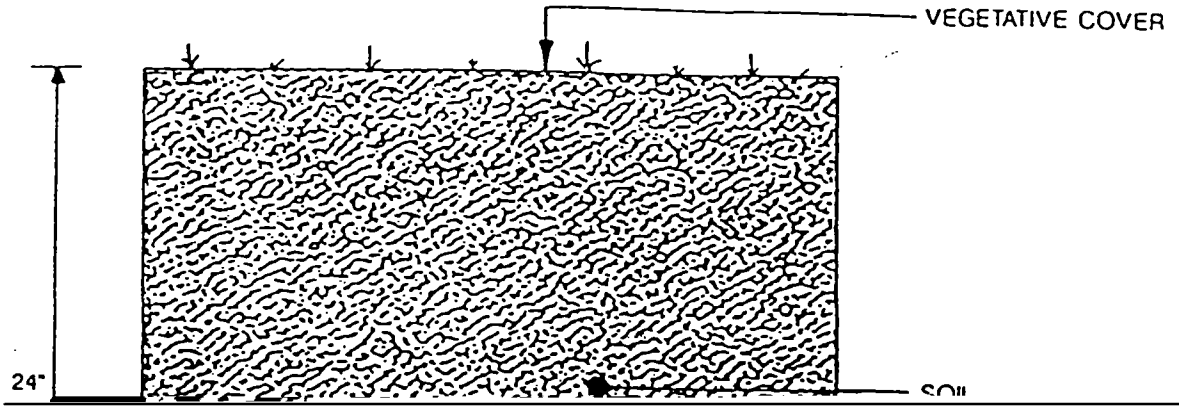

VEGETATIVE COVER
24"
SOIL

TABLE 6

GROUNDWATER MONITORING WELLS

MARTIN MARIETTA REDUCTION FACILITY

THE DALLES, OREGON

Aquifer System	Wells to be Monitored
[redacted]	
	26S, 27S, 29S,
A	1A, 4A, 6AA, 7A, 8A, 9A, 10A, 12A, 13A, 14A, 15A, 27A, 30S, 33A
B	1B, 3A, 8B, 9B, 12B, 14B, 18A, 26B, 27B, 33B, 34A
DGWR	PW-1
Other	Chenoweth Irrigation 1, 2, and 3

Contingency Plan. The following plan would be implemented if the

The remediation criteria that shall be used to determine the volumes of soils to be remediated are as follows:

Criteria	Basis
Arsenic - 65 mg/kg	Carcinigenic Risk
PAHs - 175 mg/kg	Urban Background

[redacted]

Statutory Determinations

A. The Selected Remedy is Protective of Human Health and the Environment

The remedy at this site will permanently reduce the risks presently posed to human health and the environment by:

* [redacted]

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies the the Maximum Extent Practicable.

The selected remedy provides groundwater treatment for those areas where

it is considered practicable, taking into account the nine evaluation criteria.

E. Satisfying the Preference for Treatment as a Principle Element.

The principal element of the selected remedy involves capping and consolidation of areas of contamination. Although this does not satisfy the preference for treatment as a principal element, the remedy does adress the

APPENDIX A

A. FEDERAL LAWS AND REGULATIONS THAT ARE POTENTIAL ARARs FOR THE MARTIN MARIETTA SITE

° Resource Conservation and Recovery Act (RCRA) (42 USC 6901), Subtitle C:

Landfills: must comply with 40 CFR 264 standards for a hazardous waste landfill.

Capping: must comply with 40 CFR 264 Subpart G standards for a cover over hazardous waste at closure.

Closure with [illegible] must comply with 40 CFR 264 Subpart G standards for closure performance and post-closure care and monitoring.

° Clean Air Act (CAA) (42 USC 7401):

National Ambient Air Quality Standards for particulate matter and PM10. Requirements are specified under Oregon ARARs

° OSHA 29 CFR 1910:

Regulations governing worker safety at hazardous waste sites.

° Safe Drinking Water Act (SWDW) (42 USC 300):
Drinking Water Standards (40 CFR 141), including maximum contaminant levels (MCLs) for fluoride

OAR 340.20.225	Air/ Significant Emission Rate of 3 tons/year fluoride
OAR 437.111.010	No employee exposure at lead concentrations greater than 50 ug./m^3 of air averaged over an 8-hour period.
OAR 340-45	Regulations Pertaining to NPDES and WPCF Permits

Suspended Particulate Matter

OAR 340-31.015

Annual Geometric Mean	60 ug/m3
24 hour concentration for more than 15% of samples in one calendar month.	100 ug/m3
24 hour concentration not more than once per year.	150 ug/m3

Fine Particulates/ PM10

Annual Arithmetic Average	50 ug/m3
24 hour average concentration, not exceeded more than average of one day per year.	150 ug/m3

Action Specific ARARs

[redacted]

OAR 340.100-002

(Federal Regulations Incorporated by Reference)

Capping

surface impoundments - 40 CFR 264.228

waste piles - 40 CFR 264.258(b)

landfills - 40 CFR 264.310(a)

- Closure with waste in place

stabilization - 40 CFR 264.228 (a)(2) and 40 CFR 264.258(b)

install final cover - 40 CFR 264.310

30 year post closure care - 40 CFR 264.310

Operation and Maintenance - 40 CFR 264.310

Surface Water Control - 40 CFR 264.251(c),(d)
264.273(c),(d)
264.221(c)

Waste Pile - 40 CFR 264.251

Regulation	Standard
OAR 340-101	Identification and Listing of Hazardous Waste - will determine which wastes at the site are considered hazardous
OAR 340-102	Standards Applicable to Generators of Hazardous Waste - will determine which wastes at the site are considered hazardous.
OAR 340-104	Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities - establishes closure and post closure care of surface impoundments and waste piles.
OAR 340-108	Oil and Hazardous Material Spills and Releases -regulates emergency spill reporting and cleanup standards.
ORS 466-005 to ORS 466-995	Hazardous Waste and Hazardous Materials - Covers hazardous waste disposal and treatment, monitoring requirements.
OAR 340-130	Notice of Environmental Hazards - pertains to institutional controls at the site

Solid Waste

Regulation	Standard
OAR 340-61	Solid Waste Management - covers storage, disposal and treatment of solid waste
ORS 459.005 to 459.355	Solid Waste Control - same as above

Air Quality

Depending on the type of action designed, the regulations described below may contain specific requirements in addition to the chemical specific air pollution regulations cited earlier.

Regulation	Standard
[redacted]	[redacted]
	regulations cited below.
OAR 340-20-001	Highest and Best Practicable Treatment and Control Required
OAR 340-20-040	Methods
OAR 340-20-240	Requirements for Sources in Non-attainment Areas
OAR 340-20-225	Significant Emission Rate
[redacted]	[redacted]

C. FEDERAL LAWS AND REGULATIONS TO BE CONSIDERED

° Safe Drinking Water Act (SWDW) (42 USC 300):
Drinking Water Standards (40 CFR 141), including secondary standard for sulfate.

° Clean Water Act (CWA) (33 USC 1251):
Water Quality Criteria (EPA440/5-86-001).

D. STATE OF OREGON LAWS AND REGULATIONS TO BE CONSIDERED

Oregon Land Use Goals:

OAR 660.15.000(6)
Goal 6. Air, Water and Land Resources Quality - Establishes that land and shall not violate applicable Federal or State environmental quality statutes and regulations.

Water Quality Regulations

OAR 340-41-445

2.2 mg/l Arsenic Standard for Protection of Human Health from Water and Fish Ingestion
17.5 mg/l Arsenic Standard for Protection of Human Health from Fish Ingestion Only
1.00 mg/l Barium Standard for Protection of Human Health from Water and Fish Ingestion
2.8 ng/l Polyaromatic Hydrocarbon Standard for Protection of Human Health from Water and Fish Ingestion
31.1 ng/l Polyaromatic Hydrocarbon Standard for Protection of Human Health from Fish Ingestion only
42 ug/l Fluoranthene Standard for Protection of Human Health from Water and Fish Ingestion
54 ug/l Fluoranthene Standard for Protection of

APPENDIX B
RESPONSIVENESS SUMMARY

EPA conducted community interviews, sent out fact sheets, published notices, and held two public meetings to identify community concerns and

widespread, although several issues and questions were raised. These three issues were raised by several community members:

1) the concern over cyanide contamination;

3) Some community members have been critical of the aluminum plant because of the odor and air pollution it created.

EPA Response: This Superfund investigation focussed on hazardous soil and groundwater contamination from past practices. EPA did not identify any

4) Port representatives expressed concerns about possible impacts of

industrial property along the Columbia River.

EPA Response: It is not expected that the contamination found, or remedial actions to be taken, will affect development.

3. Which way is groundwater under the landfill flowing -- is it flowing toward the Columbia River?

EPA Response:

Groundwater flow in the S Aquifer is generally to the east and northeast; groundwater flow in the A Aquifer is predominantly east to west; groundwater

[redacted]

groundwater flow is largely determined by local pumping conditions.

4. What considerations are being given to long-range monitoring of off-site wells in the area?

[redacted]

APPENDIX C
ADMINISTRATIVE RECORD

[redacted]

1. BACKGROUND/SITE IDENTIFICATION

00000001. Background information	Observation well log with attached graph of municipal wells	5/22/56	3	R. J. Strausser Drilling Company	Leo M. Smith, Chenoweth Irrigation Cooperative

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
[redacted]						
		Phase II Investigation			Corp., prepared for Martin Marietta Aluminum Company	
00000000	Background information	Ground water surface and leachate	11/83	2	Century West Engineering	

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000015.	Background information	Memo re surface water routes within three miles downstream from Martin Marietta Corp.; attached USGS map of The Dalles, Oregon	3/29/84	2	Bart, WRD Salem	Gary Calaba, Oregon DEQ
00000016	Telephone conversation records	Memo re phone call from Jon Miller of Martin Marietta on April 13 re cathode waste disposal in the old landfill	6/18/84	1	Gary Calaba, Oregon DEQ	File
00000017	Telephone conversation records	Record of phone call re observed release to ground water from Joan McNamee to Gary Calaba, Oregon DEQ; attached sampling results	7/5/84	2	Gary Calaba, Oregon DEQ	File
[illegible]	[illegible]	production well #2; attached well record; attached map re representative	[illegible]	[illegible]	[illegible]	[illegible]

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000023	Background information	Letter re major points agreed upon between Dick Nichols, Tom Miller, Bob Shimek and Joe Byrne; attached Hazardous Waste Management Facility Closure Plan	11/5/84	5	Joe Byrne, Martin	Dick Nichols, Oregon
00000024.	Background information	Letter re official notification of leak in new spent cathode storage slab	9/3/84	1	Stan J. Casswell, Martin Marietta Aluminum	Richard Nichols, Oregon DEQ
00000025	Background information	Letter re financial responsibility	12/5/84	2	Williams, Weber, Martin	Fred Hansen, Oregon DEQ

Doc #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000032.	Telephone conversation records	Record of phone call from Joan McNamee to Gary Calaba re potential sources of contamination including	3/19/85	1	Gary Calaba, Oregon DEQ	Norma Lewis, EPA
00000033.	Background information	Technical Directive Memorandum re analysis for priority pollutants from wells belonging to the Chenoweth Irrigation Cooperative	9/9/85	1	John F. Osborn, EPA	
00000034.	Background information	Memo re collection of soil samples; attached DEQ request for analysis; laboratory data sheets; attached map of sample locations	10/18/85	6	Richard Nichols, Oregon DEQ	Martin Marietta, The Dalles; Dennis Illingworth, Wasco County; Norma Lewis, EPA; Port of The Dalles; DEQ, Portland
00000035.	Background information	Letter re proposal to cover the	10/23/85	1	Jacalyn Spiszman,	Richard Nichols, Oregon

[redacted]

00000042. Site investigation and site inspection reports | Potential hazardous waste site tentative disposition | 1/82 | 1 | J. W. Fey, EPA

[redacted]

inspection reports | inspection report

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000057.	Correspondence and memos,	Memo re Martin Marietta Aluminum	2/13/85	1	William R. Keyser,	Del Cesar, City Manager

[redacted]

Study

and Treatment, City of

[redacted]

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[redacted]

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
	Remedial Investigation/Feasibility Study	fund designation for Martin Marietta with attached: letter re The Dalles groundwater reservoir; excerpt from US Geological Survey, The Dalles Groundwater Reservoir; and photo of Martin Marietta drainfield				Oregon Operations Office, EPA
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[redacted]

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000071.	Correspondence and memos, Remedial Investigation/Feasibility Study	Letter re review comments on work-plan; attached comments from the Corps of Engineers' Missouri River Division	3/28/86	2	John W. Sager, Dept. of The Army, Portland District Corps of Engineers	Norma Lewis, EPA
[redacted]						
	Remedial Investigation/Feasibility status update				Geraghty and Miller, Inc.	
	Study					
00000073.	Correspondence and memos, Remedial Investigation/Feasibility	Letter re surface water sampling in accordance with RI/FS work plan	5/13/86	1	Loretta V. Grabowski, Martin Marietta Corp.	Norma Lewis, EPA

Doc #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000083	Correspondence and memos	Letter re concerns and issues raised during months of April and May of 1986 with attached: Statement of Work aerial photography and topographic mapping of Martin Marietta Corp. facility; Scope of Work American Fencing; Scope of Work Landfill Excavations	7/30/86	12	Jerry E. Kubal Geraghty and Miller, Inc.	Norma Lewis, EPA
00000082	Correspondence and memos	Letter and comments re EPA's update	8/1/86	2	Jose R. Rey, Martin	James Fuentes, EPA

Doc. #	File	Type/Description	Date	# Pages	Author(Organization)	Addressee(Organization)
00000090.	Correspondence and memos, Remedial Investigation/Feasibility Study	Letter re status of drill cuttings from spent potliner disposal; attached hazardous waste standards applicable to generators of hazardous wastes and identification and listing hazardous wastes	11/6/86	12	Janis Whitworth, Oregon DEQ	Jim Everts, EPA
00000091.	Correspondence and memos, Study	Letter requesting extension of dead- Investigation Report	12/8/86	2	Jose R. Bou, Martin	Norma Lewis, EPA
00000092.			12/9/86		John H. Spence, Portland	Norma Lewis, EPA

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000100.	Correspondence and memos, [illegible] Study	Letter re land disposal of reactive	1/7/87	1	Loretta V. Grabowski, [illegible]	Jan Whitworth, [illegible]
00000101.	Correspondence and memos, Remedial Investigation/Feasibility Study	Memo re comments on the Interim Report Remedial Investigation	1/9/87	4	Norma Lewis, EPA	Files
00000102.	Correspondence and memos, Remedial Investigation/Feasibility Study	Letter re December On Scene Coordinator's Report	1/9/87	1	Costas Zogas, Portland District Army Corps of Engineers	Norma Lewis, EPA
00000103.	Correspondence and memos, Remedial Investigation/Feasibility Study	Letter and review comments on Interim Report for Remedial Investigation	1/9/87	7	Norma M. Lewis, EPA	Jose R. Bou, Martin Marietta Aluminum
00000104	Correspondence and memos	Letter re request for modification	2/12/87	2	Jose R. Bou, Martin	Philip Vega, EPA

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
	Remedial Investigation/ Feasibility Study	[illegible] report for March, 1987			District Army Corps of Engineers	

[redacted]

00000122. Telephone conversation records Phone/meeting log re conversation with 6/25/87]

[redacted]

Brett McKnight of Oregon DEQ re identi-
[redacted]

[redacted]

Martin Marietta site

00000123 Correspondence and memoranda Letter re field data collected from 7/8/87 2 Frank D. Edwards, C and Jenny Kuhal, Conestoga and

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000130.	Correspondence and memoranda, Remedial Investigation/ Feasibility Study	Handwritten letter re broken seal and abandonment of production well No. 2 with attached: regulations regarding abandonment of wells, final proof survey, letter re water rights in the name of Harvey Aluminum for industrial use, water well driller's report, newspaper articles re landfill cyanide traces and Oregon DEQ effort, photographs	No date	15	Wilson J. Meyer	Phil Sobolewski, EPA
00000285.	Correspondence and memoranda, Remedial Investigation/	Request for assistance	8/4/87	1	David Tetta, EPA	Bill Schmidt, EPA
00000286.	Correspondence and memoranda	Remedial Investigation Critical	10/20/87	1	William Penfree, DEQ	David Tetta, EPA
	Remedial Investigation/ Feasibility Study	Elements				
00000287.	Correspondence and memoranda, Remedial Investigation/	Request for assistance	11/13/87	1	David Tetta, EPA	Barry Townes, Chief, Office of Quality
00000288.	Remedial Investigation comments	Trip report (2/4/88): Electromagnetic	2/8/88	3	Bernie Zavala, EPA	David Tetta, EPA

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000292.	Correspondence and memoranda, Remedial Investigation/ Feasibility Study	Review of Martin Marietta Feasibility Study site and waste characterization summary	1/11/88	4	Bob Stamnes, EPA	David Tetta, EPA
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Doc #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000144.	Sampling and analysis plans	Letter re revisions to standard operating procedures for analytical chemistry services	5/20/86	1	Joseph Arlauskas, Martin Marietta Environmental Systems	Jerry Kubal, Geraghty and Miller, Inc.
00000145.	Sampling and analysis plans	Letter re screening of samples for sulfides	5/30/86	1	Dale Schmidt, Century Environmental Sciences	Jose Bou, Martin Marietta Corp.
00000146.	Sampling and analysis plans	Professional services agreement between Martin Marietta and Laucks Testing Laboratory	7/30/86	5	Loretta V. Grabowski, Martin Marietta	James Owens, Laucks Testing Laboratory
00000147.	Sampling and analysis plans	Letter re EPA comments on standard	6/86	2	Norma Lewis, EPA	Jose Bou, Martin

[redacted]

operating procedures of Martin

Marietta

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000155	Sampling and analysis plans	Memo re data review - organics	8/13/86	2	Gerald Muth, EPA	Norma Lewis, EPA

00000168.	Sampling and analysis plans	Batch definition and detection limits; detection limits re samples from Martin Marietta site	5/6/87	1	Versar, Inc.	
00000169.	Sampling and analysis plans	Letter re data reporting error	5/11/87	1	Jose R. Bou, Marietta Corp.	David Tetta, EPA
00000170.	Sampling and analysis plans	Letter re [illegible]	5/8/87	2	Joseph A. Anlauskas	Jose Bou, Martin

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
[redacted]						
					Inc., prepared for Martin Marietta	
00000179.	Sampling and analysis data	Preliminary Data Submittal, Vol. 2	8/86	246	Geraghty and Miller, Inc., prepared for Martin Marietta	
00000180.	Sampling and analysis data	Supporting Raw Data for the Inorganic Analysis of Samples Collected at the Martin Marietta Reduction Facility	8/8/86	164	Martin Marietta Environmental Systems. Prepared for EPA.	EPA
00000181.	Sampling and analysis data	Supporting Raw Data for the Organic	8/8/86	264	Martin Marietta	EPA

00000264.	Sampling analysis and data	Sample analysis results for sample numbers 85290210 through 85290212	9/24/85	3	EPA Lab, Region X
00000265.	Sampling analysis and data	Sample analysis results for sample numbers 86190010 through 86190013	5/10/86	4	EPA Lab, Region X
00000266.	Sampling analysis and data	Sample analysis results for sample numbers 86360000 through 86360005	9/2/86	9	EPA Lab, Region X
00000267.	Sampling analysis data	Sample analysis results for sample numbers 86130410 through 86130419	3/26/86	10	EPA Lab, Region X
00000268.	Sampling analysis data	Sample analysis results for sample numbers 86134580 through 86134582	3/28/86	3	EPA Lab, Region X

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000189.	Work Plans	Memo re: ACOE Task Assignment for IAG No. DW 96930310-01. Attached ACOE Work Plan and revised schedule [illegible]	12/19/85	5	Norma Lewis, EPA	Kurt Lamber

[illegible]

Plan Addendum dated 12 June 1987 with [illegible] attached: Summary of Additional Sampling (revised 6/11/87); map of test pit locations; field sampling method and screening procedure for [illegible] — Marietta Corp [illegible]

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
		Information				
00000195.	OSHA/Site Safety Plans and Information	Memo re air particulate monitoring	6/11/86	2	Norma Lewis, EPA	The Record
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000205.	On Scene Coordinator's Report (OSC)	On Scene coordinator's summary report re August, 1986	9/10/86	5	William T. Renfroe, Jr., On Scene Coordinator	ACOE
00000206	On Scene Coordinator's Report	On Scene coordinator's summary	10/15/86	3	William T. Renfroe	ACOE

[redacted]

(OSC) report re September 1986 On Scene Coordinator

[redacted]

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization

15. COMMUNITY RELATIONS PLANS & FACT SHEETS

[redacted]

	fact sheets	memo			Inc.	
00000213.	Community relations plans and fact sheets	Community relations plan, Martin Marietta Aluminum, Reduction Facility Site	12/24/85	27	Camp Dresser & McKee, Inc.	___
00000214.	Community relations plans and fact sheets	Fact sheet	3/10/86	1	___	___
00000215.	Community relations plans and fact sheets	Superfund Program project update, site investigation--Martin Marietta with attached mailing list	6/12/87	5	EPA	___

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000224.	Newspaper articles	"Deal set to reopen The Dalles smelter"	9/18/86	1	Larry Shaw, The Oregonian	___
00000225.	Newspaper articles	"Out of the ashes, aluminum smelters get second chance"	12/86	3	Paula M. Walker, Northwest Energy News	___
		..."			Post-Intelligencer	
00000227.	Newspaper articles	"Aluminum plants: struggle for survival"	2/17/87	3	Bruce Ramsey, Seattle Post-Intelligencer	___
00000228.	Newspaper articles	"Martin Marietta planning more test of waste site"	6/22/87	1	The Dalles Chronicle	___
00000229.	Newspaper articles	"Bill would force clean-up of toxic-waste sites"	___	1	Janet G. Dickson	___
00000230.	Newspaper articles	"UNV aluminum, MM draft final agree	6/20/	1	Austin Abrams, The	

17. TECHNICAL GUIDANCES AND REFERENCES

00000234.	Technical guidances and references	Guidances for administrative record	___	2	EPA	___

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000241.	Permits	Letter, NPDES Permit and NPDES General Conditions re Waste Discharge Permit, File No. 53166	3/31/86	9	Fred Hansen, Oregon DEQ	Martin Marietta Corp.
00000242.	Permits	Letter and transfer application for waste water disposal permit re transfer of permit from Martin Marietta Corp. to Northwest Aluminum Company	9/15/86	2	Brett Wilcox, Northwest Aluminum Company	Larry Patterson and Bill Fuller, Oregon DEQ
00000243.	Permits	Letter and NPDES water discharge permit re transfer of permit from Martin Marietta Corp. to Northwest Aluminum Company	9/18/86	2	Fred Hansen, Oregon DEQ	Brett Wilcox, Northwest Aluminum Company
00000244.	Permits	Stipulation and Final Order No. WQ-CR-86-20, Wasco County, from Oregon DEQ vs. Martin Marietta Corp.	3/28/86	6	Oregon DEQ	—

19. MAPS AND PHOTOS

00000245.	Maps and photos	Memo re map showing well locations	4/9/84	1	Bessie Illingworth	Gary Calaba, Hagee

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000252.	Maps and photos	Aerial photo of Martin Marietta site	___	1	___	___
00000253.	Maps and photos	Aerial photos entitled Figure 1--Site Plan, Figure 2--probable surface/shallow subsurface drainage direction, Figure 3--Representative water sample locations and cyanide concentrations, Figure 4--Leachate prevention and control alternatives	___	4	Century West Engineering	___

20. OTHER DOCUMENTS

00000254.	Other documents	Memo re authorization of technical	2/19/86	1	EPA	Army Corps of

[redacted]

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
00000307.	Enforcement Correspondence	Letter re Martin Marietta's response to EPA request for reimbursement of costs	12/16/87	1	Lisa Stone, EPA	John Peterson, Martin Marietta
00000308.	Enforcement Correspondence	Time period for 14-day resolution	12/30/87	1	Lisa Stone, EPA	John Peterson,
00000309.	Enforcement Correspondence	Use of reinforced liners to contain	8/18/87	1		David Tetta, EPA
		erize drill cuttings			Martin Marietta	
00000310.	Enforcement Correspondence	Fax duplicate of #00000309	8/18/87	1	Loretta Grabowski, Martin Marietta	David Tetta, EPA
00000311.	Enforcement Correspondence	Payment of uncontested costs per	12/4/87	1	Harold Miller	Collection Officer

Doc. #	File	Type/Description	Date	# Pages	Author/Organization	Addressee/Organization
24. REMEDIAL INVESTIGATION/FEASIBILITY STUDY ERRATA AND ADDITIONS						
00000282.	Feasibility Study Report	Errata sheet	7/8/88	10	G & M Consulting Engineers, Inc.	Martin Marietta Corp.
00000283.	Remedial Investigation Reports	Appendix B, additions to Appendix D	6/30/88	18	Geraghty & Miller, Inc.	Martin Marietta Corp.
00000284.	Remedial Investigation Reports	Summary Remedial Investigation	6/88	76	G & M Consulting Engineers, Inc.	Martin Marietta Corp.
25. NATURAL RESOURCE TRUSTEES						

00000278 Remedial Investigations Reports/ Final Remedial Investigations 3/88 503 Geraghty & Miller, Inc. Martin Marietta Corp.

Binder #5 Report Volume 5 Appendices

LIST OF DOCUMENTS DELETED FROM MARTIN MARIETTA ADMINISTRATIVE RECORD

Doc. #	File	Type/Description	Reason deleted
[redacted]	[redacted]	[redacted]	[redacted]
	Remedial Investigation/ Feasibility Study	strategy	
00000182.	Sampling and analysis data	Supporting Raw Data for the Inorganic Analysis of Samples Collected at the [redacted]	Duplicate of Document #00000180

APPENDIX D
STATE LETTER OF CONCURRENCE

OCT 0 3 1988