ACTION MEMORANDUM

ANACONDA CO. SMELTER NPL SITE
ARBITER AND BERYLLIUM OPERABLE UNITS
ANACONDA, DEERLODGE COUNTY, MONTANA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

JULY 1991

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, MONTANA OFFICE
FEDERAL BUILDING, 301 S. PARK, DRAWER 10096
HELENA, MONTANA 59626-0096

Ref: 8MO

August 5, 1992

MEMORANDUM

SUBJECT: Request for scope change to Removal Action at Anaconda Smelter Superfund Site, Arbiter and Beryllium Operable Units, Deer Lodge County, Montana

FROM: Donald E. Pizzini, Chief
Superfund Branch, 8MO

TO: Robert L. Duprey, Director
Hazardous Waste Management Division, 8HWM

Site ID #: 18

I. PURPOSE

The purpose of this Action Memorandum amendment is to request and document approval of a proposed change of scope for the removal action at the Arbiter and Beryllium Operable Units of the Anaconda Smelter Site.

II. SITE CONDITIONS AND BACKGROUND

For site characteristics and background information, see the attached original Action Memorandum which was signed on July 8, 1991. Design activities began last fall after the signing of the Action Memorandum and the removal action began on July 15, 1992.

The proposed action and final design identified a typical RCRA Subtitle C waste repository for placement of Arbiter and Beryllium waste materials, which included a three foot clay lower liner. The clay for the lower liner was to be excavated from the disposal area. Previous bore samples had indicated that sufficient clay was available for the liner and cover for both the Arbiter and Beryllium repositories. During excavation, it became evident that the clay material was not of sufficient quantity or satisfactory quality for direct use in the liner construction.

Because of the lack of an on-site clay source, the Atlantic Richfield Company (ARCO) proposed an alternative design for satisfying the identified RCRA ARAR. This alternative design included the use of a synthetic liner (bentonite mat) in place of the three foot of clay. ARCO was requested to provide technical specifications demonstrating that the proposed alternative liner design would be at least as effective as a typical RCRA liner design with consideration of operating practices and location characteristics as specified in 40 CFR Part 264.301(d). The attached report provides the technical rationale for selecting the alternative design.

RCRA personnel from EPA Region VIII and the State of Montana have been consulted as well as EPA Regional Counsel (see attached). Also, the Bureau of Reclamation, EPA's oversight contractor, has worked closely with ARCO's contractors to provide the necessary demonstration of RCRA equivalency. EPA has determined that the information satisfies the RCRA equivalency demonstration. In fact, the synthetic liner will, in many aspects, provide for a much more desirable liner design. However, the synthetic liner has not been widely used and its performance has not been tested over time.

Other factors lending support for this alternative design include: 1) Upgrading the entire liner system by providing for thicker flexible membrane liners; 2) Operating conditions that include the placement of the waste material in a dry condition and the prevention of excess moisture from entering the repository during and after waste placement, thus reducing potential leachate head; 3) Favorable location characteristics which include a natural clayey submaterial and a distance of approximately 100 feet to groundwater.

III. PROPOSED ACTION AND ESTIMATED COST

The proposed change will result in a disposal cell lined with a double geomembrane liner system overlaying a synthetic liner of very low permeability. The landfill cover will consist of a composite cap of topsoil, synthetic liner and a single geomembrane. The repository will meet all applicable or relevant and appropriate RCRA Subtitle C and Montana Hazardous Waste Act design requirements.

Specific design details for the liner and cover systems are shown in the enclosed rationale document.

The change to the liner system design will not significantly effect the overall proposed action. The change will also help keep the project on schedule for a completion later this year. The alternative liner design is likely to increase the original project cost estimate for ARCO, but is favorable to purchasing clay from an outside source.

IV. RECOMMENDATION

This decision document represents a change in the scope of the removal action for the Arbiter and Beryllium operable units, Anaconda Smelter site, in Deer Lodge County, Montana, developed in accordance with CERCLA, as amended, and not inconsistent with the NCP.

Conditions at the site will continue to meet the NCP section 300.415(b)(5)(ii) criteria for a removal and I recommend your approval of the proposed change. The total project ceiling, if approved, will remain at approximately $5.5 million. No expenditure of regional removal allowance is anticipated.

Signature

Robert L. Duprey, Director
Hazardous Waste Management Division
Region VIII
U.S. Environmental Protection Agency

8/14/92
Date

CONCURRENCE COPY

Ref: 8MO

August 5, 1992

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Signature

_____ _____

Robert L. Duprey, Director Date
Hazardous Waste Management Division
Region VIII
U.S. Environmental Protection Agency

FCD:August 4, 1992:cbc:charlie:amam

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, MONTANA OFFICE
FEDERAL BUILDING, 301 S. PARK, DRAWER 10096
HELENA, MONTANA 59626-0096

Ref: 8MO

June 17, 1991

MEMORANDUM

SUBJECT: Request for a Removal Action at Anaconda Smelter Superfund Site, Arbiter and Beryllium Operable Units, Deer Lodge County, Montana

CERCLIS ID#: MTD093291656

SITE ID#: 18

Category of Removal: Non-Time Critical

Nationally Significant or Precedent Setting: No

FROM: Donald E. Pizzini, Chief
Superfund Branch, 8MO

TO: Robert L. Duprey, Director
Hazardous Waste Management Division, 8HWM

This Action is organized in the following sequence:

I Purpose

II Background
- A. Site Characterization
- B. Analytical Data
- C. NPL Status
- D. State Role

III Threat to Public Health, Welfare or the Environment
- A. Threats to Public Health
- B. Threats to the Environment

IV Endangerment Finding

V Proposed Actions and Estimated Costs
- A. Proposed Action
- B. Contribution to Remedial Performance
- C. Alternative Actions

I PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed action described herein for portions of the Anaconda Smelter CERCLA Site, located in Deer Lodge County, Montana. This portion of the site includes three disposal sites associated with the Arbiter and Beryllium Operable Units more particulary described below. The proposed removal action is expected to be conducted by the Atlantic Richfield Company under an Administrative Order on Consent.

II. BACKGROUND

Three disposal sites are associated with the Arbiter and Beryllium operable units. The three sites which are the subject of this removal action are located within the Anaconda Smelter NPL site. The Arbiter Ponds site is located at the eastern boundary of Anaconda, Montana; the Weather Hill beryllium bunker is located on Weather Hill, approximately 2 miles southeast of the eastern boundary of Anaconda; and the B-2 Pond beryllium disposal site is located in the Opportunity Ponds, midway between Anaconda and Warm Springs (Figure 1).

The three disposal sites were associated with metals processing and smelting activities conducted in the 1960s and 1970s. Copper smelting facilities were first constructed in the Anaconda area at the Old Works site in 1884 to process ore mined in nearby Butte. The Old Works facilities were closed and dismantled in 1902 and replaced by the Washoe Reductions Works (later called the Anaconda Reduction Works) located on Smelter Hill. The Anaconda Reduction Works were permanently closed in September 1980, with demolition occurring between 1982 and 1985.

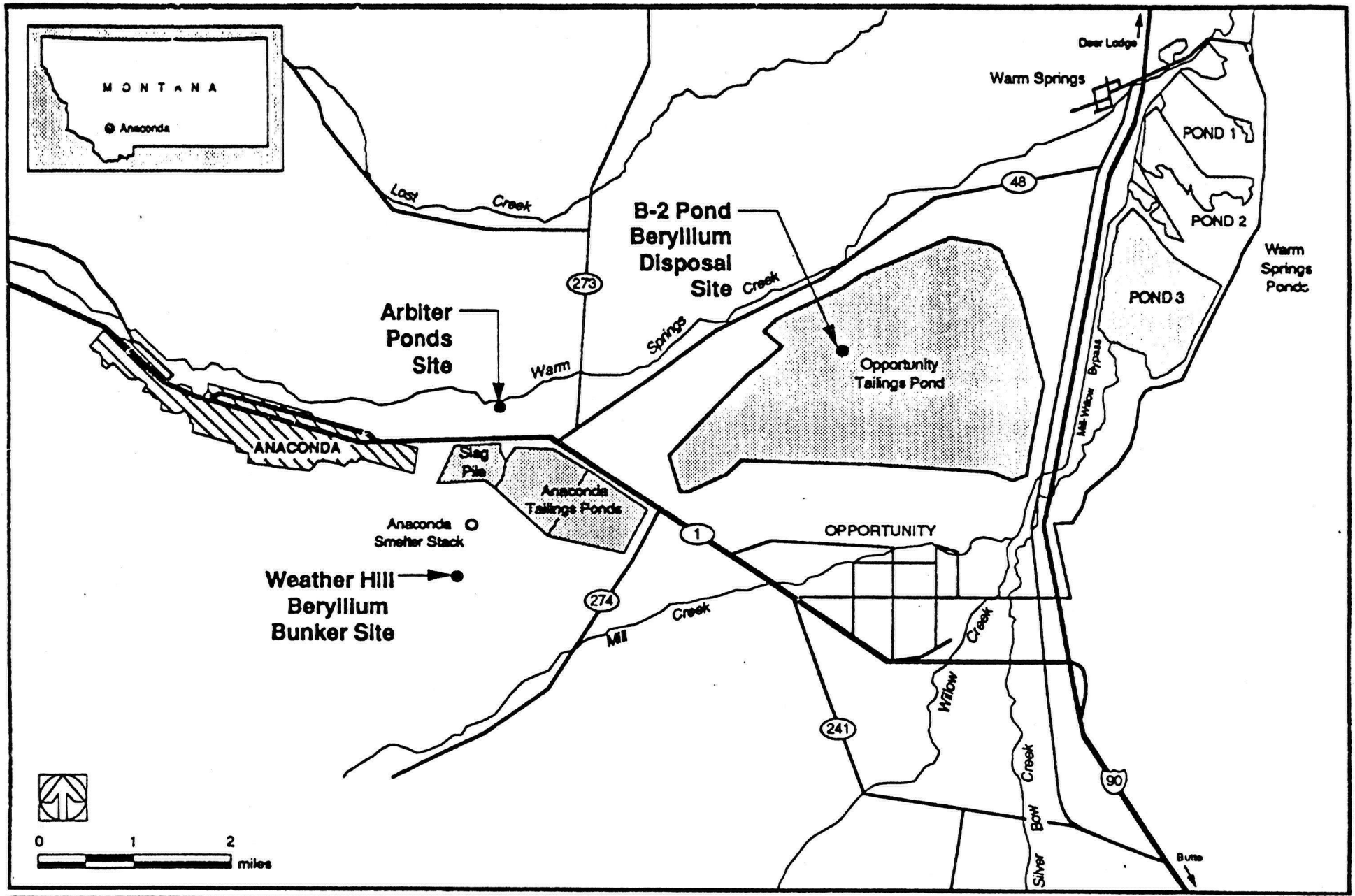


Figure 1. EE/CA waste disposal sites-Anaconda Smelter NPL site

The disposal sites contain significant quantities of contaminated waste material with little or no existing controls for preventing releases into the environment. This Action Memorandum addresses the threats to human health and the environment from exposed waste material contained in the disposal sites. Human health threats include potential carcinogenic effects of inhalation and ingestion of contaminated dusts. Environmental threats include the potential release of contaminants through surface runoff, infiltration into the groundwater and as a result of floods.

Site background and descriptions provided below are based on historical information compiled during the preparation of the work plan and from site inspections that were conducted in May 1990 during the EE/CA field investigations.

Arbiter Ponds and Bunkers

Buildings, ponds, bunkers and other remaining features at the Arbiter site are shown on (Figure 2). This site is located east of Anaconda, adjacent to Warm Springs Creek, and just east of the Red Sands waste pile. Wastes that currently remain onsite are located in two storage ponds, Pond II and Pond III, and four concrete bunkers, Bunkers A, B, C, and D. An apparently empty pond, Pond I, also exists at the site. Wastes from the Arbiter plant were pumped as slurries to the ponds, and the bunkers were probably used as a temporary storage facility for bulk solid materials.

The Arbiter Works was a hydrometallurgical copper refining plant erected by the Anaconda Minerals Company (AMC) in the 1970s to produce cathode copper from copper sulfide concentrate produced at the Weed Concentrator in Butte. The Arbiter Works used an ammonia leaching process to solubilize and refine flotation concentrates of 25 percent copper sulfide. Two waste streams were generated during the ammonia leaching process: waste from the leach residue flotation facility (flotation tailings), and waste from the lime-boil system (primarily calcium sulphate or gypsum).

The Arbiter plant operated from August 1974 to February 1975, and from September 1976 to November 1977 (a total of less than 2 years). Between February 1975 and September 1976, the plant stopped operation to complete additional construction. The plant was permanently closed in November 1977. The site is currently used as a storage area for various equipment and surplus materials. Most of the buildings have been cleaned and are either vacant or used for storage by local commercial businesses.

Additional site background is contained in the literature review section of the draft field operations plan for the Arbiter Plant soils screening study (CDM 1987).

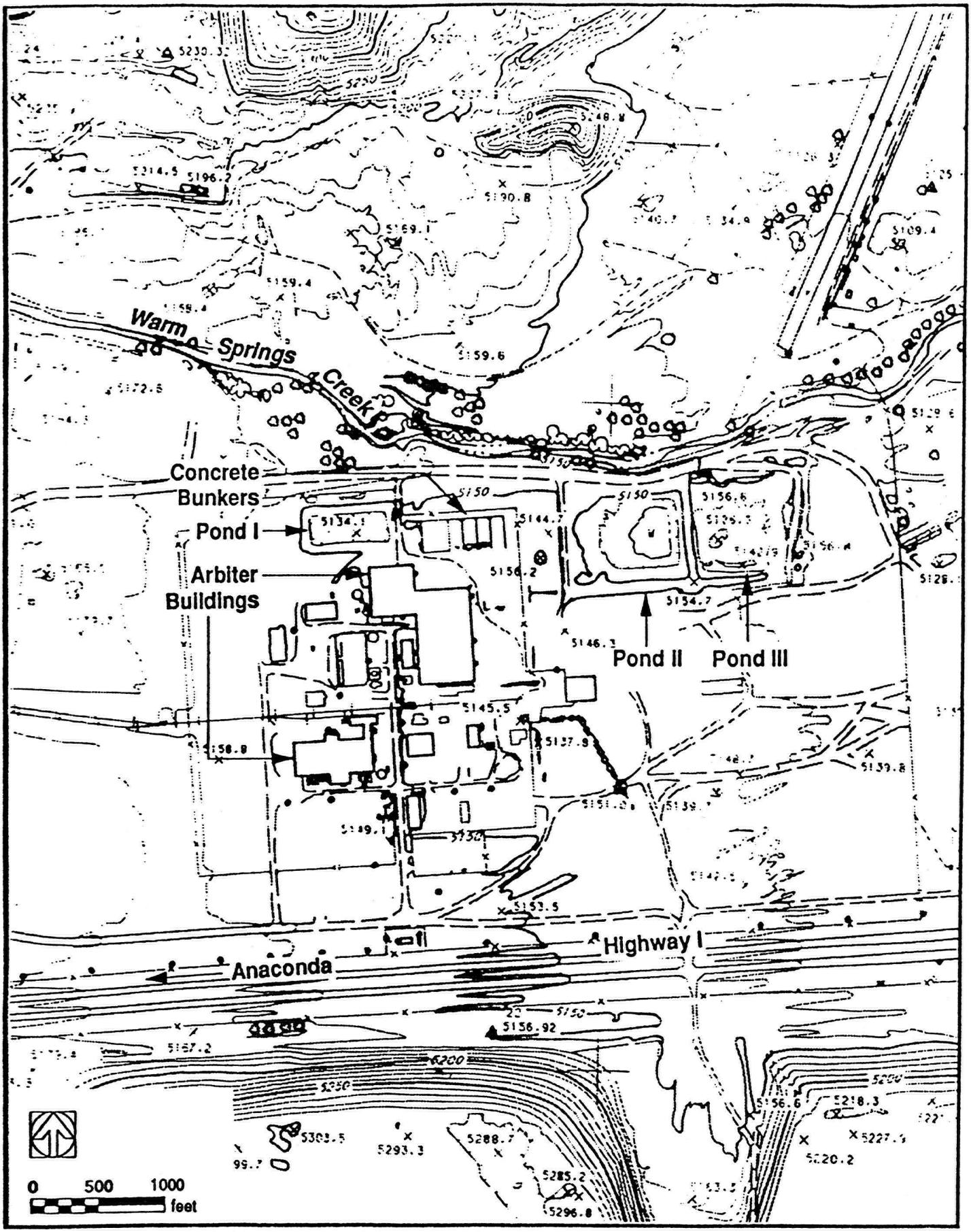


Figure 2. Arbiter Ponds site vicinity

B-2 Pond Beryllium Disposal Site

The B-2 Pond beryllium disposal site is located in the north corner of the B-2 cell of the Opportunity tailings pond, which is located near Highway 48 between Anaconda and Warm Springs.

A beryllium flake-material pilot plant and a beryllium oxide pilot plant operated within the Smelter Hill complex between 1964 and 1968. Immediately following plant closure and during the initial cleanup operations in 1968, wastes and contaminated materials from the plant were drummed and disposed of in the B-2 Pond at the east end of an existing 20-foot-deep, 100-foot-wide, and several hundred-feet-long tailing borrow trench. A magnetometer survey conducted during the Phase I Anaconda Smelter remedial investigation was used to identify the probable location of the buried beryllium waste.

Weather Hill Beryllium Bunker

The Weather Hill beryllium bunker is located in the Anaconda Smelter RI/FS site boundary at an elevation of 6,000 feet (approximately 800 feet above the valley floor) and midway on the road between the Smelter stack and the summit of Weather Hill. The site is currently enclosed in a fenced area of 70 feet by 120 feet.

Beryllium wastes deposited in the Weather Hill bunker originated from the cleanup and decontamination of the beryllium pilot plant in 1972. Wastes were supposedly deposited in a much more remote location and a portion of the wastes were encased in concrete.

A. Site Characterization

Arbiter Pond I - Pond I appears to be empty of Arbiter wastes removed prior to 1985 (when the Anaconda Smelter Phase I remedial investigation was conducted). Pond I was apparently lined with a hypalon liner as a hypalon strip remains around the perimeter of the pond at the top of the bank. The present Pond I surface consists of crushed limestone that has a slight greenish color, which becomes more noticeable when saturated from rainfall. Large erosion gullies on the west side of the pond indicate that substantial volumes of surface water runoff may have transported metals from the neighboring Red Sands (a large mound of mixed slag and tailings produced by the lower Old Works smelters) into Pond I. The suspected Red Sands waste in Pond 1 will be addressed in the Old Works/Arbiter RI/FS.

Arbiter Pond II - Pond II is currently lined with a hypalon liner that, because of standing water in the pond, is apparently still intact. The liner is placed on a crushed limestone bed. Two different types of solid material are visually apparent on the surface of this pond. The material in the upper terrace on the

west end of the pond consists of light, hard, massive gypsum (below a thin black crust) from 2 to 5 feet in thickness. This material lies over a gray slurry material. The lower portion of the pond's solid surface consists of a thin layer of dark, friable, and soft material overlying a white to light aqua-colored crystalline material, also apparently gypsum. The difference in appearance is probably a result of how fast and at what time the gypsum precipitated or settled out of the original slurry; chemical analyses do not indicate any significant differences between the two materials. A fairly large volume of blue-colored clear liquid remains in the middle portion of the pond.

Arbiter Pond III - Pond III has a clay liner and contains materials similar to those in Pond II, but the materials are more desiccated. No liquid or slurry is present in Pond III. As with Pond II, Pond III contains two visually distinct types of waste: a light grayish-colored gypsum containing desiccation cracks, and a dark, blocky, hard gypsum. Chemical analyses indicate that these wastes are slightly different in composition (see Analytical Data below). A very small quantity (a few cubic yards) of slag material was also deposited into the pond along the south berm. Alluvial fill material along with the north berm covers a portion of the pond waste.

Arbiter Bunkers - Bunkers A, B, C, and D are of concrete construction and appear to be in good structural condition. Each bunker is 50 feet wide, 120 feet long, and sloped to a maximum depth of 6 feet at the north end. A 100-foot x 120-foot concrete slab is also located to the west and adjacent to Bunker A. The material in these bunkers consists of four predominant waste types, each of which may be present in one or more bunkers or in the area immediately south of the bunkers. The four waste types are identified as follows:

- Black slag material, fine-grained and mixed with concrete rubble, present in Bunkers A, B, C, and D.
- Clayey gray waste, similar to tailings and very fine-grained, present in Bunker C and D.
- Mixed alluvium and waste present in Bunker B.
- Sediments (under standing water) present in Bunker A.

Beryllium B-2 Pond - Several truckloads of waste material from the pilot plant were buried in the B-2 Pond. The area where the wastes were buried is estimated (by magnetometer survey) to be approximately 30 feet wide by 80 feet long. Wastes were buried at a depth of 12-20 feet and covered with tailings. During disposition of the barrels, some of the drums may have broken open. Photographs of the disposal site prior to backfilling show

approximately 75 drums in the trench. In 1985, fill dirt was placed on the surface of the trench to reduce erosion and possible future exposure of the buried materials (Tetra Tech 1985b). The groundwater surface is approximately 16 feet below the base of the disposal site (based on 1985 well data contained in Tetra Tech 1986), although surface water ponding and runoff has occurred at the site.

Beryllium Weather Hill Bunker - The contents of the Weather Hill bunker were described in the original scope of work for dismantling the plant and constructing the bunker facility (included in Tetra Tech 1985a). Demolition debris from the plant and approximately twelve 55-gallon drums containing beryllium-contaminated solid wastes were deposited in the Weather Hill bunker. The 55-gallon drums were documented as being placed on blocks in up to three separate zinc cells and encased in concrete. These cells were to be buried 7-12 feet below the ground surface. A detailed proposal for performance of the plant dismantling and disposal work (included in Tetra Tech 1985a) included an estimate for disposal of 24 truckloads of general demolition debris and 1 truck load of the concrete cells. This suggests that most of the waste mass in the bunker is demolition debris. Site inspection or preconstruction reports that would have documented the completed disposal could not be located.

A reconnaissance of the disposal site was conducted during the May 1990 EE/CA field investigation to gather additional information on site conditions. During this investigation, a large track-mounted backhoe was used to excavate the site to determine the general characteristics of the disposed debris and to find and determine the condition of the concrete cells. A total of six trenches were dug, generally up to 6-8 feet deep and 27 feet long. Two concrete cells were uncovered during the excavation along with several small, empty yellow barrels, a large (2-3 feet in diameter and several feet long) steel tank or process vessel, electrical cables, and other miscellaneous debris. The concrete cells, which are contained in a wooden form constructed of 4-inch-thick timbers, are approximately 4 by 6-feet in dimension and appeared to be in sound structural condition.

Based on evidence of disturbed soils in the backhoe trenches, the size of the waste burial area is approximately 40 feet by 65 feet. The area of disposal, where the backhoe actually encountered buried debris, is approximately 40 feet by 40 feet. The depth at which the debris is buried could not be verified, although the reported 7-12 feet appears accurate. Soils in the site are primarily decomposed rhyolite and are moist, but not saturated.

B. Analytical Data

Available analytical data on wastes contained in the three disposal sites include data produced during the May 1990 EE/CA sampling investigation and data compiled from previous investigations. A summary of previous analytical data for Arbiter Ponds II and III and Bunker C wastes is contained in Table 1. A summary of Arbiter Ponds site data collected during the EE/CA field investigation is presented in Table 2 for total metals analyses and Table 3 for TCLP analyses. Background soil samples from areas adjacent to Ponds II and III and analytical results are summarized in Table 2.

Arbiter Ponds and Bunkers - Soil samples were taken from alluvial materials that surround the Arbiter Ponds to identify a site background level and are contained in Table 2. These data indicated that the background soil samples contain elevated concentrations of metals. The source of these metals may be from the surrounding Red Sands tailings pile, located just east of the Arbiter Site. The Red Sands are composed of mixed tailings and slag from the Lower Old Works smelters, and were deposited throughout a large area on the south side of Warm Springs Creek, including the present Arbiter Ponds site.

Total metals data contained in Table 1 for Arbiter wastes indicate that the concentrations of metals in Arbiter Ponds II and III are significantly higher than that of soils that surround the Ponds (identified as background soil samples in Table 2), particularly zinc. TCLP data contained in Table 3 also indicates that metal concentrations exceeded TCLP regulatory limits in Ponds II and III.

Samples collected from Pond I were initially screened using field XRF analysis methods. The XRF analysis indicated that Pond I materials contained elevated metals concentrations in these samples, and therefore additional samples were collected for analytical laboratory analysis per work plan requirements. The CLP total metals results in Table 2 indicate that Pond I materials contain metal concentrations similar to neighboring soils.

Wastes contained in the Arbiter bunkers are described above in the previous section. Four distinct waste types were observed to be present in the bunkers, and two samples of each were analyzed for total metals and TCLP. Waste types and analytical results for each sampled waste are contained in Table 2. Elevated concentrations of most metals were found in these wastes. Results of the TCLP analyses are set forth in Table 3. Metal concentrations generally exceeded TCLP regulatory limits.

TABLE 1. PREVIOUS ARBITER PONDS ANALYTICAL DATA[a]

Constituent	Pond I (solids)	Pond II (solids)	Pond II (slurry)	Pond II (liquid)	Pond III (solids)	Bunker C (solids)
AMC (1983)						
Antimony	700	nd[c]	--	--	nd	--
Arsenic	300	200	--	--	nd	--
Cadmium	nd	nd	--	--	1,200	--
Chromium	100	nd	--	--	nd	--
Copper	88,000	2,500	--	--	300	--
Lead	8,000	4,000	--	--	500	--
Mercury	nd	nd	--	--	nd	--
Nickel	nd	nd	--	--	nd	--
Selenium	nd	nd	--	--	nd	--
Zinc	23,000	47,000	--	--	75,000	--
Tetra Tech (1985c)						
pH	--	4.6	11.4	7.6	12.15	2.8
Ammonia-N	--	--	--	32,500	--	--
Antimony	--	30	37	0.06	43	176
Arsenic	--	970	830	0.121	582	5,290
Cadmium	--	12	230	3.82	174	26
Calcium	--	--	--	1,186	--	--
Copper	--	6,790	5,110	39.43	495	18,800
Iron	--	15,200	6,110	0.018	1,780	384,100
Lead	--	490	365	0.069	37	2,220
Manganese	--	6	61	33	44	64
Selenium	--	nd	12	2.8	26	nd
Silver	--	7	16	0.027	8	53
Sodium	--	--	--	34.26	--	--
Sulfate	--	--	--	4,100	--	--
Zinc	--	870	42,200	101	35,090	1,940
PTI (1989)						
pH	--	9.3	--	--	10.2	--
Arsenic	--	3,250	--	--	602	--
Cadmium	--	132	--	--	209	--
Copper	--	15,900	--	--	1,008	--
Lead	--	1,880	--	--	93	--
Selenium	--	29	--	--	49	--
Silver	--	38	--	--	9	--
Zinc	--	28,800	--	--	42,100	--
Tetra Tech (1985c)						
Volume	0 ac-ft	10 ac-ft	--	2-5 ac-ft	5 ac-ft	20-30 yd^3
Surface area (acres)	0	3.3	--	--	2.4	--

[a] Units - mg/kg for solid and slurry, mg/L for liquid.

[c] nd - not detected (detection limit not reported).

TABLE 2. ARBITER PONDS TOTAL METALS DATA COLLECTED DURING EE/CA

Station/ Sample Number	Sample and waste type	pH	EC (µmho/cm)	Arsenic (mg/kg)	QL	Cadmium (mg/kg)	QL	Copper (mg/kg)	QL	Lead (mg/kg)	QL	Mercury (mg/kg)	QL	Manganese (mg/kg)	QL	Iron (mg/kg)	QL	Zinc (mg/kg)	QL
Arbiter Site - Background Soils																			
AR27-01	Soil	7.1	2210	102		3.7	JS166	668		40.6		0.10	JD38	258	JE12	16100	JE13	602	JE18
AR28-01	Soil	3.0	4840	1190		7.8	JS166	2530		642		0.71	JD38	132	JE12	49200	JE13	1110	JE18
AR29-01	Soil	6.5	2450	401		4.1	JS166	2180		147		0.34	JD38	282	JE12	22800	JE13	753	JE18
AR30-01	Soil	7.2	2100	210		6.0	JS166	1830		71.4		0.11	JD38	265	JE12	16500	JE13	825	JE18
Arbiter Bunker A																			
AR19-01	Waste (clayey gray)	1.9	12250	5540		16.8	JS166	22200		11000		2.4	JD38	16.2	JE12	291000	JE13	1180	JE18
AR21-01	Waste (sediments)	4.6	3430	3920		27.8	JS166	44900		5090		2.9	JD38	2620	JE12	173000	JE13	10400	JE18
AR22-01	Waste (sediments)	9.2	2500	5520		79.4	JS166	78400		3800		2.6	JD38	1024	JE12	163200	JE13	18320	JE18
Arbiter Bunker B																			
AR23-01	Waste (mixed alluvium and waste)	7.5	2570	4010		55.5	JS166	17500		2940		11.3	JD38	3270	JE12	221000	JE13	16300	JE18
AR24-01	Waste (mixed alluvium and waste)	7.4	3030	2090		28.2	JS166	9190		1730		0.64	JD38	3990	JE12	202000	JE13	16300	JE18
Arbiter Bunker C																			
AR20-01	Waste (clayey gray)	1.9	10670	11700		52.5	JS166	39500		13600		4.5	JD38	50.2	JE12	139000	JE13	1310	JE18
AR25-01	Waste (black slag)	6.2	2620	2020		17.1	JS166	5650		1670		0.21	JD38	2520	JE12	250000	JE13	25200	JE18

TABLE 2. (Continued)

Station/ Sample Number	Sample and waste type	pH	EC (µmho/cm)	Arsenic (mg/kg)	QL	Cadmium (mg/kg)	QL	Copper (mg/kg)	QL	Lead (mg/kg)	QL	Mercury (mg/kg)	QL	Manganese (mg/kg)	QL	Iron (mg/kg)	QL	Zinc (mg/kg)	QL
Arbiter Bunker D																			
AR26-01	Waste (black slag)	6.3	1395	2170		27.1	JS166	6860		2010		0.23	J038	2760	JE12	250000	JE13	26900	JE18
Arbiter Pond I																			
AR17-01	Waste (crushed limestone)	7.5	399	209		3.9	JD1	2280		108		0.11	U	195		8530		1020	
AR18-01	Waste (crushed limestone)	7.6	307	68.2		0.96	JD1	390		33.2		0.11	U	160		5770		293	
AR43-01	Waste (crushed limestone)	7.5	434	75.0		0.83	JD1	585		35.0		0.09	U	168		7600		321	

TABLE 3. ARBITER PONDS TCLP DATA COLLECTED DURING EE/CA

Station/ Sample Number	Sample Type	pH	EC (µmho/cm)	Arsenic (µg/L)	QL	Barium (µg/L)	QL	Cadmium (µg/L)	QL	Chromium (µg/L)	QL	Lead (µg/L)	QL	Mercury (µg/L)	QL	Selenium (µg/L)	QL	Silver (µg/L)	QL
Regulatory Limits				5,000		100,000		1,000		5,000		5,000		200		1,000		5,000	
Arbiter Bunker A																			
AR19-01	Waste	1.9	12700	244		4.4	JE14/JS15	59.7	JE12	6.8	U	94.8		0.20	U	97.2		2.0	U
AR21-10	Waste	4.7	3370	50.0	U	29.6	JE14/JS15	144	JE12	3.3	U	607		0.20	U	40.0	U	6.4	
AR22-01	Waste	9.3	2430	50.0	U	72.8	JE14/JS15	415	JE12	3.0	U	557		0.20	U	128		2.0	U
Arbiter Bunker B																			
AR23-01	Waste	7.3	2590	80.0		104	JE14/JS15	584	JE12	4.2	U	444		0.20	U	40.0	U	2.0	U
AR24-01	Waste	7.4	3180	83.9		102	JE14/JS15	356	JE12	3.0	U	134		0.20	U	40.0	U	2.0	U
Arbiter Bunker C																			
AR20-01	Waste	1.9	10650	11000		3.6	JE14/JS15	166	JE12	37.5		241		0.20	U	283		6.4	
AR25-01	Waste	6.4	2090	61.8		81.0	JE14/JS15	97.3	JE12	6.8	U	226		0.20	U	40.0	U	2.0	U
Arbiter Bunker D																			
AR26-01	Waste	6.2	2180	54.9		60.1	JE14/JS15	238	JE12	5.8	U	519		0.20	U	40.8	U	2.0	U
Arbiter Pond I																			
AR17-01	Waste	7.4	380	50.0	U	784	JS41	33.8		3.0	U	20.0	UJB-20.8	0.20	U	40.0	U	2.0	U
AR18-01	Waste	7.5	314	50.0	U	979	JS41	8.5		3.0	U	20.0	UJB-20.8	0.20	U	40.0	U	2.0	U
AR43-01	Waste	7.5	443	50.0	U	483	JS41	5.7		3.0	U	20.0	UJB-20.8	0.20	U	40.0	U	2.0	U

TABLE 3. (Continued)

Station/ Sample Number	Sample Type	pH	EC (µmho/cm)	Arsenic (µg/L)	QL	Barium (µg/L)	QL	Cadmium (µg/L)	QL	Chromium (µg/L)	QL	Lead (µg/L)	QL	Mercury (µg/L)	QL	Selenium (µg/L)	QL	Silver (µg/L)	QL
Arbiter Pond II																			
AR31-01	Waste	7.8	1760	50.0	U	63.0	JE14/JS15	4560	JE12	16.7	U	103		0.20		40.0	U	2.0	U
AR32-01	Waste	7.8	6810	181		73.7	JE14/JS15	3940	JE12	3.7	U	1530		0.20	U	40.0	U	2.0	U
AR33-01	Waste	12.4	2280	50.0	U	82.7	JE14/JS15	2.0	UJE12	12.8	U	23.3		0.20	U	194		2.0	U
AR34-01	Waste	8.0	1563	1180		54.6	JE14/JS15	6760	JE12	3.0	U	6850		3.2		125		3.3	
AR35-01	Waste	8.5	2180	157		76.6	JE14/JS15	3610	JE12	8.2	U	971		0.28		87.3		2.0	U
AR36-01	Waste	7.6	1690	517		27.6	JS41	3090		3.0	U	2850		0.20	U	60.7		2.0	U
Arbiter Pond III																			
AR37-01	Waste	7.9	2500	732		95.8	JS41	2380		3.0	U	458		0.23		90.5		2.0	U
AR38-01	Waste	7.9	1680	256		109	JS41	4750		3.0	U	563		0.20	U	113		2.0	U
AR39-01	Waste	7.9	2780	87.7		97.8	JS41	4050		3.0	U	457		0.20	U	77.5		2.0	U
AR40-01	Waste	11.6	2200	50.0	U	86.5	JS41	1430		3.0	U	20.0	UJB-20.8	0.29		40.0	U	2.0	U
AR41-01	Waste	11.3	1435	50.0	U	80.0	JS41	2520		3.0	U	277		0.21		40.0	U	2.0	U
AR42-01	Waste	9.9	1208	50.0	U	58.9	JS41	3120		7.3		887		0.20	U	60.6		2.0	U

B-2 Pond Beryllium Disposal Site - Limited analytical data are available on beryllium wastes deposited in the B-2 Pond disposal site. In 1982, AMC analyzed three separate beryllium waste samples from the disposal site. The results of the analyses (by emission spectrograph assay) provided beryllium concentrations of 0.1, 0.4, and 0.5 percent beryllium, respectively, or an average beryllium concentration of 0.33 percent (3,300 mg/kg). Based on this estimate, it was calculated that approximately 166 pounds of beryllium wastes may have been buried onsite in the estimated 75 drums. These drums may have deteriorated over time in the tailings pond (Tetra Tech 1985b).

Weather Hill Beryllium Bunker - No chemical data were obtained during previous investigations of the beryllium bunker site, nor are data available on the actual composition of the beryllium wastes. The EE/CA field investigation that was conducted in May 1990 collected soil samples from around debris and from beneath the concrete cells, and collected filterwipe samples of the debris itself. The filterwipe samples would indicate if debris objects were contaminated. Samples of background soils were also collected to determine the concentrations of naturally-present beryllium. A summary table of analytical data for the Weather Hill beryllium bunker is provided in Table 4.

Soil samples were collected during the EE/CA investigation to determine whether underlying and adjacent soils are contaminated with beryllium, and, therefore, to determine if additional removal of soils would be required. The results of the sampling, presented in Table 4, indicates beryllium contamination is present on the surface of at least some of the debris, but beryllium concentrations in soils surrounding and underneath the debris are close to that for background soils samples (i.e., up to 1.1 mg/kg for soil near debris vs. 0.74 mg/kg for background soils). Natural background concentrations of beryllium range between <1 mg/kg to 3 mg/kg in soils derived from volcanic rocks, and are as high as 15 mg/kg in clay and clay-loamy soils (Kabata-Pendias and Pendias, 1984). The mean beryllium concentration for all United States surface soils is 1.6 mg/kg. The beryllium concentrations observed in soils around the buried debris are slightly higher than site background concentrations, but are within the range of natural background concentrations.

Estimates of waste volumes were calculated using information and data from the EE/CA investigation, previous investigations, and historical references. Information on original disposal quantities was either unavailable or unreliable. Estimated waste volumes are summarized in Table 5.

TABLE 4. WEATHER HILL BERYLLIUM BUNKER ANALYTICAL DATA COLLECTED DURING EE/CA

Station/Sample Number	Sample Type	pH	EC (μmhos/cm)	Beryllium	
				Value	Units
WHBB01-01	Filterwipe of debris object	--	--	0.91	μg
WHBB02-01	Soil 1 foot below concrete cell	7.7	387	1.1	mg/kg
WHBB02-02	Soil 2 feet below concrete cell	8.4	159	0.98	mg/kg
WHBB02-03	Filterwipe of small drum	--	--	22.7	μg
WHBB02-04	Soil 1 foot below concrete cell	7.6	610	1.1	mg/kg
WHBB02-05	Wood from concrete cell	--	--	0.43	mg/kg
WHBB03-01	Background soil	8.4	162	0.74	mg/kg

TABLE 5. SUMMARY OF WASTE VOLUME ESTIMATES

Site	Total Volume (yd^3)	
	Waste, Debris, and Associated Soils	Soil Overburden
Arbiter Pond I	0	0
Arbiter Pond II	64,000 yd^3 waste (solid) 3,000 yd^3 waste (liquid)	0
Arbiter Pond III	84,000 yd^3 waste (solid)	0
Arbiter Bunkers	900 yd^3 waste (solid)	0
B-2 Pond Beryllium disposal site	1,000 yd^3 waste, debris, and soil	1,100 yd^3
Weather Hill beryllium bunker	350 yd^3 debris and soil, 2-3 concrete cells (each approximately 4 × 4 × 6 feet)	675 yd^3

C. NPL Status

The Arbiter and Beryllium operable units are a portion of the larger Anaconda Smelter CERCLA Site, which was placed on the Superfund National Priorities List (NPL) in September 1983 (48 Federal Register 40658, September 8, 1983). In October 1984, Anaconda Minerals Company entered into an agreement with EPA to conduct a remedial investigation at the Smelter site (Administrative Order on Consent, Docket No. CERCLA-VIII-84-08). Focused remedial investigations of the Weather Hill disposal site (Tetra Tech 1985a), the B-2 Pond disposal site (Tetra Tech 1985b), and the Arbiter Ponds site (Tetra Tech 1985c) were conducted as part of the Order.

In February 1990, the Administrative Order on Consent, Docket No. CERCLA-VIII-88-06 was amended to include the Accelerated Removals project for the Arbiter and Beryllium Operable Units. A preliminary draft Engineering Evaluation/ Cost Analysis was prepared by ARCO and was submitted to EPA in August 1990. A final draft EE/CA was prepared and released for public comment in April 1991. The final draft EE/CA is now approved as final and is the basis for this Action Memorandum.

D. State Role

The Montana Department of Health and Environmental Sciences (MDHES) had been involved with the site as early as 1984. The State's role has been and will continue to be that of the support agency.

- State and local actions to date - State and local governments have not responded independently to the potential threats posed by the Arbiter and Beryllium waste disposal sites. The State has been actively participating with EPA on the Arbiter/Beryllium removal actions since its inception. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR Section 300.525(e) provides for the State to be consulted by EPA on removal actions. Additionally, the Montana Comprehensive Environmental Cleanup and Responsibility Act, Montana Code Annotated (MCA) Sections 75-10-701 et. seq., provides the authority to respond to releases of hazardous or deleterious substances.

- Summary of continued State and local response - The State will continue to work with EPA on the Arbiter/Beryllium removal action. Nevertheless, State authority is not limited by federal actions and the State may impose additional conditions as necessary. Local governments may be involved in the development and enforcement of institutional controls to protect selected removal actions.

III. Threat to Public Health or Welfare or the Environment

The Arbiter and Beryllium waste disposal sites meet the two requirements for initiating a removal action:

- It poses a threat to public health, welfare, or the environment; and
- There has been a lack of timely non-CERCLA response mechanisms.

CERCLA section 104(a) authorizes removal responses "whenever any hazardous substance is released or there is a substantial threat of such a release into the environmental; or there is a release or substantial threat of release into the environment of any pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare.

Analysis of data collected during previous investigations and during the EE/CA provides sufficient information to characterize the threat or potential threat to public health, welfare and the environment from the Arbiter and Beryllium waste disposal sites. The conditions which pose a threat or potential threat are based primarily on the potential for these wastes to be released or migrate into the environment. Wastes include Arbiter materials containing arsenic, cadmium, lead, copper and zinc in both elevated total and leachable concentrations, and beryllium wastes containing beryllium dusts. The wastes generally have the potential to migrate into groundwater and/or surface water, to be windblown onto adjacent soils or become exposed to direct contact.

Factors that were considered to determine if a threat or potential threat existed and therefore the need for a removal action are listed in Paragraph (b)(2) of Section 300.415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP):

- Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations, animals, or food chain.
- Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations, animals, or food chain.
- Actual or potential contamination of sensitive ecosystems.
- High levels of hazardous substances or pollutants or contaminants, in soils largely or at near the surface, that may migrate.

- o Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

Specifically, the primary factor that poses the threat or potential threat is the high levels of hazardous substances or pollutants or contaminants in soils, largely at or near the surface, that may migrate. Other factors also include the potential exposure to humans and animals, threat of release, potential contamination of future drinking water supplies and Warm Springs Creek and weather conditions (flood events) that may cause a migration or release.

A. Threats to Public Health

Elevated levels of arsenic, cadmium, lead, copper and zinc have been reported in the wastes located in the Arbiter waste ponds. The primary human exposure pathways generally include ingestion of contaminated soils, groundwater and surface water, inhalation of suspended particulates, dermal contact and the food chain. Residents who live in close proximity to contaminated areas, persons who use an adjacent dump road and adults or children who use the surrounding area for recreational purposes are subject to the greatest risk.

Most metals can produce toxic effects both by the oral route and by inhalation. When exposure is by inhalation, a common effect is respiratory tract irritation, leading in some cases to fibrotic lung injury and reduced breathing capacity. It is important to note that in most cases, this effect is due mainly to the fact that the metals are adsorbed to particulate matter in the air, and the particulate matter itself is irritating to the lung (Menzel and Admur 1986).

The chief effect of inhalation exposure to arsenic compounds in air is usually irritation to the skin and mucous membranes of the eyes, nose and throat. Direct dermal contact with arsenic compounds can cause skin irritation and may even lead to contact sensitivity in some cases (ATSDR 1987), but these effects are rarely severe and regress when exposure ceases. There are a number of epidemiological studies in humans which indicate that chronic inhalation exposure to arsenic is associated with the increased risk of lung cancer. There is also strong evidence from a number of human studies that oral exposure to arsenic increases the risk of skin cancer (USEPA 1984, ATSDR 1987a). Arsenic is a Group A carcinogen.

Cadmium compounds are readily absorbed from the lung, and inhalation exposure to cadmium can cause lung irritation, kidney damage, reproductive toxicity and death in animals and humans (ATSDR 1989a). Workers chronically exposed to cadmium dusts have impaired respiratory function as well as kidney damage similar to

that seen from oral exposure. At low levels of exposure, renal injury is more likely than lung injury (ATSDR 1989a). By the oral route, cadmium has not been shown to have significant carcinogenic potential. However, inhalation exposure to cadmium has been found to increase the incidence of lung tumors in animals (Takenaka et al. 1983) and has been associated with increased frequency of lung tumors in occupationally exposed human (Thun et al. 1985). Based on these data, EPA has ranked cadmium as a Group B1 carcinogen by the inhalation route.

Acute and subacute lead poisoning generally occurs only after ingestion of very large doses of lead (USEPA 1986a). Acute lead poisoning from short-term exposure is now rare in humans, and most health concerns center around chronic, low-level exposure by the oral and inhalation routes. Dermal exposure is not of significant concern, since lead is absorbed through the skin very slowly (USEPA 1986a). The systems that appear to be the most sensitive to lead toxicity are heme synthesis, nervous system, reproduction and the cardiovascular system. Lead appears to have a weak mutagenic and genotoxic effects in some systems, and studies in animals indicate that chronic oral exposure to very high doses of lead acetate may cause increased frequency of tumors of the kidney (USEPA 11986). The evidence for carcinogenicity of lead in humans is equivocal. Based on these data, the EPA has classified lead as a Group B2 carcinogen (probable human carcinogen) (USEPA 1990b).

Copper has relatively low oral toxicity to humans and is not expected to cause adverse effects (NAS 1980). There is little evidence to suggest that copper is carcinogenic, either in animals or humans (ATSDR 1990).

Inhalation of beryllium or its compounds in sufficient dose will cause a variety of toxic responses in the lung. At relatively high doses, inhalation of beryllium produces a pneumonia-like response known as acute beryllium disease. Severe cases can be fatal. Chronic exposure to much lower doses produces an irreversible lung disease known as berylliosis. Chronic exposure to beryllium may also increase the incidence of lung cancer. In studies of humans occupationally-exposed to beryllium there is suggestive evidence of increased numbers of lung cancers. In animal studies, beryllium exposure has been shown to increase the incidence of lung cancer. This supports the suggestive human epidemiologic evidence from animal studies. The EPA classifies beryllium as a Group B2 carcinogen. Dermal exposure to beryllium may also lead to toxic effects.

B. Threats to the Environment

The environmental exposure pathways include direct contaminant runoff to Warm Springs Creek and dissolved contaminants to Warm Springs Creek via groundwater. A shallow alluvial aquifer underlies the Warm Spring Creek flood plain.
Current information on the aquatic organisms in Warm Springs Creek indicates that a healthy, producing trout population is present. Similarly a qualitative assessment of the aquatic invertebrate community (Chadwick and Associates 1989) indicates that Warm Springs Creek supports a diverse food base for the fishery. True flies, worms and snails would be the most threatened invertebrates in Warm Springs Creek if copper concentrations become greater than 30 ug/L for an appreciable time period. Both invertebrates and fish are sensitive to copper, with values as low as 6.1 ug/L and 3.9 ug/L causing chronic toxicity in some invertebrates and fish species, respectively.

Given the importance of Warm Springs Creek as a spawning habitat for Clark Fork River brown trout and potential exposure of progeny during egg incubation (November-April) and rearing stages (spring), elevated metal concentrations (primarily copper and zinc) during the April to June period appear to be the single largest risks to the biota of Warm
Springs Creek.

IV. ENDANGERMENT FINDING

Actual or threatened releases of hazardous substances, pollutants and contaminants from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to the public health or welfare or the environment. This finding is based on the administrative record for the Anaconda Smelter Site, specifically the Arbiter and Beryllium Operable units. Detailed analysis of conditions which present an imminent and substantial endangerment are discussed in the Final Draft Accelerated Removals Engineering Evaluation/Cost Analysis dated April, 1991.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

The removal action objectives identified in the Accelerated Removals EE/CA are to stabilize, mitigate, or prevent releases or threatened releases from materials in the Arbiter and beryllium waste disposal areas. The focus of the EE/CA is on the removal of source materials from these locations and disposal of the materials in a manner protective of public health and the environment. Removal action alternatives that were considered include removal of wastes and disposal in an onsite or offsite waste repository. The alternatives considered are intended to mitigate threats or potential threats by removing the contaminant

source from the existing exposure pathways and permanent containment of the material in an engineered facility. These alternatives are consistent with the overall cleanup objectives for the site. Treatment alternatives were initially screened and determined to be inappropriate for this removal action given the accelerated approach taken on the project.

A. **Proposed Action** - Removal of wastes to an onsite waste repository - See attached EE/CA for additional information.

- Removal of wastes to an onsite repository involves excavation of wastes from the Arbiter Ponds and bunkers, B-2 Pond and Weather Hill Bunker sites and disposal of these wastes at a waste repository that meets applicable or relevant and appropriate RCRA Subtitle C requirements, to be constructed within the Anaconda Smelter Hill site.

- Arbiter wastes to be removed are those materials contained within the discrete disposal pond cell or bunker (Ponds II and III and bunkers A,B,C and D) and adjacent soils that contain visually distinct wastes of the same type and equivalent concentrations. Waste will be removed and placed in a constructed RCRA subtitle C storage facility on Smelter Hill. Confirmation sampling will be conducted to confirm the removal of the Arbiter wastes. Further investigation of the extent of soil contamination under and around the Arbiter Ponds will be performed during the subsequent RI/FS.

- Beryllium B-2 Pond and Weather Hill Bunker wastes to be removed are those visually distinct wastes (i.e. drums and debris) and adjacent soils that are contaminated with beryllium above a concentration of 3 mg/kg. 3 mg/kg is considered to be within the national background range. Confirmation sampling will be conducted to confirm the removal of beryllium to this level. Post-removal site control is not anticipated.

- The proposed location of the RCRA subtitle C waste repository site is on Smelter Hill, as shown in Figure 3. This site was identified (as PSA #9) in the *Anaconda Smelter NPL Site Repository Siting Final Phase II Report (SRM 1990)*, and is located on the eastern slope of Smelter Hill, on an alluvial terrace above Mill Creek. The site was selected over other potential areas because of the large depth to groundwater, low transportation impacts, favorable physical soil properties, constructability and potentially favorable institutional controls. A final siting investigation will be performed at the Smelter Hill site prior to final selection to confirm suitability of soils and other site conditions.

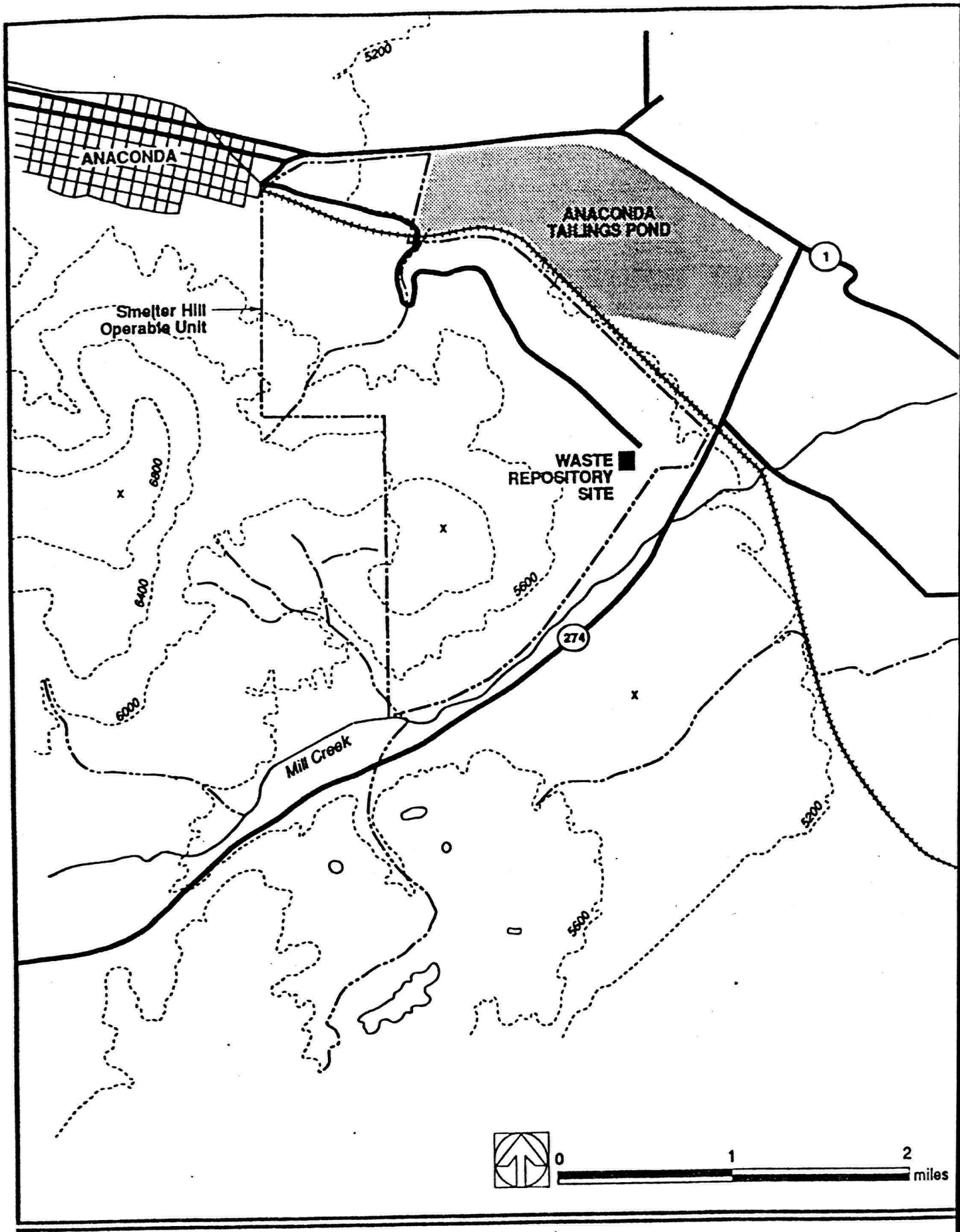


Figure 3 Location of onsite waste repository

- Wastes from the Arbiter and beryllium disposal sites will be hauled by truck to the repository for direct disposal. Liquid wastes that are present in the Arbiter ponds or bunkers will either be evaporated at the Arbiter site or transported to the repository site for evaporation.

- Following excavation and confirmation monitoring, the beryllium sites will be backfilled with clean local soils. The Arbiter Ponds will not be backfilled because monitoring of deep soils beneath the pond may be required for the subsequent RI/FS. Limited backfilling or regrading may be required, however, to stabilize banks and reduce physical hazards. Post-removal site control may be necessary.

- Arbiter Pond I will not be within the scope of the removal action. It appears that most of the waste material has been removed from the pond. Data indicate that contaminant levels within the pond are very similar to those surrounding the pond. The pond as well as the surrounding area will be subject of a subsequent RI/FS.

- A conceptual drawing of the disposal cell is shown in Figure 4. The preliminary design shows the landfill as a 440-feet square facility covering approximately 4.5 acres. The containment cell will be lined by a double geomembrane liner system overlying three feet of low-permeability compacted clay. The landfill cover will consist of a composite cap of topsoil, clay, and a single geomembrane. Maximum waste deposit depth will be about 30 feet. The repository will meet all applicable or relevant and appropriate RCRA Subtitle C and Montana Hazardous Waste Act design requirements. A detailed investigation will be performed to adequately describe the site conditions such as topography, foundation properties and availability of construction materials. Attached is a Statement of Work for implementing the removal action.

- Specific design details for the waste repository will be submitted to EPA and the State for approval.

- Standard heavy equipment will be used to excavate the waste materials of the three waste disposal sites. Of the three waste disposal sites, only the B-2 Pond site removal action will require transport over public roads. However, the distance is short (approximately 5 miles), and volumes are relatively small. Transport of the Arbiter Ponds wastes, representing 99 percent of the total removal action waste volume, will involve only a single public road crossing, with a haul distance of only a few miles.

EBASCO SERVICES INCORPORATED

ATTACHMENT "B"

CLIENT ARCO COAL

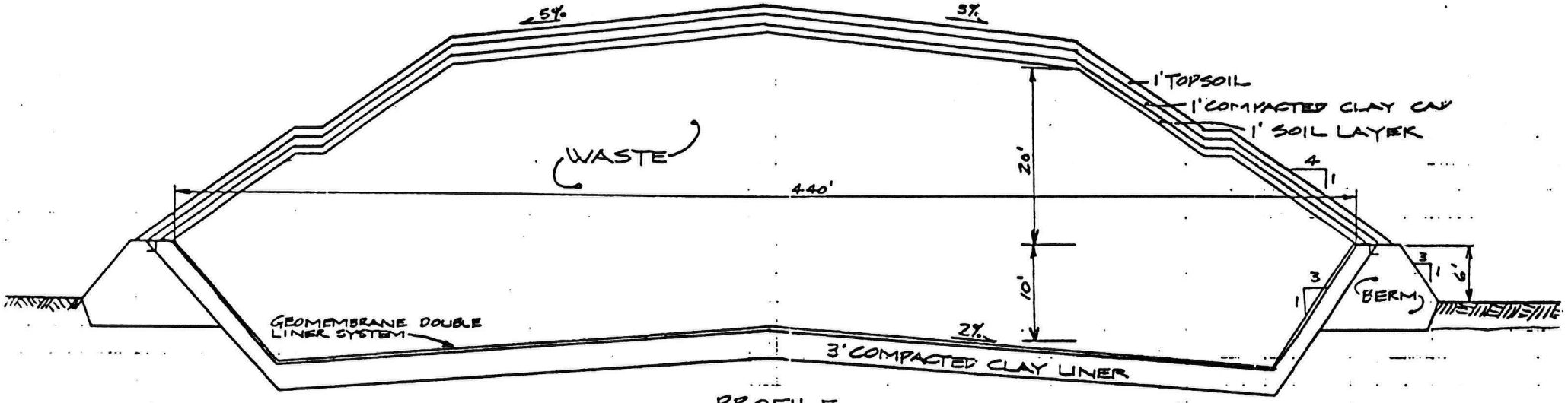
PROJECT EE/CA LANDFILL

SUBJECT CONCEPTUAL DESIGN - RCRA DISPOSAL CELL

OFS NO. _____

BY J. LOWREY DATE

CHECKED BY R. VERSAW DATE

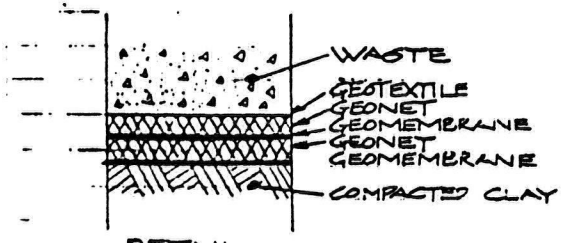


PROFILE

RCRA DISPOSAL CELL, N/S & E/W

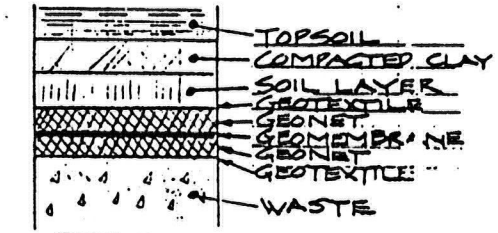
SCALE: 1" = 40' H

1" = 12' V



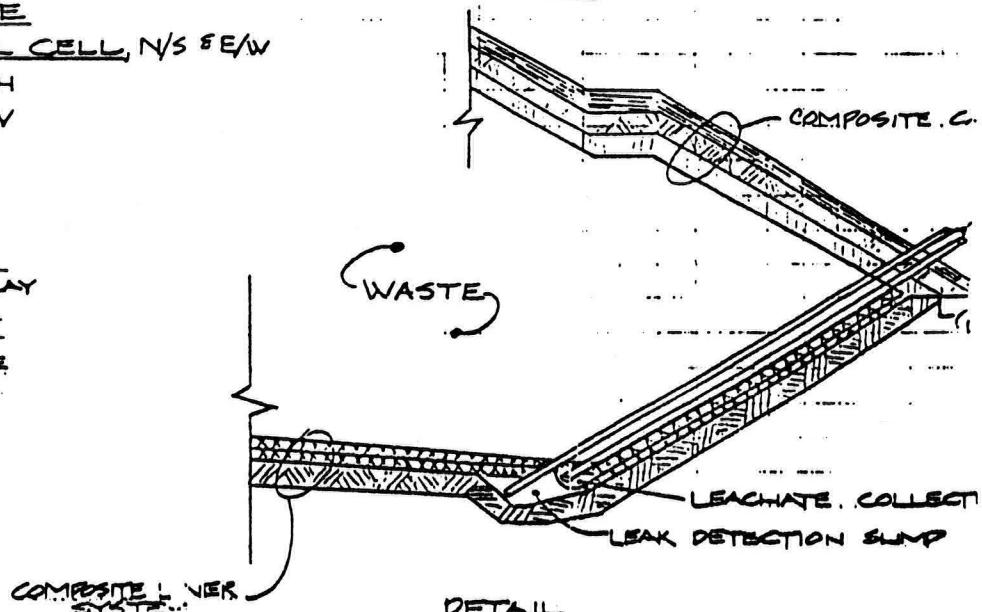
DETAIL

COMPOSITE LINER SYSTEM



DETAIL

COMPOSITE CAP SYSTEM



DETAIL

LEACHATE COLLECTION/LEAK DETECTION SUMPS & RISERS (4 LOCATIONS)

- Institutional controls may be necessary to ensure long-term operation and maintenance of the waste repository. These will be further developed in the subsequent RI/FS.

- Local government and public concerns over the onsite waste repository were evaluated during the repository siting investigation. Public comment received on the Arbiter/Beryllium EE/CA was primarily favorable. There was no change to the proposed alternative as a result of public comment.

B. Contribution to Remedial Performance

- Because this removal action alternative involves complete removal of identified wastes to an engineered containment facility, the current threat of release of contaminants from the waste source areas would be eliminated by action of the removal.

- This removal action alternative is consistent with the overall cleanup objectives for the site. It is anticipated that no further action will be required when the removal action is complete. Subsequent RI/FSs will evaluate the success of the removal actions.

- Adverse environmental impacts that may result from the removal action will be limited to construction-related activities, such as generation of dust, and the potential for the waste repository liner or cover to fail in the future. Generation of contaminated dust during implementation of the removal action or during stabilization following completion of construction may result in offsite contamination of soils and surface water. However, strict dust-control measures, equipment wash-down procedures, and restriction of activities during adverse weather conditions should effectively limit or prevent these releases.

- Integrity of the waste repository structure will be closely monitored throughout the operational life of the facility. Corrective measures would be initiated if the cover is damaged or if the leak detection system detects a failure in the bottom liner.

C. Alternative Actions

- The only other alternative evaluated involved removal of wastes from the Arbiter and beryllium waste disposal sites and placement of these wastes at an established offsite hazardous waste disposal facility.

- o No permitted hazardous waste disposal facilities are currently in operation in Montana. The EE/CA analysis therefore identified two regional facilities at which wastes could be transported to and disposed, including the Arlington, Oregon facility, operated by Chemical Waste Management, Inc., and the Grand View, Idaho facility, operated by Envirosafe, Inc. Wastes from the three subject waste sites would be transported by truck or railroad to one of these two disposal facilities in accordance with regulations governing the transport of hazardous materials.

- o Removal of wastes to an offsite repository would effectively address the contamination but would not be cost effective. The cost for this alternative is $27,550,000. Another prohibitive factor includes added risk and possible public concern of transporting, over public roads, large volumes of waste over long distances to an out-of-state repository.

D. Applicable or Relevant and Appropriate Requirements

- o The proposed removal action will attain all applicable or relevant and appropriate requirements (ARARs) identified within the scope of the project (see attached list of ARARs). The removal action is not intended to address all problems associated with the geographical areas on which the waste disposal sites lie. Therefore, the scope of the removal action does not go to the cleanup of groundwater or surface water located at or near the site.

- o ARARs that are within the scope of the removal action include: all State and federal location specific ARARs identified in the EE/CA; State and Federal air standards which must be achieved during on-site removal activities; Montana Safety Act and Employee and Community Hazardous Chemical Information Act regulations; Federal RCRA regulations and Montana Hazardous Waste Act requirements; and Federal and State reclamation regulations to the extent that they address above ground excavation and revegetation. Federal OSHA requirements, though not ARARs, will be in effect.

- o The analysis of ARARs (both Federal and State) has been reviewed by the State and appropriate comments have been incorporated into the final analysis. The State has recently submitted an updated list of State ARARs which are appended to the ARARs analysis and incorporated into the attached list of ARARs for this Action Memorandum.

E. Project Schedule

o Approval of the Action Memorandum selecting the proposed removal action alternative is tentatively scheduled for June 1991. A removal work plan, which details all requirements of the removal action that are specified in the Action Memorandum, and the draft Administrative Order on Consent will then be prepared. Negotiations for the work plan and Administrative Order will be concluded within 60 days of ARCO's receipt of the draft AOC and removal scope of work.

Implementation of the removal will be contingent upon design and construction of the waste repository. Contractor selection, mobilization of equipment and weather may impact start and completion dates. Removal of Beryllium and Arbiter wastes, including construction of a repository for each, may be implemented separately. This may allow for the Beryllium portion to be initiated in 1991. Completion of the removal action is anticipated for 1992. EPA, in consultation with the State, will provide oversight of the action.

F. Estimated Cost

o Detailed costs for the proposed action are presented in the EE/CA. Total costs, and a present worth sum of all costs, are summarized in Table 6. The total estimated present worth cost for the proposed removal action is $5,331,975. The cost will be absorbed by the responsible party (ARCO) who will conduct the removal action.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD NO ACTION BE TAKEN OR DELAYED

Delayed action will increase the potential for the migration of contaminants into the environment by exposure to ground and surface water caused by flood events. Also, delayed action will increase public health risks to persons who come in contact with the waste material, especially the beryllium wastes.

VII. OUTSTANDING POLICY ISSUES

None.

TABLE 6. COST ESTIMATE SUMMARY - ONSITE WASTE REPOSITORY

Item	Cost
Project Construction Cost[a]	
Waste Repository Construction	$1,655,811
Waste Removal and Disposal	1,054,645
Other Direct and Indirect Field Costs	1,041,600
Total Direct Construction Cost	$3,752,056
Contingency	$375,206
Contractor's Fee	562,808
Engineering	328,305
Total Indirect Costs	$1,266,319
Total Project Construction Cost	$5,018,375
Annual Costs[b]	
Maintenance	$400/YR
Monitoring	$10,000/YR
Regulatory Compliance	$10,000/YR
Total First Year Annual Cost	$20,400
30-Year Present Worth Annual Cost[c]	$313,600
Total Project Cost[d]	$5,331,975

[a] Cost estimate details are contained in Appendix D (Attachment A). Direct construction costs are summarized as following:

Waste repository construction, items 1-17 and 20-23.
Waste removal and disposal, items 18-19.
Other direct and indirect field costs, items 24-26 and field indirect costs.

[b] Annual operation, maintenance, and monitoring cost details are contained in Appendix D (Attachment E).

[c] Discounted at 5 percent over 30-year project duration.

[d] Sum of total project construction cost and present worth annual cost.

VIII. ENFORCEMENT

Title searches and accounting records have identified the Atlantic Richfield Company (ARCO) as the primary responsible party. ARCO has received several 104(e) notices and has been actively involved in conducting investigations at the site. ARCO has indicated a willingness to conduct the removal action and is expected to conduct the work under an Administrative Order on Consent. ARCO is believed capable of performing the work as described in this Action Memorandum (see Attachment 2).

IX. RECOMMENDATION

This decision document represents the selected removal action for the Arbiter and Beryllium operable units, Anaconda Smelter site, in Deer Lodge County, Montana, developed in accordance with CERCLA, as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the site. The Administrative Record is available for public review at the EPA Office in Helena, Montana.

Conditions at the site meet the NCP section 300.415 (b) (5) (ii) criteria for a removal and I recommend your approval of the proposed removal action. The total project ceiling, if approved, will be $5.5 million. No expenditure of the Regional removal allowance is anticipated.

Signature:

Robert L. Duprey, Director
Hazardous Waste Management Division
Region VIII
U.S. Environmental Protection Agency

7-8-91
Date

ATTACHMENT 1
TO ARBITER/BERYLLIUM OU ACTION MEMORANDUM

SUMMARY OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This attachment presents a summary of the applicable or relevant and appropriate requirements ("ARARs") for the Arbiter/Beryllium OU removal action. The ARARs summary consolidates state and federal ARARs by identifying only those that are most stringent, thereby avoiding unnecessary duplication. Below is a summary of the ARARs most critical to selection of the response action at the site, organized by the three ARARs categories. ARARs set out herein are not identified as being "applicable" or "relevant and appropriate" unless they were not discussed in EPA's original ARARs analysis, "Screening and Description of Potential Applicable or Relevant and Appropriate Requirements for the Arbiter Plant/Beryllium Disposal Areas Accelerated Removal, Anaconda Smelter NPL Site, June 1990" or in the document entitled "STATE OF MONTANA, ARARS, ARBITER/BERYLLIUM REMOVAL ACTION," dated March, 1991.

I. CONTAMINANT-SPECIFIC ARARS.

Contaminant specific ARARs include those laws and regulations governing the release to the environment of materials possessing certain chemical or physical characteristics or containing specific chemical compounds. Contaminant specific ARARs generally set health or risk based numerical values or methodologies which, when applied to site specific conditions, result in the establishment of numerical values. These values establish the acceptable amounts or concentrations of chemicals that may be found in, or discharged to, the ambient environment. If a chemical is subject to more than one discharge or exposure limit, the more stringent ARAR generally applies.

A. AIR.

1. Clean Air Act, 42 U.S.C. § 7401, et seq.

Federal ARARs governing air quality closely parallel the Montana contaminant-specific standards. Because the state standards are part of a delegated or authorized program under the Clean Air Act, the state requirements are identified as the appropriate standards. The requirements set forth below must be

met during and at the conclusion of the removal action.

a. ARM (Administrative Rules of Montana) § 16.8.811; Carbon Monoxide.

b. ARM § 16.8.815; Lead.

c. ARM § 16.8.818; Settled particulates.

d. ARM § 16.8.821; PM-10.

e. ARM § 16.8.822; Visibility.

f. ARM § 16.8.925; Ambient air increments.

g. ARM § 16.8.926; Ambient air limits.

h. ARM § 16.8.1401(2), (3), and (4); Airborne particulate matter.

j. ARM § 16.8.1404(2); Visible Air Contaminants.

k. ARM § 16.8.1427; Nuisance type odor bearing gases.

l. ARM § 26.4.761; Fugitive dust control measures.

II. LOCATION SPECIFIC ARARS.

Location specific ARARs are restrictions placed on the concentrations of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs relate to the geographic or physical position of the site, rather than to the nature of the site contaminants.

A. The statutes and regulations set forth below relate to the preservation of certain cultural, historic, natural or other national resources which may be adversely affected by the removal action. They require that such resources be identified, and that steps be taken to minimize the impact of the removal action upon any such resources.

1. National Historic Preservation Act, 16 U.S.C. § 470, 40 C.F.R. § 6.301(b), 36 C.F.R. Part 800.

2. Historic Sites, Buildings and Antiquities Act, 16 U.S.C. § 461, et seq., 40 C.F.R. § 6.301(a).

3. Archaeological and Historic Preservation Act, 16 U.S.C. § 469, 40 C.F.R. § 6.301(c).

4. Endangered Species Act, 16 U.S.C. § 1531, 50 C.F.R. Parts 17 and 402, 40 C.F.R. § 6.302(h).

5. Fish and Wildlife Coordination Act, 16 U.S.C. § 1531, et seq., 40 C.F.R. § 6.302(g).

6. 40 C.F.R. Part 6, Appendix A.

   a. Wetlands Protection, Executive Order No. 11990.

   b. Floodplain Management, Executive Order No. 11988.

B. Resource Conservation and Recovery Act, as amended, 42 U.S.C. § 6901, et seq., 40 C.F.R. § 264.18(a) and (b), incorporated by reference under ARM § 16.44.702. Facilities where hazardous waste is stored, treated or disposed may not be placed within 200 feet of a fault. Facilities located within a 100 year floodplain must meet the requirements of this section.

C. State of Montana requirements.

1. Floodplains and floodways, MCA §§ 76-5-402, -403, and -404; ARM §§ 36.15.216, -601 through -606, -701 and -703.

2. Natural Streambed and Land Preservation Act of 1975, MCA §§ 75-7-102, -104, -105, and -111; ARM § 36.2.404.

III. ACTION SPECIFIC ARARS.

Action specific ARARs are usually technology based or activity based requirements or limitations on actions taken with respect to hazardous wastes. A particular removal activity triggers an action specific ARAR. Action specific ARARs indicate how a removal action alternative, once selected, will be achieved.

The alternative selected for this removal action will consist of removal of all materials in the Arbiter ponds and bunkers, the beryllium bunker on Weather Hill, and the beryllium disposal site located at the B-2 Pond within the Opportunity Ponds, and placement of those materials in a waste repository to be located on Smelter Hill. Action specific requirements governing this alternative are as set forth below.

A. Hazardous waste requirements.

1. RCRA applicability.

Certain RCRA Subtitle C requirements are practicable as well as relevant and appropriate for removal of the beryllium wastes in the B-2 Ponds and in the Weather Hill bunker and deposition of those wastes in a waste repository, to be located upon the Anaconda Smelter NPL site. These RCRA requirements are also applicable for removal of the mining processing wastes in the Arbiter Ponds and bunkers and deposition of these wastes in the same waste repository.

It should be noted that the Bevill Amendment no longer excludes the processing waste in the Arbiter Ponds and bunkers from coverage under RCRA Subtitle C. The rulemakings of September 1, 1989, 54 F.R. 36592, and January 23, 1990, 55 F.R. 2322, limited the Bevill exclusion to the 20 wastes set out at 40 C.F.R. 261.4(b)(7). The processing waste in the Arbiter ponds is not among these 20 wastes. Montana has adopted these rule changes. See, amendments to ARM §§ 16.44.202, -303, -304, -408, -605, -607, and -610, December 17, 1990.

The Arbiter wastes are characteristic hazardous wastes, having failed TCLP testing. See, Action Memorandum, page 7. Also, deposition of the wastes in the waste repository amounts to "disposal (land disposal)" such that RCRA Subtitle C requirements become applicable. See, CERCLA Compliance With Other Laws Manual, August 8, 1988, page 2-5. "Land disposal" occurs when RCRA hazardous waste is moved across boundaries of "hazardous waste management units." Since the waste here will be moved from what could be considered a "unit," the Arbiter Ponds and bunkers, to a second unit, the waste repository, "land disposal" will occur[1].

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[1]It could be argued that the entire Anaconda NPL site is one "unit." If that were true, movement of waste from the Arbiter Ponds to the waste repository would be movement of waste within a unit, not across a unit boundary, and there would be no "land disposal." Although there is some basis for treating a CERCLA site as a single "unit," this is not always the case, and it is not the case here. First, the entire Anaconda NPL site is huge, some tens of square miles in size. It is simply too big to be treated as one unit. Second, EPA recognizes that "where there are discrete, widely separated areas of contamination, the RCRA 'unit' will not always encompass an entire CERCLA site." 55 Fed Reg. 8760. The Arbiter Ponds along with the bunkers consist of discrete "areas of contamination," which will are far away from the proposed waste repository location. Waste

Thus, RCRA Subtitle C requirements are applicable for movement of the Arbiter wastes to the repository. The wastes are characteristic hazardous wastes under RCRA, movement of the wastes to the waste repository will be "disposal" under RCRA, and the wastes are no longer excluded from RCRA Subtitle C coverage by the Bevill Amendment.

2. Applicable or relevant and appropriate RCRA Subtitle C provisions.

The following regulations are in effect in Montana through that state's own hazardous waste regulations. These incorporate by reference the federal RCRA Subtitle C regulations. See, ARM § 16.44.701 through -703.

a. 40 C.F.R. Part 264, Subpart F. Releases From Solid Waste Management Units.

This entire provision is practicable, relevant and appropriate for the construction and operation and maintenance of the portion of the waste repository to which the beryllium wastes will be transferred. It is applicable for the portion of the waste repository to which the Arbiter wastes will be moved.

This provision pertains to groundwater protection, establishing requirements for groundwater protection, for corrective action, and prescribing three different types of monitoring requirements, including detection, compliance, and corrective action monitoring. This provision is beyond scope for the areas from which beryllium and arbiter wastes will be excavated.

b. 40 C.F.R. Part 264, Subpart G, including 40 C.F.R. § 264.228 and 264.310. Closure and Post Closure.

All substantive provisions of 40 C.F.R. Part 264 Subpart G are either applicable or relevant and appropriate for deposition of Arbiter wastes into the waste repository. These provisions are relevant and appropriate for deposition of the beryllium wastes into the waste repository. Included among these are:

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transported from the Ponds will be moved in vehicles which will have to use or cross public highways to get to the waste repository. The Arbiter Ponds, therefore, should be considered a unit separate from the waste repository. Because there are two units in this situation, and because there is movement of RCRA hazardous waste from one unit to the other, there is "disposal."

- 40 C.F.R. § 264.111, which provides that a facility must be closed in a way that minimizes the need for further maintenance and that controls or minimizes the release of hazardous waste to the extent necessary to protect human health and the environment;

- 40 C.F.R. § 264.114, which provides that contaminated equipment must be properly decontaminated or disposed of;

- 40 C.F.R. § 264.117, the substantive portions of which require certain monitoring, see 40 C.F.R. § 264.117(a)(1)(i) and (ii), and 40 C.F.R. § 264.117(c), which limits the circumstances under which the integrity of components of the facility containment or monitoring systems may be disturbed;

- 40 C.F.R. § 264.228(a) and (b), providing for, among other things, decontamination of equipment, stabilization of wastes, requirements for covers, and groundwater monitoring.

c. 40 C.F.R. Part 264, Subpart L. Waste Piles.

- 40 C.F.R. § 264.252, providing for design and operating requirements;

- 40 C.F.R. § 264.258, providing requirements for closure and post closure care.

d. 40 C.F.R. Part 264, Subpart N. Landfills.

- 40 C.F.R. § 264.301, providing for design and operating requirements;

- 40 C.F.R. § 264.310, providing for closure and post closure design and maintenance requirements for covers, also, monitoring requirements.

3. 49 C.F.R. Parts 171-179, DOT Transportation Regulations.

a. 49 C.F.R. Part 177, setting forth requirements for transporting hazardous materials on highways. Among these are requirements for inspections, for reporting "incidents," for containers, for shipping papers, for marking vehicles, for loading and unloading, for disabled vehicles, and for accidents;

b. 49 C.F.R. Part 179, setting forth requirements for shipping containers.

4. Montana Solid Waste Management Act, specifically, MCA § 75-10-212, and regulations thereunder.

a. ARM § 16.14.504; restricts types of wastes that disposal sites may handle.

b. ARM § 16.14.505; no disposal sites in a 100 - year flood plain.

c. ARM § 16.14.509; solid waste disposal must be in areas that can be effectively maintained.

d. ARM § 16.14.520 and -521; sets forth operation and maintenance requirements for solid waste management systems.

e. ARM 16.14.523; solid waste must be managed in a way that prevents discharge from transporting vehicles.

4. ARM 16.40.1103

requires ponds from mining, milling, and manufacturing operations to be drained, piles must be leveled to prevent collection of water, side slopes must be stabilized.

5. Montana hazardous waste management regulations.

a. ARM §§ 16.44.109, -110, and -113; setting forth substantive monitoring, operation and maintenance, and sampling requirements.

b. ARM §§ 16.44.511, -512, -525, -526, and -527; setting forth standards and requirements for transporters of hazardous waste.

5. Requirements of the Montana Strip and Underground Mine Reclamation Act, MCA § 82-4-201, et seq., and regulations promulgated thereunder.

For the most part, reclamation requirements are outside the scope of this removal action and will instead be addressed at the time of remedial actions yet to be undertaken. A few reclamation requirements, however, will be at issue for this removal action. These will relate to erosion, ponding and other problems arising at excavated areas and at the waste repository, which could cause threats to human health and the environment during or after completion of the removal action and prior to the time remedial actions are commenced. For example, removal of waste from the Arbiter Ponds could leave excavated areas at risk for ponding of water, for erosion and dust if the waste is simply removed and the areas from which waste is taken are not otherwise stabilized. Certain temporary stabilization measures can be taken concurrently with the Arbiter/Beryllium removal to prevent these sorts of problems from occurring during the removal and prior to the time when a remedial action would deal permanently with the problem. The substantive portions of the following regulatory provisions, to the extent they address these issues, are identified as relevant and appropriate for both Arbiter and beryllium wastes because they deal with grading requirements, erosion control, and stabilization measures that will be useful in securing the excavation sites in the period before final remedial action is taken: MCA § 82-4-231, ARM §§ 26.4.501, -501A, -504, -505, -507, -510, -514, -515, -519, -520, -631, -633, -634, -635, -636, -637, -638, -639, -640, -641, -642, -650, -702, -703, -721, and -751.

Revegetation of excavated areas is not part of this removal. Therefore, regulatory provisions setting forth requirements for revegetation are not ARARs for this action. The following provisions are nevertheless expected to be ARARs at the time of a subsequent remedial action: MCA § 82-4-233, ARM §§ 26.4.711, -713, -714, -716, -717, -718, -723, -724, -725, -727, -728, -730, -731, and -733.

6. Ground and Surface Water.

Remediation of ground and surface water has been excluded from this removal. Ground and surface water were not sampled or studied as part of the EE/CA and it is not anticipated that ground or surface water will be adversely impacted in any way as a result of removal activity to be implemented. Therefore, water sampling requirements at ARM §§ 26.4.643 through -646, water quality requirements at MCA Title 75, Chapter 5, Part 2, and regulations promulgated thereunder, drinking water requirements at MCA Title 75, Chapter 6, and regulations promulgated thereunder, and groundwater requirements at MCA § 85-20-505 are not listed here as ARARs[2]. However, if this removal should in some unforeseen way adversely impact ground or surface water, then EPA reserves the right to reexamine these ARARs[3] and to look to the above mentioned provisions for guidance in dealing with impacts to affected waters.

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2 RCRA groundwater monitoring requirements must still be complied with. See, discussion beginning page 4, above.

3 These potential ARARs are more fully outlined in the State of Montana's document entitled "STATE OF MONTANA, ARARS, ARBITER/BERYLLIUM REMOVAL ACTION," dated March, 1991.

Attachment 3

RESPONSIVENESS SUMMARY FOR ACCELERATED REMOVAL ENGINEERING EVALUATION/COST ANALYSIS ARBITER AND BERYLLIUM OPERABLE UNITS

The U.S. Environmental Protection Agency sought public comment on the draft Accelerated Removals Engineering Evaluation/Cost Analysis (EE/CA) on April 24, 1991. The EE/CA was conducted to evaluate removal action alternatives for three waste deposit sites located within the Anaconda Smelter NPL site.

A public meeting was held on May 22, 1991 at the Metcalf Center in Anaconda to receive additional comments on the draft EE/CA. Approximately 35 individuals attended. This responsiveness summary responds to both verbal and written comments and questions.

Question/Comment Number 1: Several comments were received regarding a formal review of the work plan by the public.

RESPONSE: Although the law does not require a formal review period, the public will have a chance to comment on the work plan. Work may proceed during this period and comments will be incorporated as they are received. Communication with city public works departments and the community will continue during construction.

Question/Comment Number 2: One area of concern was the hazard of handling the beryllium.

RESPONSE: Worker safety and protection of the public will be emphasized. On-site work will be performed in accordance with OSHA requirements. Dust suppressant will be used to prevent the dispersion of contaminated soils. Public access to the work sites will be restricted.

The primary concern with handling the beryllium waste is inhalation of dust. Inhalation of beryllium or its compounds in sufficient dose will cause a variety of toxic responses in the lungs. At relatively high doses, inhalation of beryllium produces a pneumonia-like response known as acute beryllium disease. Severe cases can be fatal. Chronic exposure to much lower doses produces an irreversible lung disease known as berylliosis. Chronic exposure may also increase the incidence of lung cancer. In addition to inhalation, dermal exposure to beryllium may also lead to toxic effects.

Personal protection equipment for workers, dust and contaminant monitoring, and equipment operating procedures will prevent contact with possibly contaminated dust.

Question/Comment Number 3: One letter expressed concern about transportation of arbiter and beryllium wastes on and across public roads and highways.

RESPONSE: Transportation of wastes will be performed in accordance with Department of Transportation and State of Montana regulations. These include prevention of discharge of material from hauling vehicles, traffic control, and related items. An emergency plan will be developed to react to accidents.

Question/Comment Number 4: Two questions were received regarding the condition of the waste areas after removal and the need for signs that may have a negative impact on the community.

RESPONSE: After the beryllium wastes have been removed, the excavated areas will be backfilled with suitable material. The Weather Hill site will be revegetated. The Arbiter Ponds will be larger but will not be backfilled at this time. Further monitoring of the soils below the ponds may be required in the near future. Limited backfilling or regrading may be performed to reduce physical hazards. Final backfilling of the ponds will be addressed as part of later work in the Old Works area.

Access restrictions will be maintained. Due to concerns with the negative impact of signs regarding hazardous waste, EPA will work with the community to maintain access restrictions in the least negative way.

Question/Comment Number 5: Three questions involved the design of the repository.

RESPONSE: The repository will be similar to other hazardous waste repositories in the country. The design will consider site-specific factors and will conform to federal regulations and follow the latest guidelines. Site investigations will be performed to assure that the specific location selected for the repository is acceptable.

Basically the repository will consist of an excavated area surrounded with an earth berm. A double liner and leachate collection and removal system will prevent migration of wastes out of the impoundment. A leak detection system between the two liners will alert maintenance personnel to potential problems with the upper liner. A cover system and groundwater monitoring

system will be installed after the wastes are placed in the repository.

The double liner system consists of a composite bottom liner below a flexible membrane liner. The composite bottom liner is made up of low permeability compacted soil overlain by a flexible membrane. The leachate collection and removal system consists of a drainage layer above the upper flexible membrane liner. The leak detection layer will be located between the flexible membrane liner and the composite liner below.

After the wastes have been placed in the repository, a cover will be constructed over the repository to prevent further contact with the wastes. The cover will consist of low permeability soil, flexible membrane and a leachate collection system to prevent rainwater from entering the repository. Wells will be installed to monitor groundwater around the repository.

The beryllium wastes and the arbiter wastes will be placed in separate cells within the repository. A single repository will be built to simplify construction.

Question/ Comment Number 6: One comment was that beryllium wastes should be taken to an existing repository out of state.

RESPONSE: The intent of the Superfund program is to deal with hazardous waste on the site if possible. Offsite disposal could increase the risk potential. In addition, other states often will not accept waste from out of state.

Disposal of the beryllium at an out of state repository would not increase the protectiveness of the removal. The additional cost to ship the beryllium wastes out of state would be about $500,000 for the 100 cubic yards of material. The additional cost and risk potential outweigh any benefits of out of state disposal.

Question/Comment Number 7: One letter included several questions and comments regarding locating the repository at PSA #9 and the impact on the flue dust processing plant and industrial development, what other wastes may go here, and would other locations be considered for other repositories.

RESPONSE: This is the only repository planned for construction on the Anaconda smelter site at this time. The location of the repository will not impact future remediation of the Anaconda smelter site. Only mining and smelting wastes from the Upper Clark Fork basin, including Anaconda, will be placed in the repository.

Question/Comment Number 8: The letter also contained several questions regarding the life of the repository, responsibilities after the life is over, and the possibility of later treatment of wastes.

RESPONSE: RCRA Subtitle C requirements include maintenance of the repository and groundwater monitoring for a period of 30 years following closure of the repository. The post-closure care period may be extended if necessary to protect human health and the environment. Responsibility for the repository remains that of the potentially responsible party. No further treatment of the wastes in the repository is anticipated.

Question/Comment Number 9: ARCO letter dated May 24, 1991 concerning ARAR's and the removal action.

RESPONSE: Responses to the individual comments in the letter will be provided to the Administrative Record.

FCD:June 6, 1991:EECARESP

Attachment 4

STATEMENT OF WORK
FOR
REMOVAL ACTION
ARBITER AND BERYLLIUM
OPERABLE UNITS

INTRODUCTION:

The following scope of work describes the removal action to be conducted by the Atlantic Richfield Company under an Administrative Order on Consent. The scope of work covers the selected alternative developed in the engineering evaluation/cost analysis (EE/CA) for the Arbiter and Beryllium Operable Units. The EE/CA was conducted to evaluate removal action alternatives for three waste disposal sites located within the Anaconda Smelter National Priorities List site near Anaconda, Montana.

The three waste disposal sites are the Arbiter Ponds and Bunkers, located at the eastern boundary of Anaconda, Montana; the Weather Hill beryllium bunker located on Weather Hill, about 2 miles southeast of the eastern boundary of Anaconda; and the B-2 Pond beryllium disposal site located in the Opportunity Ponds, midway between Anaconda and Warm Springs, Montana.

The selected removal action alternative is the removal of wastes from the three disposal sites and placement of the wastes in an on-site repository. The on-site repository will be located on the eastern part of Smelter Hill. The removal action will include design and construction of the on-site repository, removal of the wastes and placement in the repository, closure of the repository and post-closure monitoring of the repository.

The removal action scope is limited to the materials within the boundaries of three waste sources. Investigations of surrounding media, such as groundwater, surface water, and air will be performed in concurrent and future remedial investigation/ feasibility studies (RI/FS).

SCOPE OF WORK:

1. <u>Design and construction of hazardous waste repository:</u>

Design of the waste repository will be in accordance with applicable or relevant and appropriate Montana Hazardous Waste Act and RCRA Subtitle C requirements and associated guidance. The repository will be located on Smelter Hill within site PSA #9

identified in the Anaconda Smelter NPL Site Repository Siting Phase II Report (SRM 1990). A final siting investigation will be conducted to confirm suitability of the site. Additional field data collection may be required to determine waste material properties, repository site properties and conditions, locations of borrow sources and waste areas,etc. The exact location of the repository and all other design details will be submitted to EPA for approval.

Requirements regarding siting of the waste repository include the following:

A. Cultural, historic, natural and other national resources

1. National Historic Preservation Act, 16 U.S.C. 470, 40 C.F.R. 6.301(b), 36 C.F.R. Part 800.
2. Historic Sites, Buildings and Antiquities Act, 16 U.S.C. 461, et seq. , 40 C.F.R. 6.301(a).
3. Archaeological and Historic Preservation Act, 16 U.S.C. 469, 40 C.F.R. 6.301(c).
4. Endangered Species Act, 16 U.S.C. 1531, 50 C.F.R. Parts 17 and 402, 40 C.F.R. 6.302(h).
5. Fish and Wildlife Coordination Act, 16 U.S.C. 1531, et seq., 40 C.F.R. 6.302(g).
6. 40 C.F.R. Part 6, Appendix A.
   a. Wetlands Protection, Executive Order No. 11990
   b. Floodplain Management, Executive Order No. 11988

B. Resource Conservation and Recovery At, as amended, 42 U.S.C. 6901, et seq., 40 C.F.R. 264.18(a) and (b).

C. State of Montana requirements

1. Floodplains and floodways, MCA 75-5-402, -403, and -404; ARM 36.15.216, -601 through -606, -701 and -703.
2. Natural Streambed and Land Preservation Act of 1975, MCA 75-7-102, -104, -105, and -111; ARM 36.2.404.

Requirements regarding design and operation of the waste repository include the following:

A. RCRA Subtitle C provisions

1. 40 C.F.R. Part 264, Subpart F. Releases From Solid Waste Management Units.
2. 40 C.F.R. Part 264, Subpart G, including 40 C.F.R. 264.228 and 264.310. Closure and Post Closure.
3. 40 C.F.R. Part 264, Subpart L. Waste Piles.
4. 40 C.F.R. Part 264, Subpart N. Landfills.

B. Montana Solid Waste Management Act, specifically, MCA 75-10-212, and regulations thereunder

1. ARM 16.14.504; restricts types of wastes that disposal sites may handle.
2. ARM 16.14.505; no disposal sites in a 100-year flood plain.
3. ARM 16.14.529; solid waste disposal must be in areas that can be effectively maintained.
4. ARM 16.14.520 and -521; sets forth operation and maintenance requirements for solid waste management systems.
5. ARM 16.40.1103; requires ponds from mining, milling, and manufacturing operations to be drained, piles must be leveled to prevent collection of water, side slopes must be stabilized.

C. Montana hazardous waste management regulations

1. ARM 16.14.109, -110, and -113; setting forth substantive monitoring, operation and maintenance, and sampling requirements.
2. ARM 16.44.511, -512, -525, -526 and -527; setting forth standards and requirements for transporters of hazardous waste

Construction of the waste repository will be in accordance with applicable or relevant and appropriate requirements and associated guidance documents. A Construction Quality Assurance Plan should be developed and strictly followed to assure that the repository is constructed as designed.

Requirements regarding construction of the repository include the following:

A. Air Quality

1. ARM (Administrative Rules of Montana) 16.8.811; Carbon Monoxide
2. ARM 16.8.815; Lead
3. ARM 16.8.818; Settled particulates
4. ARM 16.8.821; PM-10
5. ARM 16.8.822; Visibility
6. ARM 16.8.925; Ambient air increments
7. ARM 16.8.926; Ambient air limits
8. ARM 16.8.1401(2), (3), and (4); Airborne particulate matter

9. ARM 16.8.1404(2); Visible air contaminants
10. ARM 16.8.1427; Nuisance type odor bearing gases
11. ARM 26.4.761; Fugitive dust control measures

B. OSHA Requirements for worker safety

Recommended guidance documents for design and construction of hazardous waste repositories include the following:

A. Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments - Design, Construction and Operation USEPA 1985

B. Technical Guidance Document: Construction Quality Assurance for Hazardous Waste Land Disposal Facilities USEPA 1986

C. Lining of Waste Containment and Other Impoundment Facilities USEPA 1988

D. Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments USEPA 1989

2. Removal of wastes from disposal sites:

Removal of wastes will include excavation, haul and placement in the on-site repository. Removal of the wastes shall be in accordance with applicable or relevant and appropriate requirements. Liquid wastes encountered at any waste site will be evaporated at the waste site or in the vicinity of the repository.

Wastes at the Arbiter ponds and bunkers may include liquids, soils, sludge, concrete rubble and related materials. These wastes are contaminated with varying levels of arsenic and other metals. Wastes at the B-2 pond beryllium disposal area may include soils, tailings, drums(both sealed and damaged) and associated debris. Wastes at the Weather Hill beryllium bunker site may include soils, barrels, tanks, concrete cells and miscellaneous demolition debris. More information regarding the quantities and composition of the wastes to be removed is included in the Arbiter/ Beryllium EE/CA.

The extent of waste removal at the three sites will be determined by visual inspection and confirmation sampling as described below. A monitoring plan shall be submitted to EPA for approval prior to the removal. A post-monitoring report summarizing the results of the final monitoring for each site will be provided upon completion of the removal.

Arbiter wastes to be removed are those materials contained within

the discrete disposal pond cells or bunkers (Ponds 2 & 3, bunkers A,B,C,&D) and adjacent soils that contain visually distinct wastes of the same type and equivalent concentrations. Confirmation sampling will be conducted to confirm the removal of Arbiter wastes. Equipment limitations could limit the removal of adjacent soils to approximately three feet below the original pond bottoms. Further investigation of the extent of soil contamination under and around the Arbiter Ponds will be performed during the subsequent remedial investigation/ feasibility study.

B-2 Pond and Weather Hill Bunker wastes to be removed are those visually distinct wastes(i.e. drums and debris) and adjacent soils that are contaminated with beryllium above a concentration of 3 mg/kg. Confirmation sampling will be conducted to confirm the removal of beryllium to this level.

Following excavation and confirmation monitoring, and upon approval of EPA, the beryllium sites will be backfilled with suitable soil material. The Arbiter Ponds will not be backfilled because monitoring of deep soils beneath the ponds may be required for the subsequent RI/FS. Limited backfilling or regrading may be required to stabilize excavated slopes and reduce physical hazards, as determined in the field. The bunkers may remain in place but should be rinsed with high pressure spray and the water disposed of with other liquid wastes.

Requirements regarding excavation, hauling and placement of wastes in the repository include the following:

A. Air quality standards as listed above for construction of repository

B. OSHA requirements for worker safety

C. Transportation regulations
   1. 49 C.F.R. Parts 171-179, DOT Transportation Regulations
   2. ARM 16.44.511, -512, -525, -526, and -527; setting forth standards and requirements for transporters of hazardous waste.
   3. ARM 16.14.523; solid waste must be managed in a way that prevents discharge from transporting vehicles.

D. RCRA Subtitle C requirements
   1. 40 C.F.R. 264.314, Special requirements for bulk and containerized liquids
   2. 40 C.F.R. 264.315, Special requirements for containers

E. Requirements of the Montana Strip and Underground Mine

Reclamation Act, MCA 82-4-201, et seq., and regulations promulgated thereunder, including MCA 82-4-233, ARM 26.4.711, -713, -714, -716, -717, -718, -723, -724, -725, -727, -728, -730, -731, and -733.

3. Closure and post-closure monitoring of repository:

Closure and post-closure monitoring of the repository shall be in accordance with applicable or relevant and appropriate requirements. Requirements regarding closure and post closure of the repository include the following:

A. RCRA Subtitle C requirements
   1. 40 C.F.R. Part 264, Subpart G, including 40 C.F.R. 264.228 and 264.310. Closure and Post Closure

WORK PLAN AND OTHER PLANS:

1. Removal Design/ Removal Action Work Plan:

A Work Plan should be prepared covering design and construction of the repository, removal of wastes, transportation and placement in the repository, and closure and post-closure monitoring of the repository. Qualifications of key personnel involved in the removal activities should be included or addressed in the work plan. Work plans may be developed separately for beryllium wastes and arbiter wastes.

The work plan should outline any requirements for additional field data collection. Specific design criteria and assumptions regarding the repository and handling of the waste materials should be included in the plan. Preliminary schedules for design, construction and removal activities should also be included in the work plan.

The work plan should also address the related plans described below.

2. Site Health and Safety Plan:

A site-specific health and safety plan (HSP) should be prepared. The HSP should provide for protection of health and safety of individuals who will be involved in implementation of the remedial design and remedial action. The HSP will also develop the requirements for protection of the surrounding communities during all phases of the remedial design, remedial action, and

operation and maintenance implementation. Included in the HSP will be a chapter detailing the actions to be taken during a site emergency, including a telephone notification list of key individuals. This emergency plan will be developed in coordination with appropriate Deer Lodge County officials. The HSP should be reviewed and approved by the EPA prior to any activity on the site.

3. Sampling and Analysis Plan:

A Sampling and Analysis Plan (SAP) should be prepared, if necessary, including a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP). These documents should be consistent with previously approved SAPs, FSPs and QAPPs for other Clark Fork Basin Superfund sites. These and all other field documents must be reviewed and approved prior to initiation of any field work described as work under this removal.

4. Remedial Design Reports:

A preliminary design report should be submitted to EPA reflecting the effort at 30 percent completion of construction plans and specifications. The report should include results of any additional field data collection, design criteria, preliminary plans, drawings and sketches, specifications outline and a preliminary construction schedule.

A prefinal design report reflecting about 90 percent completion of the construction plans and specifications should be submitted. The prefinal design report should include design rationale and calculations. The report should address potential environmental impacts and mitigative measures during construction of the repository and removal, haul and placement of wastes.

A draft Construction Management Plan, Operations and Maintenance Plan, Sampling and Analysis Plan and Health and Safety Plan should be included with the prefinal design report.

The final design report should include drawings and specifications of quality necessary to include in a package for contractors who will be submitting bids for the construction activities. Final plans submitted with the prefinal design report should be included with the final design report.

5. Construction Quality Assurance Plan:

A Construction Quality Assurance Plan (CQAP) should be prepared following review of the final design package. The CQAP should be developed and implemented to ensure that the completed remedial measures will meet or exceed all design criteria, plans, and specifications. The CQAP should be reviewed and approved by EPA prior to the start of construction.

6. Post-Closure Care Plan:

A post-closure care plan must be prepared upon closure of the repository in accordance with RCRA Subtitle C requirements.

Additional items to be considered when developing the work plan and preparing the design, construction and removal specifications are attached.

Attachment

FCD:May 22, 1991:AR4

ATTACHMENT TO STATEMENT OF WORK
FOR REMOVAL ACTION
ARBITER AND BERYLLIUM
OPERABLE UNITS

Arbiter/beryllium work plan considerations:

Proposed design firm(s)

Scope of work for design firm (e.g. plans and specs for entire removal, design of repository only, etc.)

Initial design criteria and assumptions regarding material to be removed

- -Review and verification of existing data including quantities, chemical and physical characteristics, compatibility with other wastes and liner materials, expected moisture content of soils and sludges, etc.

Initial design criteria and assumptions regarding location of repository

- -capacity, basic configuration and dimensions, anticipated future expansion, etc.

Initial design criteria and assumptions regarding construction and operation of repository

- -anticipated construction and operation season(s), length of time repository will be uncovered, estimated leachate volume to be handled during removal action and following closure of repository, need for protective soil cover over liner during operation, availability of water and power, etc.

Additional field data collection needs

- -waste material properties
- -repository site investigation, including soil and foundation properties, minimum seasonal depth to groundwater, topography, climate, etc.
- -borrow sources for fill material and topsoil
- -waste areas for material unsuitable for construction

Health and safety plan and QA/QC plan for field work

Design schedule, including field investigations, repository design,preliminary(30%) design package, pre-final design package, Construction Quality Assurance Plan, post-closure plan, etc.

Breakdown of construction activities by contract, if more than one contract is anticipated.

Preliminary schedule for construction of repository

Initial assumptions regarding excavation and placement of wastes in repository

- -removal of soil above waste and method of determining when contaminated material is encountered
- -handling of liquids, sludges, barrels, concrete rubble, debris, etc.
- -compaction and slope stability of waste in repository
- -protection of liner during operation
- -inventory and as-built layout of waste placed in repository
- -required permits to haul on public roads, etc.

Preliminary schedule for excavation and placement of wastes in repository

Anticipated confirmation sampling plan

Initial design criteria for final excavation site conditions, backfill, topsoil, resloping, etc.

Preliminary schedule for closure of repository and post-closure monitoring

FCD:June 1991:ARWP