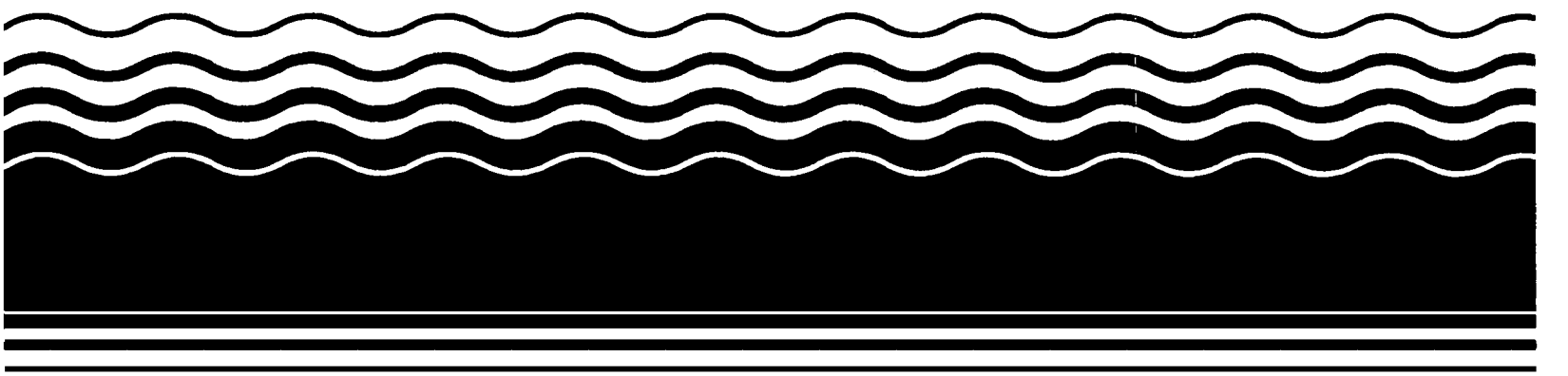
PB96-963108
EPA/AMD/R10-96/146
April 1997

EPA Superfund Record of Decision Amendment:

Bunker Hill Mining & Metallurgical Complex (Non-Populated Areas) Superfund Site, Smelterville, ID 9/9/1996



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

Reply To
Attn Of: ECL-111

September 3, 1996

MEMORANDUM

TO: Chuck Clarke, Regional Administrator

FROM: Michael F. Gearheard, Associate Director
Environmental Cleanup Office

SUBJECT: Amendment to the Record of Decision for the Bunker Hill Mining and Metallurgical Complex (Non-Populated Areas) Superfund Site

The attached ROD Amendment represents a minor overall change to the Bunker Hill non-pop. ROD. This proposed change updates the stabilization remedy for "principal threat materials" to containment in order to promote remedy cost effectiveness. Treatment of the currently estimated volume of PTMs would have cost in excess of $7,000,000. The current estimate of containment is just over $600,000. The Amended remedy therefore represents a 90 percent cost savings over the 1992 ROD remedy and would achieve the same level of protectiveness of human health and the environment.

During the public meeting on August 15, no formal comments were received on the proposed plan. Only one comment letter was received from the Coeur d'Alene Tribe. The Tribe's comments are addressed in the Responsiveness Summary of the Amended ROD. The State concurs with this ROD Amendment.

Attachment

COEUR D'ALENE TRIBE

ROUTE 1 • BOX 11-F.A.
TRIBAL HEADQUARTERS
PLUMMER, IDAHO 83851
(208) 686-1800 • Fax (208) 686-1182

REFERENCE:

RECEIVED

AUG 30 1996

Environmental Cleanup Office

August 26, 1996

Sean Sheldrake, Project Manager
US EPA Mailstop: ECL-111
1200 Sixth Ave.
Seattle, WA 98101

RE: Proposed Amendment to the Record of Decision, Bunker Hill Mining and Metallurgical Complex Superfund Site, Shoshone County, Idaho

Dear Sean:

Thank you for the opportunity to comment on EPA's proposed Amendment to the Bunker Hill ROD. Below are the Coeur d'Alene Tribes comments:

1) This is a unique proposal, because the bottom liner which is outlined in this amendment and subject to review by the public prior to enacting has already been installed. At a minimum, this has the appearance of poor coordination or impropriety. I urge EPA to better coordinate its administrative duties with its construction projects in the future.

2) The Principal Threat Threshold Criteria (PTM) were established as part of the stabilization option. Because of the differing technologies (stabilization versus containment) it is unclear whether these numbers should be adjusted in response to the proposed ROD amendment.

3) The Draft Amendment concludes approximately 73,000 yd^3 of material will be contained. The containment cell is estimated at 100,000 yd^3. The 73,000 yd^3 will expand to an unknown quantity because of handling and mercury stabilization. Additional space may therefore be available if expansion is minimal. Additionally, the cell could be expanded upwards to create space for additional materials. The proposal should consider including additional wastes in the cell, whether from on-site or off-site. The Tribe has long-held that the Bunker Hill Site should be used as a regional repository. While EPA has concluded that only on-site wastes will be disposed on-site, this amendment provides a new occasion to consider the idea.

4) If the containment structure leaks, unlike stabilized materials, the contamination will be instantaneous and concentrated. Therefore, the existing monitoring plan should be reviewed to ensure that it takes into account the nature of the disposed materials (chemical availability) and containment method (HDPE susceptibility and immediacy of release upon breach

(notwithstanding the clay layer)).

Thank you for considering these comments. Please contact me if you need additional information.

Sincerely,

Phillip Cernera, Project Manager
Natural Resources Damage Assessment
Coeur d'Alene Tribe

CC: Stu Levit
Chronolog

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington

Non-Populated Areas
Bunker Hill Superfund Site
Shoshone County, Idaho

Amended Record of Decision
Decision Summary and
Responsiveness Summary

September 1996

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Non-Populated Areas Operable Unit of the Bunker Hill Superfund Site Amended Record of Decision

Site

Non-populated Areas Operable Unit (Mining and Metallurgical Complex), Bunker Hill Superfund Site, Shoshone County, Idaho.

Statement of Basis and Purpose

This Record of Decision (ROD) Amendment has been developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C. Section 9601 et seq., and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. The decision to amend the ROD is based on the administrative record for the non-populated areas, which was updated August 14, 1996, to include information that was generated since the issuance of the ROD in 1992 pertaining to this Amendment.

The State of Idaho concurs with the ROD Amendment.

Assessment of the Site

Actual or threatened releases of hazardous substances in the former Metallurgical Complex, if not addressed by implementing the selected remedy documented in the ROD as modified in this ROD Amendment, may present an imminent and substantial threat to human health, welfare, or the environment.

Description of the Amendment to the Remedy

This decision document changes a component of the selected remedial action for the Non-populated Areas Operable Unit of the Bunker Hill Superfund Site (Site). The ROD for this operable unit, signed on September 22, 1992, required treatment of all principal threat materials (PTMs) at the site. This Amendment to the ROD will require containment of all

PTMs, except mercury, in a fully lined monocell rather than treatment followed by capping. Mercury contaminated materials will still be treated prior to disposal. Unlike the containment proposal evaluated in the 1992 ROD, which called for consolidation of PTMs and placement under a simple, surficial cap, this amended remedy will completely isolate the PTMs from the environment, including groundwater, thereby being protective of both human health and the environment. Containment satisfies all applicable or relevant and appropriate requirements. The containment design will also allow for potential future reprocessing of materials as technology develops. All other elements of the selected remedy set forth in the ROD are unchanged.

Declaration

Although this ROD Amendment changes a component of the remedy selected in the ROD, the remedy as amended continues to be protective of human health and the environment. The remedy as amended complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective. The remedy as amended continues to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

Because this remedy will result in hazardous substances remaining on site above health based levels, a review will be conducted every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Chuck Clarke

9-9-96

Chuck Clarke
Regional Administrator, Region 10
U.S. Environmental Protection Agency

Date

Decision Summary

Non-Populated Areas Operable Unit of the Bunker Hill Superfund Site Amended Record of Decision

Introduction

Site Name and Location

Non-populated Areas Operable Unit (Mining and Metallurgical Complex), Bunker Hill Superfund Site, Shoshone County, Idaho.

Lead and Support Agencies

The U.S. Environmental Protection Agency (EPA) is the lead agency and the Idaho Department of Health and Welfare, Division of Environmental Quality (DEQ) is the support agency for this Amendment.

Statutory Citation for a Record of Decision (ROD) Amendment

Section 117(c) of CERCLA, 42 U.S.C. Section 9617(c) provides for addressing and documenting changes to the selected remedy after issuance of a ROD. This ROD Amendment documents the changes to the remedy set forth in the ROD. Additionally, since fundamental changes are being made to the remedy, public participation and documentation procedures specified in the NCP, Section 300.435(c)(2)(ii) have been followed.

Date of ROD Signature

The ROD for the Bunker Hill Mining and Metallurgical Complex (Non-populated Operable Areas Unit) was signed September 22, 1992.

Need for the ROD Amendment

EPA selected treatment for materials exceeding the "Principal Threat Material" (PTM) action levels in the 1992 ROD. PTMs were defined as contaminants which would be expected to induce symptomatic health effects (requiring emergency treatment) to an exposed individual based on a 70 mg/day soil ingestion rate for a short duration (less than three months). The five metals identified as PTMs and the threshold criteria are listed in Table 1, below. Materials contaminated with these metals, but at concentrations below the threshold criteria, were to be consolidated without treatment beneath the Smelter Complex Closure Cap.

Table 1. Principal Threat Threshold Criteria		
Metal	Parts per Million (ppm)	Percent
Antimony	127,000	12.7
Arsenic	15,000	1.5
Cadmium	71,000	7.1
Lead	84,600	8.5
Mercury	33,000	3.3

The ROD selected cement based stabilization of materials above the threshold criteria shown in Table 1, above. After treatment, the PTMs were to be disposed of in an on-site unlined landfill. During the remedial design process for the Industrial Complex Closure in late 1995 and early 1996, EPA identified an alternative option to stabilization/fixation of PTMs. Complete containment was identified as a possible alternative which would provide long-term protectiveness and overall protection of human health and the environment. Containment satisfies all applicable or relevant and appropriate requirements. Containment has several advantages over cement based stabilization, including a 90 percent reduction in cost, faster implementation, and fewer on-site worker exposure concerns. The containment design will also allow for potential future reprocessing of materials as technology develops. Since all of the above advantages can be realized without treatment, EPA is modifying the stabilization remedy of PTMs to containment in a separate, completely enclosed cell beneath the Closure Cap.

In addition, in October of 1995, EPA proposed 20 administrative reforms designed to improve the efficiency and effectiveness of the Superfund Program. One of the 20 reforms called for EPA to update remedy decisions where there is an opportunity to control remedy costs and promote cost effectiveness while providing the same protection of human health and the environment. The remedy changes reflected in this ROD Amendment will result in a faster, more cost effective remediation effort, thus achieving the reform intent.

Public Involvement

EPA issued two newspaper notices, a fact sheet, and a proposed plan on August 2, 1996 to initiate a 30 day comment period. A public meeting was held on August 15 at the Kellogg Middle School. Attendance was very low. The decision to amend the ROD is based on the administrative record for the non-populated areas, which was updated August 14, 1996, to include information generated since the issuance of the ROD in 1992 pertaining to this Amendment. Locations where the administrative record may be found are listed below.

Administrative Record

This ROD Amendment will become part of the Administrative Record for the Non-populated Areas, as required by Section 300.825(a)(2) of the NCP, and will be available for public review on weekdays between 8:30 a.m. and 4:30 p.m. at the information repository below:

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

Other copies of the Administrative Record may be viewed at the following two locations during their respective hours of operation:

Kellogg Public Library
16 W. Market
Kellogg, Idaho 83837

Idaho Department of Health and Welfare
Division of Environmental Quality
1410 North Hilton
Boise, Idaho 83706-1253

Site History

The Bunker Hill Mining and Metallurgical Complex Superfund Site encompasses 21 square miles along Interstate 90 in the Silver Valley area of Shoshone County in northern Idaho. The Site includes the now active Bunker Hill Mine and the inactive metallurgical and smelting facility (together called the Bunker Hill Complex), and the cities of Kellogg, Pinehurst, Smelterville, and Wardner (total population of over 5,000).

The site has widespread contamination from mine tailings, emissions from the Bunker Hill smelter complex, and blowing dust from tailings piles and other barren areas. Barren hillsides and open areas within the site contribute to erosion and blowing dust problems. Extensive soil contamination remains in the residential areas of the above mentioned communities as well as the surrounding non-populated areas. There are high lead levels in house dust. There is also extensive heavy metals contamination of ground water and surface water because of historical mining activities and continued leaching of metals from mine and mill wastes.

In 1917, the Bunker Hill lead smelter began producing lead, cadmium, silver, and alloys of these heavy metals. In 1928, an electrolytic zinc plant was also put into production. Smelter and zinc plant operations resulted in fugitive and stack emissions of

metals and sulfur dioxide.

In September 1973, a fire in a pollution control device (bag house) at the lead smelter operated by Gulf Resources and Chemical Corporation (Gulf) resulted in a dramatic increase in emissions. In the first three months of 1974, approximately 73 tons of lead per month were emitted into the environment.

In 1974, the average blood-lead level for children under 12 years of age within the site was 65 micrograms of lead per deciliter of blood. This average is over six times the Centers for Disease Control and Prevention (CDC) current level of concern. Excessive amounts of lead in the body has been linked to impaired neuro-behavioral development, kidney damage, anemia, and hypertension, especially in children.

Health studies were initiated and emergency measures were taken at the Site in the late 1970's. The Bunker Hill facility was closed in 1981. Due to the human health and environmental concerns, the Bunker Hill Superfund site was added on the National Priorities List in 1983.

EPA identified seventeen potentially responsible parties (PRPs), including Gulf, for site contamination in the 1980's. On September 22, 1992, EPA signed the Record of Decision (ROD) covering the non-populated portions of the site. Since 1992, Gulf has gone through bankruptcy proceedings and the majority of the non-populated areas aside from the Union Pacific railroad right-of-way and parts of the Phosphoric Acid Fertilizer Plant (Stauffer entities) are being remediated by the EPA using the Superfund.

To date, the bulk of the Smelter Complex has been demolished and the Closure Cap area is being constructed. EPA is beginning the removal of contaminated soils from the surrounding gulches for consolidation under the Closure Cap.

Remedy Selected in the ROD

The ROD identified cement based stabilization as the preferred means to reduce the mobility of PTMs. Since RCRA Land Disposal Restrictions (LDRs) were determined to be relevant and appropriate to the treatment of PTMs, treatment goals were set at percent reduction and/or extract concentration goals based on the LDR treatability variance guidance. The cost of such stabilization was estimated in the original ROD at approximately $2,600,000. More recent estimates for this work are over $7,000,000 due in large part to increases in volume of PTMs since the time of the 1992 ROD. To further limit the mobility of contaminants, the stabilized material was then to be placed in building foundations or other structures beneath the Closure Cap. This remedy could be implemented in one to two years.

Hazardous materials that contain metals can often be stabilized using cement-based

stabilization/fixation technologies. In such a process, wastes are mixed with cement and other additives. The cement hydrates and sets to form a matrix, encapsulating the waste and physically limiting contact with water which might mobilize the contaminants.

Description of the Modified Remedy

All PTMs except mercury will be contained rather than stabilized. Mercury contaminated material will be stabilized as stated in the 1992 ROD. Figures one through three, below, illustrate the high density polyethylene (HDPE) bottom lined and three-ply copolymer laminate (plastic) top lined monocell which will contain the PTMs. Unlike the containment proposal evaluated in the ROD, which called for consolidation of PTMs and placement under a simple, surficial cap, the amended remedy will completely isolate the PTMs from the environment utilizing a bottom and top sealed plastic liner which will be the engineered equivalent to a 'ziplock™ baggie'. This method of containment will seal in the PTMs and practically lock out water. As seen in the figures, the monocell will also be covered with a HDPE cap, which will cover the entire Smelter Complex Closure Area. This top liner will provide a supplemental barrier to infiltration. In addition, upstream surface and groundwater cutoffs will be in place to ensure that water does not contact the monocell from the sides. From the bottom, a naturally occurring clay layer will prevent contact with the monocell by impeding upward migration of groundwater. The monocell will be located well above the highest location of the local groundwater table (groundwater will be 40 to 50 feet below the monocell). Figure 4 illustrates the selected location for the PTM monocell. The area depicted for the monocell is roughly three acres, while the size of the overall Smelter Complex Closure Area is approximately 30 acres. This fully encapsulated PTM monocell, with supplemental barriers above, below, and to the sides, will prevent both direct human contact with the PTMs and the PTM's exposure to groundwater thereby being protective of both human health and the environment.

Performance standards are a key element of this modified remedy for the PTMs. Appendix B describes the planned design criteria and minimum performance standards for the HDPE portion of the cell. Appendix C describes the construction quality assurance (CQA) and quality control procedures that will be required. CQA will be a crucial component to attaining the performance standards listed in Appendix B. Appendix D lists the current minimum specifications of the HDPE liner. The liner, once installed to CQA specifications, will be as impermeable or better than the overall Smelter Complex Closure Cap, which will have a permeability of 10^{-7} centimeters per second or less.

The modified remedy will also allow reprocessing of materials should changes in technology make this option viable in the future.

Two important features of the 1992 ROD remain unchanged. First, mercury contaminated soils above the PTM threshold will still be treated/stabilized, consistent with the 1992 ROD, before being placed in the plastic monocell with the other, untreated PTMs.

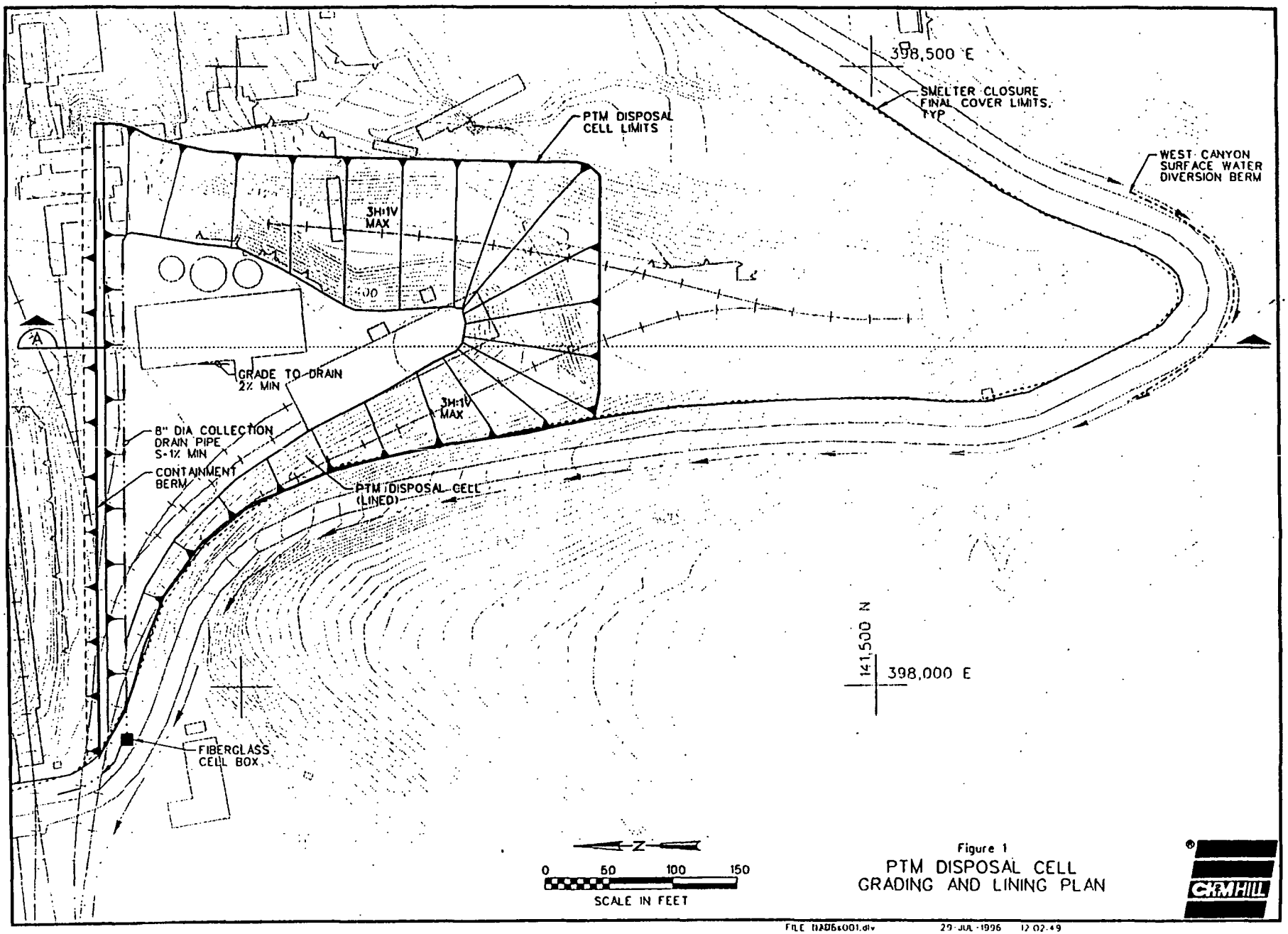

Figure 1
PTM DISPOSAL CELL
GRADING AND LINING PLAN

CRMHILL

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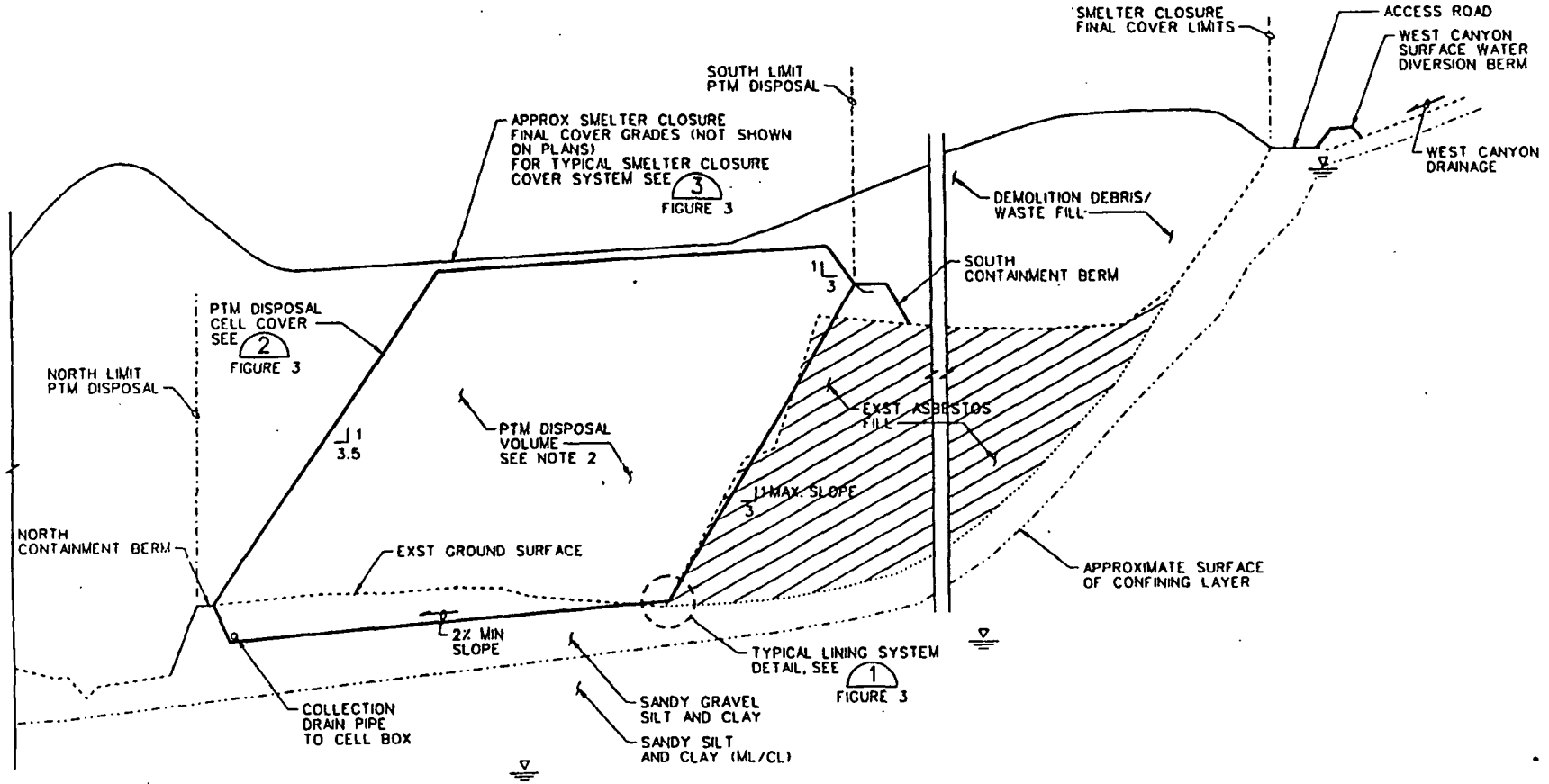

SECTION A
NTS FIGURE 1

Figure 2
PTM DISPOSAL CELL
SECTION

▽ -MAXIMUM OBSERVED
WATER LEVEL

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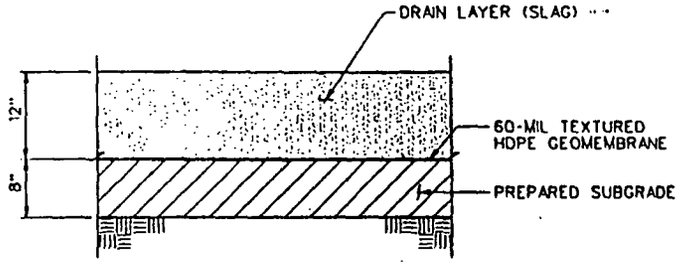
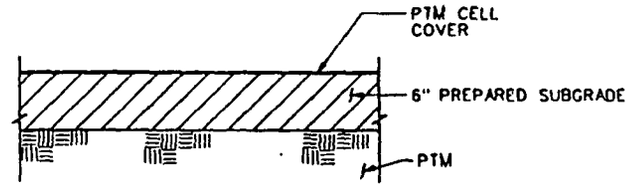


TYPICAL LINING SYSTEM

DETAIL 1

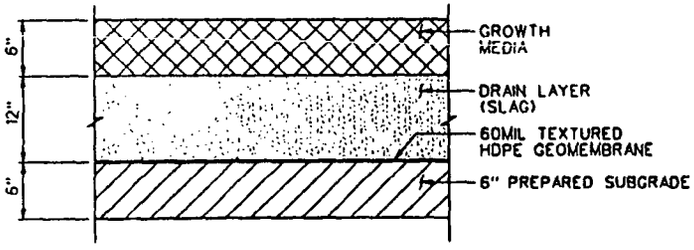
NTS



TYPICAL PTM CELL COVER

DETAIL 2

NTS



TYPICAL SMELTER CLOSURE FINAL COVER

DETAIL 3

NTS

Figure 3

PTM DISPOSAL CELL DETAILS

CH2MHILL

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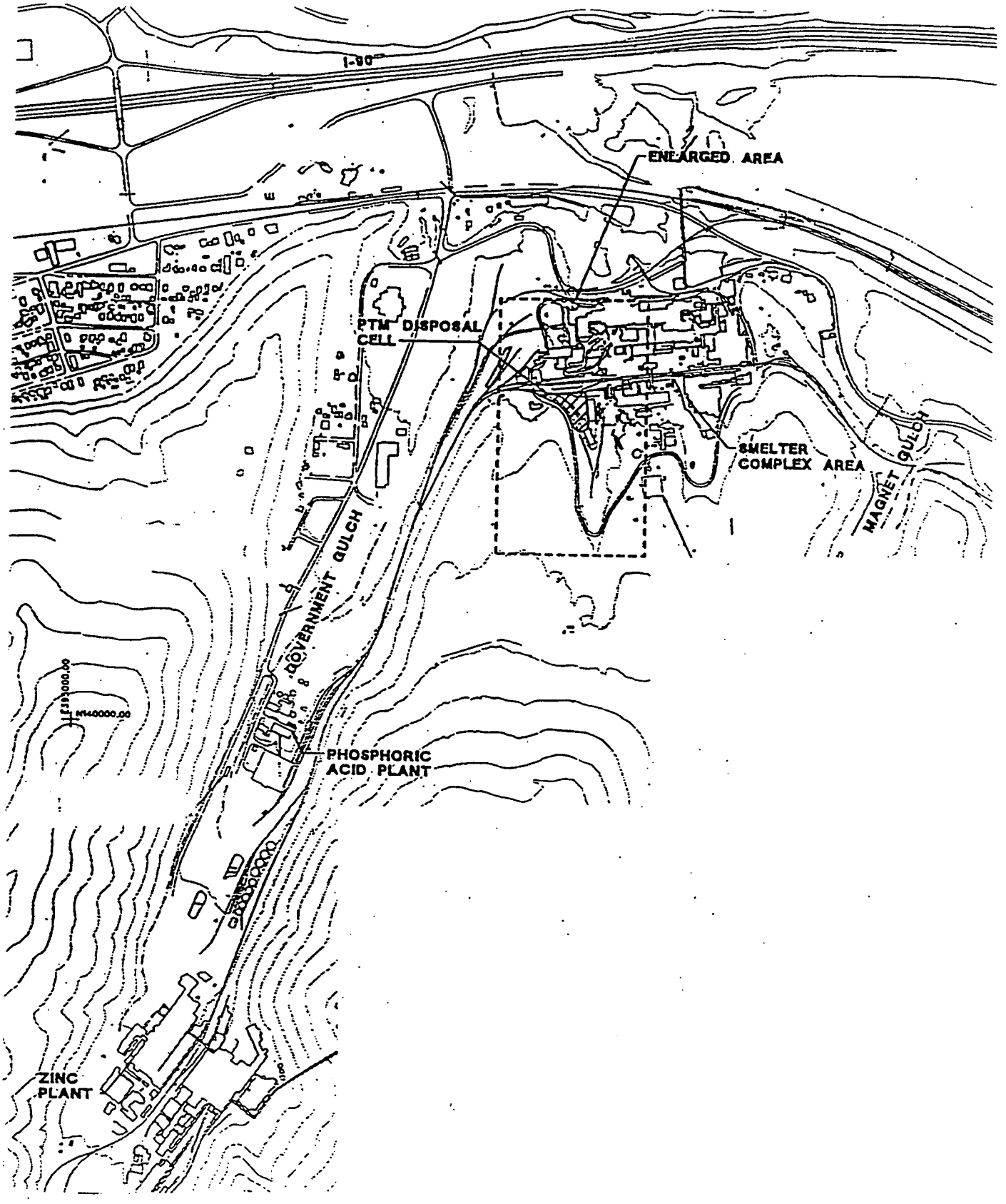

Figure 4: Bunker Hill Non-Populated Area Site Map
-Planned PTM Monocell Area -

Quantities of mercury contaminated soils and debris are currently estimated at up to 5,000 cubic yards of material. Mercury contaminated material, particularly that potentially containing elemental [liquid] mercury is more likely to remain highly mobile in the environment than the other PTMs, and warrants stabilization before disposal.

Second, all PTM material may be reprocessed into a commercially valuable material if the material characteristics are suitable. For example, the copper dross flue dust is currently being evaluated for use as an ingredient substitute to a pyrometallurgical or hydrometallurgical process. If reprocessing is not viable for this dust it will be disposed of within the PTM monocell.

Table 2, below, summarizes the changes to the handling of PTMs.

Table 2. Summary of Changes

Principal Threat Material	1992 ROD Remedy	Remedy Change	Comment
Mercury contaminated soils	Stabilization / Reprocessing	None. If stabilized, disposal will be in the PTM monocell.	No change was proposed due to the presence of liquids necessitating stabilization if not reprocessed.
Antimony, Lead, Cadmium, and Arsenic contaminated soils	Stabilization / Reprocessing	Containment rather than stabilization.	Containment will involve a completely sealed plastic cell.

The overall cost to implement the amended remedy is approximately $600,000 and could be implemented in less than one year.

Evaluation of Alternatives

The NCP establishes nine criteria for evaluating remedial action alternatives. These criteria are divided into three categories of weighted importance, which include: threshold, balancing, and modifying criteria. All remedies must meet the threshold criteria to be considered. The seven balancing and modifying criteria help describe relative differences between alternatives. A discussion of the original remedy and modified remedy relative to the nine criteria evaluation is required by CERCLA. In this section, concrete stabilization (1992 ROD) will be compared to the amended remedy of containment, relative to each of the nine criteria.

In the design process, containment (previously evaluated in a limited fashion in the Feasibility Study and summarized in the 1992 ROD) was re-evaluated as a potential alternative to stabilization. Advantages of containment over stabilization include: a level of long-term protectiveness and overall protection of human health and the environment comparable to that provided by cement based stabilization, satisfaction of all applicable or relevant and appropriate requirements (ARARs), a 90 percent reduction in cost, fewer technical concerns, faster implementation, and fewer on-site worker exposure concerns. The containment design would also allow for potential future reprocessing of PTMs as technology develops.

Threshold Criteria

Overall Protection of Human Health and the Environment - Both the original remedy and the containment approach meet the threshold criterion of protection of human health and the environment. Both isolate the worst metal contamination from the ground and surface water, from the food chain, and from direct human contact.

Compliance with ARARs - The original ROD approach and the containment of PTMs will both comply with the ARARs identified in the 1992 ROD.

Balancing Criteria

Long-term Effectiveness and Permanence - Actual life cycle (beyond 30 year) data on the endurance of concrete versus plastic is not currently available. However, it is expected that plastics including HDPE, if kept out of sunlight, can last for hundreds of years similar to the longevity of a concrete matrix. Operations and maintenance requirements are similar under both the 1992 ROD and amended remedies. With proper maintenance, the containment and stabilization alternatives are expected to have similar long term effectiveness and permanence.

Reduction of Toxicity, Mobility, and Volume Through Treatment or Recycling - For this criterion, concrete stabilization is better than containment using plastic in that containment does not permanently address the mobility of the metals via treatment. Concrete stabilization does not address toxicity or volume reduction and in fact would increase the volume of the material. Containment would allow reprocessing of the material in the future as technology develops.

Short-term Effectiveness - Stabilization would be a greater threat to worker safety due to the extended handling time involved. Dust generated by the treatment process would increase the inhalation and dermal exposure risk of on-site workers. If treatability studies are necessary to implement stabilization, containment could be implemented as much as a year sooner than the ROD selected remedy. Containment could be implemented 3-5 months faster than stabilization, if no treatability studies are necessary.

Implementability - The containment remedy is a proven technology and could be effectively implemented. Stabilization may not be as successful due to the difficulty in stabilizing both arsenic and lead in the same stabilization mixture. In earlier attempts to stabilize both constituents, arsenic has been rendered more soluble by stabilization if lead was immobilized, and vice versa due to an inverse solubility relationship (McCulley, Frick, and Gillman, 1993). Containment does address the mobility of all metals via engineered controls. In addition, containment does not increase the volume of the waste material. Stabilization actually increases the volume of the material by adding cement, lime, and other fixating agents. This may increase the material volume two to three times, which increases management costs.

Cost - Principal threat materials accumulated, as seen in Table 3, below, currently exceed 73,000 cubic yards. The cost of stabilization was estimated at $80 per cubic yard in the Feasibility Study, written in support of the 1992 ROD. Using an updated, conservative estimate of $100 per cubic yard of PTM, which includes the cost of treatability studies, treatment of the currently estimated volumes would cost in excess of $7,000,000. The current estimate of containment is just over $600,000. The containment remedy therefore represents over a 90 percent cost savings over the ROD selected remedy.

Table 3. Principal Threat Materials Estimated Quantities* *based on July 18, 1996 Morrison Knudsen (MK) estimate	
Source	Estimated Quantities/cubic yards
OHM Stockpiles	15,950
MK Temporary stockpile	3,003
Balloon Flue PTM	624
East Miscellaneous Stockpiles	1,320
West Miscellaneous Stockpiles	3,102
Mercury PTM	5,100
Copper Dross	10,495
Area 10B Magnet Gulch West	7,344
Area 14	7,047
Area 18	39
Area 2 Boulevard	6,428
Area 10A Magnet Gulch East	889
Area 13 SE of Lead Smelter	1,300
Area 15	10,686
Bunker Creek #1	unknown
Bunker Creek #2	unknown
Total Estimated Quantity	73,328

Modifying Criteria

State Acceptance - The State of Idaho has concurred with this Amendment. The concurrence letter is attached as Appendix A.

Community Acceptance - EPA issued two newspaper notices, a fact sheet, and a proposed plan on August 2, 1996 initiating a 30 day comment period. A public meeting was held on August 15 at the Kellogg Middle School. Attendance was very low. Several questions were asked regarding the proposal, however no comments were received at the meeting. The decision to amend the ROD is based on the administrative record for the non-populated

areas, which was updated August 14, 1996, to include information which has been generated since the issuance of the ROD in 1992 pertaining to this Amendment. Only one comment letter was received during the 30 day comment period from August 2 to September 2, 1996 from the Coeur d'Alene Tribe. Comments in the letter from the Tribe are addressed within the Responsiveness Summary.

Summary

In summary, based on the comparisons between stabilization and containment for each of the nine criteria, containment is the preferred alternative. The containment alternative met both of the threshold criteria of protecting human health and the environment and complying with applicable or relevant and appropriate requirements. The containment alternative was considered equivalent to stabilization in long-term effectiveness, but fell short of stabilization in the reduction of toxicity, mobility, and volume through treatment. The containment alternative was superior to stabilization in short-term effectiveness, implementability, and cost. The containment alternative also has been endorsed by the State and the community. The containment alternative is therefore selected over stabilization of PTMs.

Statutory Determination

Under CERCLA, EPA's primary responsibility is to undertake remedial actions that ensure adequate protection of human health, welfare, and the environment. In addition, Section 121 of CERCLA establishes cleanup standards which require that the selected remedial action comply with all applicable or relevant and appropriate requirements (ARARs) established under federal and state environmental law, unless any such requirements are waived by EPA in accordance with established criteria. The selected remedy must also be cost-effective and must utilize permanent solutions, alternative treatment technologies, or resource recovery technologies to the maximum extent practicable. Finally, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how the selected remedy meets those CERCLA requirements.

Protection of Human Health and the Environment

The modified remedy will remain protective of human health and the environment. PTMs were defined as contaminants which would be expected to induce symptomatic health effects (requiring emergency treatment) to an exposed individual based on a 70 mg/day soil ingestion rate for a short duration (less than three months). The modified remedy will enclose the PTMs in a fully encapsulated monocell underneath the Smelter Complex Closure Area cap. Since direct human or groundwater contact with the principal threat materials is prevented, the amended remedy is protective of human health and the environment.

Compliance with Applicable or Relevant and Appropriate Requirements

No ARARs beyond those listed in the 1992 ROD are triggered by the amended remedy. The amended remedy complies with all ARARs listed in the 1992 ROD.

Cost Effectiveness

The amended remedy represents a cost savings of over 90 percent from the 1992 remedy at $600,000 and over $7,000,000, respectively. The amended remedy provides an overall effectiveness proportionate to its costs, such that it represents a reasonable value for the money that will be spent.

Utilization of Permanent Solutions and Alternative Treatment Technologies

The remedy selected in this ROD Amendment utilizes permanent solutions and alternative treatment technologies to the extent practicable. In this case, the selected remedy is containment since the 1992 remedy of treatment was not found to be practicable. Treatment of the PTMs, except mercury, is not practicable because:

- 90 percent cost increase;
- difficulty in achieving treatment goals;
- increased worker exposure risk;
- increased implementation time; and
- increased material volume.

The 1992 remedy of stabilization will be implemented for mercury contaminated materials. However, for the remainder of the principal threat materials, stabilization was found not to be practicable for the reasons listed above. In place of stabilization, PTMs other than mercury will be contained in an on-site fully encapsulated monocell.

Preference for Treatment as Principal Element

The amended remedy for PTMs, except for the mercury contaminated materials being stabilized, does not satisfy the CERCLA preference for treatment. Treatment was not judged to be practicable for the majority of PTMs due to the implementability, short-term effectiveness, cost, and technical concerns stated above.

Responsiveness Summary

Non-Populated Areas Operable Unit of the Bunker Hill Superfund Site Amended Record of Decision

Introduction

This responsiveness summary meets the requirements of Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. The purpose of this responsiveness summary is to summarize and respond to public comments on EPA's proposed Amendment of the cleanup plan for the Non-Populated Areas of the Bunker Hill Superfund Site. The proposed ROD Amendment, issued on August 2, 1996, presented for public comment proposed changes to a component of the remedy set forth in the Non-Populated Areas Record of Decision (ROD) issued in 1992.

EPA announced the issuance of the proposed plan on two separate occasions in a community newspaper. A thirty day comment period was provided for the public to read the proposed plan, review documents in the administrative record, and submit written comments. EPA held a public meeting at the Kellogg Middle School on August 15 to answer questions and accept comments.

The proposed ROD Amendment was to change the stabilization remedy for principal threat materials (PTMs), except mercury contaminated materials, to containment in a fully encapsulated monocell. Mercury contaminated materials would be stabilized consistent with the 1992 ROD.

Community Involvement

Less than two dozen people attended the public meeting on August 15, 1996, including the Superfund Task Force. EPA presented information on both the proposed ROD Amendment and the 1992 remedy. Although several people asked questions regarding the 1992 ROD and proposed plan, no formal comments were given at the meeting. A transcript of the meeting is included in the administrative record. Only one letter was received commenting on the proposed remedy modification.

Comments and Responses

One letter was received during the 30 day comment period from the Coeur d'Alene Tribe. Comments and responses follow.

Comment: This is a unique proposal, because the bottom liner which is outlined in this amendment and subject to review by the public prior to enacting has already been installed. At a minimum, this has the appearance of poor coordination and impropriety. I urge EPA to better coordinate its administrative duties with its construction projects in the future.

Response: The original (1992 ROD) called for the consolidation of PTMs in "concrete substructures (basements, storage bins, etc.) within the Lead Smelter Complex unless other areas are determined to be appropriate by U.S. EPA during Remedial Design" (p. 9-10). After consideration during design of the placement of PTMs in basements or other structures within the Lead Smelter, EPA determined that a lined cell was a more protective and cost effective approach to containerizing stabilized PTMs as required in the 1992 ROD. If the containment proposal had been ill received by the community and the State, EPA would have placed stabilized PTMs in the lined cell which has already been constructed, consistent with the 1992 remedy. However, as outlined in this ROD Amendment, PTMs, except mercury, will be contained in the lined monocell.

Comment: The Principal Threat Threshold Criteria were established as part of a stabilization option. Because of the differing technologies (stabilization versus containment) it is unclear whether these numbers should be adjusted in response to the ROD Amendment.

Response: As described on page one of the Decision Summary of this ROD Amendment and as part of the Proposed Plan issued on August 2, the PTM levels were selected based on acute "symptomatic health effects" in humans. These levels were not selected based on technical specifications related to stabilization or groundwater impacts. The fully encapsulated lined cell will prevent exposure of PTMs to humans and groundwater, thus being protective of human health and the environment.

Comment: The Draft Amendment concludes approximately 73,000 cubic yards of material will be contained. The containment cell is estimated at 100,000 cubic yards. The 73,000 cubic yards will expand to an unknown quantity because of handling and mercury stabilization. Additional space may therefore be available if expansion is minimal. Additionally, the cell could be expanded upwards to create space for additional materials. The proposal should consider including additional wastes in the cell, whether from on-site or from off-site. The Tribe has long held that the Bunker Hill Superfund Site should be used as a regional repository. While EPA has concluded that only on-site wastes will be disposed on-site, this amendment provides a new occasion to consider the idea.

Response: Capacity concerns related to the stabilization of mercury contaminated materials and the unknown quantities of materials to be consolidated in the Smelter Complex will be addressed by design engineers and construction managers as cleanup progresses. EPA maintains that the Superfund cleanup will only deal with wastes residing within the 21 square mile area designated as the Bunker Hill Superfund Site stated in the 1992 ROD, as amended. This distinction between "on-site" and "off-site" wastes is necessary due to the liability and operations and maintenance cost concerns to both the federal and state governments for such

a regional repository.

Comment: If the containment structure leaks, unlike stabilized materials, the contamination will be instantaneous and concentrated. Therefore, the existing monitoring plan should be reviewed to ensure that it takes into account the nature of the disposed materials (chemical availability) and containment method (HDPE susceptibility and immediacy of release upon breach (notwithstanding the clay layer).

Response: The fully lined monocell, with supplemental barriers to infiltration by moisture, will be similar in protectiveness of human health and the environment to stabilization. However, consistent with your comment/recommendation, EPA and the State had previously written an additional monitoring plan and installed several new wells to monitor the performance of the Smelter Complex Closure Area. This monitoring plan will include the PTM monocell described in this Amendment.

IDAHO DEPARTMENT
OF HEALTH AND WELFARE

DIVISION OF
ENVIRONMENTAL QUALITY

1410 North Hilton, Boise, ID 83706-1255, (208) 334-0502 Philip E. Batt, Governor

August 30, 1996

Chuck Clarke
Regional Administrator
US EPA Region X
1200 6th Ave.
Seattle, WA 98101

Subject: State of Idaho Concurrence on the Non-populated Areas, Bunker Hill Superfund Site Record of Decision Amendment

Dear Mr. Clarke:

We have evaluated the proposed Plan for the alternative method for disposal of the Principle Threat Materials (PTMs) at the Bunker Hill Superfund site. We concur that disposal in a fully enclosed liner system will be protective of human health and the environment, allow retrievability for possible future reprocessing, and is more cost effective than the previously planned cement stabilization. We have also evaluated the public comments and believe the public is supportive of the Proposed Plan.

Since the State of Idaho is responsible for ten percent of the remedy cost and one hundred percent of operation and maintenance, we have a direct stake in this decision. Based upon these findings, the State of Idaho concurs with the proposed alternative for PTM disposal.

If you have any questions, please contact me or Rob Hanson at (208) 373-0502.

Sincerely,

for Wallace N. Cory P.E.
Assistant Administrator

Administrator

cc: Rob Hanson, DEQ
Sean Sheldrake, EPA

Post-it® Fax Note 7671	Date	# of pages ▶
To Sean Sheldrake	From	
Co./Dept. EPA	Co. DEQ	
Phone #	Phone # (208) 373-0260	
Fax # (206) 553-0124	Fax # (208) 373-0576	

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APPENDIX B

Principal Threat Material Mono-Cell Design Criteria and Performance Standards	
Category	Standard
Subgrade Compaction	To ensure an adequate subgrade for placing the mono-cell liner, the subgrade shall be compacted to at least 95 percent standard compaction per ASTM D 698.
Slope Stability	The slope stability of the mono-cell liner and cover systems shall have a factor of safety of at least 1.5 under static loading conditions. For dynamic loading conditions (i.e., earthquake), the factor of safety shall be at least 1.1.
Minimum Cover Over Geomembrane	A minimum of 12-inches of soil shall be placed over the mono-cell liner to protect the geomembrane from punctures and damage from vehicles while placing the PTMs.
Geomembrane Liner Type and Thickness	Geomembrane on the bottom and sides of the PTM mono-cell shall be a textured high density polyethylene liner, 60 mils in thickness.
Geomembrane Cover Type	Geomembrane cover over the placed PTM material shall be a 3-ply, copolymer laminate reinforced with a non-woven grid of high strength nylon cord.
Geomembrane Seaming	The individual geomembrane sheets of the mono-cell liner will be seamed together in the field to provide a water-tight cell for subsequent placement of PTMs. The geomembrane sheets will be seamed together using either fusion-extrusion and/or hot-wedge welding system, equipment, and techniques.
Geomembrane Installation Quality Assurance/Quality Control	A QA/QC program will be conducted to ensure that proper storage, handling, and installation requirements are met for the geomembrane-lined mono-cell.

APPENDIX C

GEOMEMBRANE QUALITY ASSURANCE - QUALITY CONTROL PROGRAM MINIMUM REQUIREMENTS

PTM Mono-Cell, Bunker Hill Superfund Site

1. **Quality Control Submittals**: QC submittals for the mono-cell geomembrane shall include:

- Written Quality Assurance Program: Includes description of geomembrane manufacturer's and installer's formal programs for manufacturing, fabricating, handling, seaming, testing, and repairing geomembrane.
- Qualifications: Documented evidence of the ability and capacity for the following services:
  - Independent Testing Laboratory : 5 years experience in the field of geomembrane testing.
  - Manufacturer and Fabricator: Successfully manufactured a minimum of 5 million square feet of the specific type of geomembrane specified for the mono-cell.
  - Installer: Successfully installed a minimum of 5 million square feet of the specific type of geomembrane specified for the mono-cell.
- Manufacturer's Certification of Compliance
- Factory Test Results
- Testing Equipment: Certified calibrations, manufacturer's product data, and test procedures.
- Certified Test Results from the Independent Laboratory.

2. **Field Quality Control**

- Field Seam Strength Sample Testing: Strength tests of field seams shall be conducted to verify that seaming equipment and operators are performing adequately. Samples of field seams of the geomembrane liner shall be tested for shear strength (ASTM D4437-84/D882-90, Method A (Modified)) and bonded seam strength in peel (ASTM D 4437-84/D413-82, Method A) at the following frequency:
  - Nondestructive Sampling: At the beginning of each shift for each seaming crew; if seaming has been suspended for more than 1/2 hour; and minimum one sample per 500 feet of field seam.
  - Destructive Sampling: Minimum one sample per 500 feet of field seam. Areas where destructive samples have been taken from the geomembrane liner shall be repaired in accordance with liner specifications.
- In-Place Leak Detection Testing: After individual geomembrane sheets has been seamed in the field, every inch of every seam shall be tested for leakage potential. Depending on the seam welding equipment used, the leakage tests shall be conducted using either a vacuum box testing device, a spark testing device, and/or air channel pressure tests for double welded seams. Leakage tests shall conform to applicable ASTM standards.
- Repair of Geomembrane Seams: Any seams found to be defective either in strength or in leakage will be repaired and retested until specifications are met.

APPENDIX D

Minimum HDPE Specifications		
Property	Required Value	Test Method
Specific Gravity	0.941 to 0.936, g/cc; not more than 15% greater than base resin density	ASTM D792-86, Method A-1
Textured-Surface, Minimum Properties, Each Direction		
Thickness, min. For thinner areas of textured Sheet	57 mil	ASTM D5199-91, Modified (Note 1)
Tensile Stress at Yield	2 lb/mil thickness	ASTM D638-90
Elongation at Yield	12% or greater	
Puncture Resistance	1 lb/mil thickness	FTMS 101C, Method 2065
Tear Resistance	0.75 lb/mil thickness	ASTM D1004-90, Die C
Hydrostatic Resistance	7.5 lb/sq in/mil thickness	ASTM D751-89, Method A
Environmental Stress Crack	1,500 hours	ASTM D1693-70, Condition C (100 degrees C)
Bonded Seam Strength in Shear	1.8 lb/in-width/mil thickness, min. & F.T.B.	ASTM D4437-84/D882-90, Method A, Modified
Bonded Seam Strength in Peel	1.2 lb/in-width/mil thickness min. & F.T.B.	ASTM D4437-84/D413-82, Method A
Water Adsorption, Weight Change/Adap.	0.085% max.	ASTM D570-81

NOTE 1: Commercially available micrometers may be used that have a 60 degree taper to a point with a radius of 1/32 inch. The Engineer shall make enough measurements of thinner areas of textured Sheet to develop a statistical basis for thickness.

NOTE 2: Thickness of 60 mils shall be used in calculating required strength properties.

NOTE 3: The liner must meet the above minimum requirements in addition to the manufacturer's most recent published specifications.

September 1996 Bunker Hill Non-Populated Areas ROD Amendment - PTM Containment

Concurrence

	Sheldrake	Yackulic	Kowalski	Krueger	Gearheard
Initials	8/29/96				
Date		8/29/96	8/29/96	9/25/96	8/30/96