



Superfund Record of Decision:

**Broderick Wood Products
(Amendment), CO**

REPORT DOCUMENTATION PAGE		1. REPORT NO. EPA/ROD/R08-91/052	2.	3. Recipient's Accession No.	
and Subtitle JPERFUND RECORD OF DECISION Broderick Wood Products, CO First Remedial Action - (Amendment)				5. Report Date 09/24/91	
7. Author(s)				6.	
9. Performing Organization Name and Address				8. Performing Organization Rept. No.	
				10. Project/Task/Work Unit No.	
				11. Contract(C) or Grant(G) No. (C) (G)	
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460				13. Type of Report & Period Covered 800/000	
				14.	
15. Supplementary Notes					
16. Abstract (Limit: 200 words) <p>The 64-acre Broderick Wood Products (BWP) site is a former wood treatment facility in Adams County, Colorado. Land use in the area is predominantly industrial. The site is one-half mile south of Clear Creek, a perennial stream. The nearest residences are less than one-eighth mile north of the site. From 1947 to 1981, BWP used the site for treating power poles, fence posts, railroad ties, and other wood products. Process wastes from the onsite plant were disposed onsite in two unlined surface impoundments in the northwest corner of the site. Waste seepage occurred just north of the site and was burned off starting in 1955. Also, four other ponds were periodically used for this purpose, and several fires have occurred onsite. In 1981, BWP submitted a RCRA permitting application and obtained interim status to operate its facility, but ceased operations because of economic conditions. As a result of the waste disposal practices at BWP, a number of investigations were conducted by EPA and the State. In 1981 and 1982, EPA noted several violations of RCRA requirements; and other site investigations identified possible contamination of a trench near the surface impoundments that had reportedly been used for the disposal of solid waste, and ground water contamination downgradient of the surface impoundments.</p> <p>(See Attached Page)</p>					
17. Document Analysis a. Descriptors Record of Decision - Broderick Wood Products, CO First Remedial Action - (Amendment) Contaminated Medium: sludge Key Contaminants: VOCs (toluene, xylenes), other organics (dioxin, PAHs), metals (lead)					
b. Identifiers/Open-Ended Terms					
c. COSATI Field/Group					
Availability Statement				19. Security Class (This Report) None	
				21. No. of Pages 64	
				20. Security Class (This Page) None	
				22. Price	

Abstract (Continued)

Additionally, a fire in 1985 damaged the treatment plant building. Water that was used to fight the fire has been contaminated with asbestos and remains in the basement of the building. A 1988 Record of Decision (ROD) addressed interim source control treatment of onsite sludge, as Operable Unit 1 (OU1), and provided for excavation and onsite incineration of impoundment sludge, onsite incineration or stockpiling of visibly contaminated soil found beneath the sludge, and treatment of water in the impoundments and buildings. Based on new technical data and cost information EPA has decided against using incineration as treatment in OU1. This ROD amends the 1988 remedy for sludge treatment. A future ROD will address the final remedy for the site by providing treatment of contaminated soil, debris, and surface and ground water, as OU2. The primary contaminants of concern affecting the sludge are VOCs including toluene and xylenes; other organics including dioxin and PAHs; and metals including lead.

The amended remedial action for this site includes excavating and preparing 950 cubic yards of solid sludge, 1,220 cubic yards of liquid sludge, and 500 gallons of oil collected from the sludge from temporary storage cells within the impoundments area; and transporting sludge and oil to a permitted recycling facility to reclaim creosote for use at other wood treating facilities, followed by offsite incineration of recycler residues, and offsite disposal of incinerator ash in a permitted landfill. The estimated total cost for this remedial action ranges from \$2,058,200 to \$2,191,000. O&M costs are included in the capital costs because treatment will occur offsite.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific sludge clean-up goals are based on A land disposal restrictions and include lead 0.51 mg/l, toluene 28 mg/kg, and xylenes 33 mg/kg.

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AMENDMENT TO JUNE 1988
RECORD OF DECISION
BRODERICK WOOD PRODUCTS
ADAMS COUNTY, COLORADO
OPERABLE UNIT 1 - IMPOUNDMENTS SLUDGES
SEPTEMBER 1991

DECLARATION STATEMENT
FOR
AMENDMENT TO JUNE 30, 1988
RECORD OF DECISION
BRODERICK WOOD PRODUCTS
ADAMS COUNTY, COLORADO
OPERABLE UNIT 1 - IMPOUNDMENTS SLUDGES

SITE NAME AND LOCATION

Broderick Wood Products
Adams County (unincorporated), Colorado

STATEMENT OF BASIS AND PURPOSE

This decision document is an amendment to the Record of Decision (ROD) signed June 30, 1988 and presents the new selected remedial action for treatment of sludges from the impoundments at the Broderick Wood Products (BWP) Superfund site. The BWP site is located at 5800 Galapago Street in unincorporated Adams County, Colorado. This ROD Amendment is undertaken pursuant to the requirements delineated in Section 300.435 (c)(2)(ii) of the National Contingency Plan (NCP) and Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

This decision document explains the basis for selecting a different remedy for the impoundments sludges at this site than that selected in the June 1988 ROD. The information that forms the basis for this remedial action decision is contained in the Administrative Record for this site and is summarized in the attached Decision Summary.

The State of Colorado concurs with the new selected remedy for treatment of sludges from the impoundments at the BWP site.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF NEW REMEDY FOR IMPOUNDMENTS SLUDGES

The BWP site has been divided into two operable units: interim actions/source control (OU 1) and final remedy (OU 2). In June 1988, EPA issued a ROD for OU 1 to address source control and the direct contact exposure pathway. The major components of the June 1988 ROD were restriction of site access, excavation and on-site incineration of sludge, stockpiling or on-site incineration of visibly contaminated soils beneath the impoundments, and treatment of water in the impoundment and buildings. Based on new technical data and cost information obtained subsequent to the June 1988 ROD, EPA has reconsidered its decision to employ on-site incineration as a source control measure for OU 1. New data evaluated by EPA included technical data on the interaction of contaminants and groundwater received from continuing RI/FS activities for OU 2 and cost information for on-site incineration received during remedial design for OU 1. Other components of the June 1988 ROD are not affected by this new information.

The selected remedy presented in this ROD Amendment addresses the sludge from the impoundments that contribute to contamination of environmental media at the BWP site. The sludge contains elevated concentrations of pentachlorophenol (PCP), polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds, and chlorinated dioxins and furans. Inhalation and ingestion of, and direct contact with these contaminants have been determined to pose the principal threat to human health from the sludges. Remediation of the sludge is intended to mitigate these exposure pathways.

OU 2 will address the final remedy for the site and includes contaminated soils, surface water and ground water, and buildings, vessels and drums. The ROD for OU 2 is expected some time later in 1991.

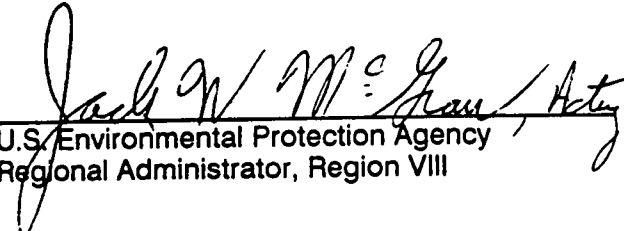
The new remedial action for interim action/source control (OU 1) selected by EPA for treatment of the sludges involves off-site reclamation of the useful components of the sludge, and incineration and disposal of the residues. The major components of the selected remedy include:

- removal and preparation of liquid and solid sludges from temporary storage cells within the impoundments area;
- transportation of the sludges and oil collected from the sludges to a permitted recycling facility;
- reclamation of creosote for use at other wood treating facilities; and
- treatment via incineration and disposal of residues by the recycler in a permitted landfill.

DECLARATION OF STATUTORY DETERMINATIONS

The newly selected remedy embodied in this ROD Amendment is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

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


U.S. Environmental Protection Agency
Regional Administrator, Region VIII

9/24/91
Date

DECISION SUMMARY
FOR
AMENDMENT TO JUNE^{30,}₁ 1988
RECORD OF DECISION
BRODERICK WOOD PRODUCTS
ADAMS COUNTY, COLORADO
OPERABLE UNIT 1 - IMPOUNDMENTS SLUDGES

DECISION SUMMARY

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DECISION SUMMARY
for
AMENDMENT TO JUNE 1988
RECORD OF DECISION
BRODERICK WOOD PRODUCTS
ADAMS COUNTY, COLORADO
OPERABLE UNIT 1 - IMPOUNDMENTS SLUDGES

I. INTRODUCTION

This document summarizes the information that forms the basis for EPA's selection of a new remedial action for treatment of sludges from the impoundments at the BWP site. This ROD Amendment will become part of the Administrative Record pursuant to Section 300.825(a)(2) of the NCP. The original ROD which was signed June 30, 1988 is attached hereto and made a part hereof as Exhibit 1, and should be referred to for further information regarding the site description, history of operations, enforcement activities and community participation prior to the June 1988 ROD, characteristics of the sludge contaminants, and risks associated with the BWP site.

In June 1988, EPA issued a ROD for the BWP site based on the Phase I and II RI/FS efforts. The June 1988 ROD identified interim actions to control the major source of contamination at the site and to address risks from direct contact exposure to site contaminants (OU 1). The major components of the June 1988 ROD were: 1) restriction of site access, 2) excavation and incineration of impoundments sludges, 3) incineration or stockpiling of visibly contaminated soils found beneath the sludges, and 4) treatment of water in the impoundments and buildings. These interim actions were selected to meet the remedial action objectives of source control and elimination of the direct exposure pathways.

Site Access (ROD Action No. 1) has been restricted through construction of a fence. ROD Action No. 3 was deferred to OU 2 when it was determined that the volume of visibly contaminated soils was significantly greater than the volume estimated in the Phase II RI/FS report. ROD Action No. 4 was also deferred to OU 2 because cost evaluations conducted as part of remedial design indicated that it would be more cost-effective to treat the water during the remedial actions for OU 2.

Implementation of ROD Action No. 2 was to have begun in the Fall of 1990. EPA determined that treatment of the sludges should be delayed until the alternatives for treatment could be reevaluated when information provided by one Potentially Responsible Party (PRP) Broderick Investment Company (BIC), and ongoing investigations showed the costs of incineration had increased significantly and other equally protective alternatives appeared to be available.

II. COMMUNITY PARTICIPATION SINCE THE JUNE 1988 ROD

Community interest at the BWP site generally has been low, to date, with involvement primarily from residents and businesses located in the vicinity of the site as well as from state and local officials. Further detail of community involvement at the BWP site is presented in the Responsiveness Summary of this ROD Amendment. The public participation requirements as specified in CERCLA Section 113 (k)(2)(B)(i-v) have been met as described below.

In mid-January 1991, EPA prepared a "Summary Document - Post-ROD Activities" (EPA, 1991) which summarized and described the data and findings of cleanup investigations that led to a reevaluation of the sludge treatment remedy selected in the June 1988 ROD. This document was placed in the Administrative Record files at the information repositories.

On January 15, 1991, EPA sent a fact sheet to 162 persons on the mailing list that included residents, business owners, and public officials. This fact sheet described the Proposed Plan to amend the June 1988 ROD for treatment of impoundment sludges. The fact sheet also described opportunities for public involvement including the public meeting and the public comment period for the Proposed Plan. Also, on January 15, 1991, EPA placed a quarter-page public notice in the *Rocky Mountain News* announcing a public comment period from January 18, 1991 to February 18, 1991 for comments on the Proposed Plan for sludge treatment. The notice also announced the public meeting, and informed the public of the availability of all pertinent information at the information repositories.

The public meeting to discuss the new Proposed Plan was held on February 5, 1991 at the Inn at the Mart located near the site. A transcript of the meeting was prepared for placement in the Administrative Record files at the information repositories. At the meeting, which was attended by fifteen community members, only one oral comment was received. This comment concerned potential health effects to children and adults residing near the site from past and ongoing exposure to site contamination. In response to this comment, EPA met with some concerned residents on February 11, 1991 to discuss potential health effects to people living near the site. In attendance were an EPA toxicologist, a representative of the Agency for Toxic Substances Disease Registry (ATSDR), the EPA Remedial Project Manager, the EPA Community Relations Coordinator for the site, and six concerned residents. During the public comment period for the Proposed Plan for treatment of impoundment sludges, EPA received written comments only from BIC. Responses to official public comments are presented in the Responsiveness Summary of this ROD Amendment.

The present repository locations housing the Administrative Record file and hours of availability are listed below:

EPA Superfund Record Center
999 18th Street
Denver, CO 80202
(303) 293-1807
Hours:
M, Th 1:00 pm - 8:00 pm
T, W, F, As 10:00 am - 5:00 pm

Adams County
Public Library
Commerce City Branch
7185 Monaco Street
Commerce City, CO 80022
(303) 287-0063
Hours: M-F 8:00 am - 4:30 pm

III. SITE ACTIVITIES SINCE THE JUNE 1988 ROD

In January of 1989, site access was restricted through construction of a fence. In the early part of the same year, EPA sought access to the site to implement the remedy of the June 1988 ROD, but was denied by BIC due to indemnification concerns. In March of 1989, EPA requested and was granted an Order in Aid of Access from the Federal District Court.

In August 1989, the design to implement the June 1988 ROD was finished. The design indicated that incinerating the contents of the main and secondary impoundments on-site might cost three to five times more than was originally estimated due to changes in the incineration market and increased transportation costs. Costs for incinerating the sludges and oil, and treating the water in the impoundments were estimated to be \$1.4 - 2.2 million in the June 1988 ROD while the Corps of Engineers estimated the costs to be \$9 - 11 million in their final design document in August 1989. Over the 14-month period between the ROD signing and the final design document, the market for mobile thermal incinerators increased from an average \$550 per cubic yard to about \$2,750 per cubic yard. Part of this increase was also a result of higher transportation costs to mobilize and demobilize the incineration operations.

In January of 1990, BIC requested reconsideration of the portion of the June 1988 ROD calling for incineration of the sludges at the site. EPA denied BIC's request in April 1990. However, since the volume of soils was significantly greater than expected, EPA decided to defer removal or treatment of the visually contaminated soils (ROD Action No. 3) to OU 2. This deferment further impacted the estimated costs of incinerating the contents of the impoundments. Loss of economy of scale occurred due to the relatively small volume of material to be incinerated at the site.

In May 1990, BIC filed a petition for reconsideration of the June 1988 ROD with the Regional Administrator of Region VIII. EPA decided to reconsider the June 1988 ROD due to the cost information acquired during design of the remedy and new technical data on the interaction of contaminants and groundwater from the OU 2 RI/FS activities. EPA had determined that removal and storage of the sludges would be necessary under any alternative selected. As a result, EPA requested and BIC agreed to proceed with removal of the sludges from the two impoundments for temporary storage. The sludge removal operations were conducted in October and November 1990 and the sludges are currently stored in two on-site lined cells.

IV. DESCRIPTION OF THE ALTERNATIVES

The specific remedial action objectives for sludges in the impoundments remain the same as stated in the June 1988 ROD. These are: 1) addressing the sludge as the greatest concentration of contaminants on-site, i.e., source control; and 2) mitigating risks or pathways for ingestion and inhalation of, and direct contact with, the sludges. In addition to the remedial alternatives, the NCP requires that a no-action alternative be considered at every site. The no-action alternative serves primarily as a point of comparison for other alternatives. As in the June 1988 ROD, the no-action alternative remains unacceptable because it is not protective of human health and the environment. EPA's reevaluation of the remedial alternatives identified three alternatives that are compatible with the remedial action objectives and current site conditions. The three alternatives include: 1) On-site Incineration, which was the remedy selected in the June 1988 ROD; 2) Off-Site Incineration; and 3) Off-site Reclamation, with incineration of residues. Long-term monitoring costs for all alternatives will be incorporated into the monitoring program for OU 2.

The amount of sludges needing remediation is approximately 950 cubic yards of solid sludge, currently stored in the solid storage cell and approximately 1,220 cubic yards of liquid sludge, stored in the liquid storage cell. In addition, about 500 gallons of oil collected from the sludge stockpile and from oil collected in the sump of the solid storage cell have been stored in 55-gallon drums on-site. Approximately 50 cubic yards of debris (fence posts, railroad rails and ties, poles, pipes, scrap metal, and a mattress) were stockpiled (ReTec, 1990b) and will be remediated as part of OU 2.

1) On-site Incineration (Originally selected in June 1988 ROD)

This alternative for treatment is unchanged from the June 1988 ROD except that the previous range of costs have increased due to market conditions. The current range of costs is based on estimates provided to EPA by the COE in their final design documents and by BIC in their petition for EPA to reconsider the June 1988 ROD (Holland & Hart, 1990). The estimated cost for this alternative is \$4,530,000 (from the BIC petition) - \$11,000,000 (from the COE). These costs are detailed in the Summary Document (EPA, 1991). Operation and maintenance costs are minimal due to the short duration of this remedy. Long-term monitoring costs would be part of the ROD for OU 2. The sludge in both the liquid and solid storage cells would be removed and incinerated on-site using a mobile thermal incinerator. Some stabilization of the sludge might be required to facilitate handling and loading of the sludge. Following removal of

the sludges, the surface impoundments including the liquid and solid storage cells would be closed as part of the remedy selected for OU 2. It is expected that this alternative would take six to eight months to complete.

State and federal regulations on incineration of RCRA/hazardous waste found at 6 CCR 1007-3, Part 264 Subpart 0 and 40 CFR 264 Subpart 0 (264.340-352), respectively, and 40 CFR 270.62 would be applicable to on-site incineration of the sludges which are K001 listed hazardous wastes. Similarly, RCRA Land Disposal Restrictions (LDRs) would apply to disposal of treatment residues, which will need to meet treatment standards in 40 CFR 268 Subpart D. The substantive requirements of the state Particulate Emission Control Regulation for Incinerators (5 CCR 1001-3, Regulation No. 1, III. B) would also apply to operating and controlling the incinerator.

The residue (ash) from this process would be tested to assure that it meets treatment standards for land disposal and then would be shipped to a permitted hazardous waste landfill. For the residue from incineration of K001 wastes to meet the standards, the maximum for any single grab sample must not exceed concentrations listed below in Table 1.

Table 1
TREATMENT STANDARDS FOR LAND DISPOSAL
OF INCINERATED K001 ASH

Constituent	Concentration in the Waste ¹ (mg/kg)	Concentration in the Waste Extract ² (mg/l)
Naphthalene	1.5	NA
Pentachlorophenol	1.5	NA
Phenanthrene	1.5	NA
Pyrene	1.5	NA
Toluene	28	NA
Xylenes	33	NA
Lead	NA	0.51

Sources:

¹ Table CCW 40 CFR Part 268.43 as revised in June 1990

² Table CCWE 40 CFR Part 268.41 as revised in June 1990

The ability of the incineration ash to meet these levels would be confirmed during a test burn of the sludge. It is possible that some stabilization of the ash would be required if the levels are not achievable without stabilization.

2) Off-site Incineration

Off-site incineration was evaluated in the June 1988 ROD. However, this alternative was not selected because at that time its cost of \$4,800,000 was greater than on-site incineration due to transportation of the materials to the off-site incinerator. The present cost for off-site incineration of the sludge from the storage cells is \$4,750,000 based on information provided in the BIC petition (Holland & Hart, 1990). Because treatment would occur off-site, operation and maintenance costs are included in the capital costs. Long-term monitoring costs will be part of the subsequent ROD for OU 2. The treatment method for this alternative would be similar to on-site incineration except that sludge in both the liquid and solid storage cells would be removed and shipped to an off-site incinerator. The sludge would be solidified as needed for transport. Off-site incineration would be performed at the nearest permitted incinerator. The surface impoundments including the liquid and solid storage cells would be closed as part of the OU 2 final remedy. This alternative would be completed in approximately six months.

Federal regulations on incineration of RCRA/hazardous wastes are found at 40 CFR 264 Subpart O (264.340-351) and 40 CFR 270.62. Under these regulations, incinerators burning K001 sludge are required to achieve a destruction removal efficiency of 99.99% for each principal organic hazardous constituent (including dioxin). In accordance with EPA off-site policy (OSWER Directive 9834.11a), a RCRA Facility Assessment (RFA) or equivalent investigation requirement must be met at the RCRA treatment facility in order for CERCLA wastes to be accepted at the facility. LDRs as specified in Table 1 would apply to disposal of treatment residues (ash). RCRA requirements (40 CFR 262 and 263) would apply to manifesting and transporting the waste. Department of Transportation (DOT) requirements are incorporated by reference in the RCRA generator/transporter regulations.

3) Off-site Reclamation and Incineration of Residues

The off-site reclamation alternative proposed in this ROD Amendment differs significantly from the reclamation alternative evaluated in the June 1988 ROD. As evaluated in the June 1988 ROD, the sludge was to be separated into creosote, water, and solids in an on-site centrifuge. The creosote would then have been sold on the open market, the water would have been evaporated, and the solids disposed off-site without treatment. EPA rejected this alternative because on-site incineration, at that time, was comparable in cost, there was no assurance that the creosote recovered via this method would be saleable, there was no assurance dioxins would be properly managed, and the solids were to be land disposed without treatment.

The off-site reclamation alternative evaluated in this ROD Amendment addresses the concerns expressed in the evaluation of the reclamation alternative in the June 1988 ROD. The range of costs for this alternative are estimated to be from \$2.06 - \$2.19 million based on preliminary information provided by BIC (ReTec, 1991). Operation and maintenance costs are included in the capital costs because treatment would occur off site. Long-term monitoring costs will be part of the ROD for OU 2.

The sludge in both the liquid and solid storage cells would be removed, prepared and shipped to a permitted recycler with a proven record of recycling K001 sludge. The estimated recovery rate is 80 percent. The sludges would be excavated and hauled to an on-site mixing tank for heating with a solvent (i.e., creosote) to make the mixture pumpable. The mixture would then be transferred and placed in rail tank cars. Next,

the mixture would be shipped to the permitted recycler. At the facility, the mixture would be filter pressed, dehydrated, distilled and blended with virgin creosote (i.e., creosote with no PCP or dioxins). The final recycled product would be classified as a creosote containing PCP and dioxins to be used by wood treaters only.

The residues from the recycling process, which contain PCP and dioxins, would be treated to LDR standards in an incinerator permitted to burn K001 sludge. The incinerator ash would be disposed in a permitted RCRA landfill. The surface impoundments, including the liquid and solid storage cells, would be closed as part of the remedy for OU 2. Completion of this alternative would take six to eight months.

Product from the recycling process would not be subject to RCRA regulations. In accordance with EPA off-site policy (OSWER Directive 9834.11a), a RCRA Facility Assessment (RFA) or equivalent investigation requirement must be met at the recycling facility in order for CERCLA wastes to be accepted at the facility. RCRA tank, manifest and transport requirements would apply as well as regulations for incineration as cited previously for alternatives 1 and 2. LDRs as specified in Table 1 would apply to treated residues (ash from incineration) from reprocessing the K001 sludge. This remedy would be required to meet all local and state air emissions standards. This remedy is easily implemented since the sludge is already in storage cells which facilitate removal and transportation from the site.

V. EVALUATION OF THE ALTERNATIVES

Overall Protection of Human Health and the Environment

The criterion addresses whether a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls. All the alternatives are protective of human health and the environment.

Alternatives 1 and 2 achieve protection by removal of the sludges from the temporary storage cells and destruction, by incineration. Alternative 3 achieves protection by removal of the sludges, reclamation of usable products from the sludge, and destruction, by incineration, of the residues from reclamation.

The analysis of this criteria in the June 1988 ROD stated that reclamation may not be protective. Off-site reclamation as proposed in this ROD Amendment would be protective because the final recycled product would be sold to and used by wood treaters only. Also, any residues would be treated to meet LDR standards before disposal.

Compliance With Applicable or Relevant and Appropriate Requirements

This criterion addresses whether a remedy will meet all of the ARARs of other federal and state environmental laws. All alternatives will meet all ARARs.

The June 1988 ROD stated that it was questionable whether reclamation would comply with ARARs. In particular, it was unclear whether LDRs would be met. Since this is an off-site activity the LDR standards are not technically ARARs. However, LDRs pertain to the off-site action and must be met. Reclamation as proposed in the June 1988 ROD did not specify that the residues would be treated thereby resulting in uncertainty over whether LDRs would be met. Off-site reclamation as proposed in this ROD Amendment includes treatment of the reclamation residues by incineration to comply with any LDRs.

Long-Term Effectiveness and Permanence

This criterion refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

All alternatives provide long-term effectiveness and permanence by removal and destruction of the sludges or reclamation of the sludges into a usable product, with any residues from the reclamation process being destroyed by incineration.

Reduction in Toxicity, Mobility, and Volume Through Treatment

This criterion refers to the anticipated performance of the treatment technologies a remedy may employ. All three alternatives involve treatment methods which significantly reduce the toxicity, mobility, and volume of the sludges.

Alternatives 1 and 2 employ destruction of the contaminants as a principal element. The destruction efficiency will be greater than 99 percent. Alternative 3 employs reclamation as the principal element with destruction of residues as a secondary element. It is estimated that 80 percent of the sludge will be reclaimed. The destruction efficiency for the residues will be greater than 99 percent. All the alternatives are essentially equivalent in reducing toxicity, mobility and volume.

Short-Term Effectiveness

This criterion addresses the period of time needed to achieve protection and any adverse effects on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved. All three alternatives create some short-term risk in disturbing and handling the sludges. Alternative 3 involves risks associated with on-site preparation of the sludges for transportation and reclamation. This risk is believed to be minimal because the on-site work only involves heating the sludges and creosote at low temperatures and no significant volatilization would occur. Alternatives 2 and 3 involve risks associated with off-site transportation of the sludges. These risks are believed to be minimal given the characteristics of the sludges and the fact that transportation of hazardous waste is carried on daily in the United States with few accidents. All alternatives involve risks associated with air emissions when the wastes or reclamation residues are incinerated. However, all alternatives would be required to meet local and state air emission standards. Each alternative would require six to eight months to implement. All the alternatives have similar short-term risks.

Implementability

This criterion addresses the technical and administrative feasibility of the remedy, including availability of materials and services to implement a particular option. All the alternatives are technically implementable.

The implementation of Alternative 2, off-site incineration, could be delayed because of the unavailability of an off-site incineration facility. Only recently, the two facilities that could have incinerated the sludges became unavailable and it is unknown if either of these facilities will be available in the near future. It is expected that a new incinerator will come on-line in the near future. However, if that facility does not become available the sludges would have to be held in the storage cells until a facility becomes available.

At the present time, EPA has identified only one facility in the country that can reclaim the sludges. This is the Allied Signal facility in Birmingham, Alabama. This facility has tentatively been identified as acceptable under EPA's Off-Site Policy to accept CERCLA wastes.

Cost

Cost factors include estimated capital and operation and maintenance costs, as well as present worth costs. Alternative 3, off-site reclamation, is the least costly of the three alternatives at \$2.06 - \$2.19 million. Alternative 2, off-site incineration, is the next least costly at \$4.75 million. Alternative 1, on-site incineration, is the most costly at \$4.5 to 11 million.

State Acceptance

The State of Colorado agrees with the remedy selected by EPA, provided that a facility can be found that is permitted to accept the waste, and that the facility has no ongoing significant environmental problems. EPA shall assure that the Allied Signal facility meets these conditions as required by EPA's Off-Site Policy prior to shipment of any wastes.

Community Acceptance

This criterion addresses the public's general response to the alternatives described in the proposed plan. The residents interviewed supported either of the off-site alternatives. The residents specifically opposed on-site incineration.

New Selected Remedy - Off-site Reclamation

Based on the information available following the June 1988 ROD and EPA's reconsideration of the treatment alternatives for the sludges, EPA has selected Off-site Reclamation (Alternative 3) as the remedy for treating the sludges at the BWP site. The selection of this remedy is based upon the comparative analysis of alternatives presented above, and provides the best balance of tradeoffs with respect to the nine evaluation criteria. It is estimated that 950 cubic yards of solid sludge and 1,220 cubic yards of liquid sludge will be removed from the storage cells and transported, along with the 500 gallons of oil collected from the sludge, to a permitted facility to recover creosote for use at wood treating facilities. Preliminary cost estimates for the selected remedy were prepared by BIC (ReTec, 1991) and verified by EPA. These costs are summarized in Table 2.

The overall objective of any remedial action at the BWP site is to protect human health and the environment. Any remedial action must also comply with other requirements of CERCLA (as amended by SARA) and the NCP.

Specific goals for remediation of sludge at the site involve the following:

1. addressing the contents of the impoundments as the greatest concentration of contaminants on the site (i.e., source control);
2. mitigating the risks/pathways associated with a) ingestion of hazardous substances in the impoundments, b) direct contact with hazardous substances in the impoundments, and c) inhalation of airborne hazardous substances.

By removing the sludges from the site and recycling the sludge, exposure to the contaminants by ingestion, inhalation and direct contact will be eliminated and the associated risk will be significantly reduced. Furthermore, this will eliminate the major source of continuing

Table 2
COSTS FOR OFF-SITE RECLAMATION

Item	Boiler and Steam Coil Cost (\$)	Electric Immersion Heater Cost (\$)
Heating Mechanism	6,700	14,800
Fuel Tank	3,300	NA
Mixer	18,500	18,500
Pumps	7,600	7,600
Hose	8,700	8,700
Power Screen	30,100	30,100
Dump Trucks	4,700	4,700
Front End Loader	6,200	6,200
Vacuum Truck	8,000	8,000
Controls	2,000	2,000
Site Work	44,000	44,000
Labor	105,000	105,000
Boiler Fuel (No. 2 Fuel Oil)	6,000	NA
Electrical	21,800	139,600
Water	200	NA
Water Treatment Chemicals	900	NA
Diesel Fuel	600	600
Creosote	96,400	96,400
By-Product Disposal*	1,419,000	1,419,000
SUBTOTAL	1,789,700	1,904,800
Contingency (15%)	268,500	285,700
TOTAL	2,058,200	2,191,000

* Includes transportation and reclamation fee.

ReTec, 1991

contamination at the site. Remediation of the soils and ground water already affected by the impoundments will be addressed as part of OU 2.

VI. STATUTORY DETERMINATIONS

EPA's primary responsibility at Superfund sites is to select remedial actions that are protective of human health and the environment in accordance with Section 121 of CERCLA. CERCLA also requires that the selected remedial action for the site comply with applicable or relevant and appropriate standards established under federal and state environmental laws, unless a waiver is granted. The selected remedy must also be cost-effective and utilize permanent treatment technologies or resource recovery technologies to the maximum extent practicable. The statute also contains a preference for remedies that include treatment as a principal element. The following sections discuss how the selected remedy for treatment of the impoundment sludges at the BWP site meets these statutory requirements.

Protection of Human Health and Environment

Based on the risk assessment developed for the site, exposure to dioxins, PCP and PAHs in the sludge through ingestion, inhalation and direct contact are the principal risks associated with the BWP site. The selected remedy will eliminate these risks and provide protection of human health and the environment by removal of the sludge from the site, reclaiming any usable portion of the sludge, and destroying by incineration, the residues from reclamation. This remedy will not pose unacceptable short-term risks or cross-media impacts to the site, the workers, or the community.

Compliance With Applicable or Relevant and Appropriate Requirements of Other Laws

Under Section 121(d)(2) of CERCLA, remedial actions must attain standards, requirements, limitations, or criteria that are "applicable or relevant and appropriate" under the circumstances of the release at a site. All ARARs would be met upon completion of the selected remedy.

Chemical-Specific ARARs

No chemical-specific ARARs were identified.

Action-Specific ARARs

The RCRA Tank regulations, 40 CFR Part 264 have been identified as action-specific ARARs for the on-site activities connected with the selected remedy. Depending upon additional activities necessary for preparing the sludge for transport, other requirements may be ARARs. Any such ARARs will be identified during remedial design and would be complied with during remedial action.

The following requirements apply to the off-site activities connected with the selected remedy. The off-site shipment of the K001 sludge to the recycling facility would comply with all applicable Department of Transportation requirements found in the Hazardous Materials Transportation Act and regulations promulgated pursuant to that Act, 49 USC Sections 1801-1806, 1808, 1811; 40 CFR Part 263; 49 CFR Parts 171-174, as well as the RCRA generator and transporter requirements, 40 CFR Part 262; 6 CCR 1007-3, Part 262, and 40 CFR Part 263. Disposal of residues from the reclamation of the sludges would be subject to the LDRs. The residues would meet the LDR BDAT Standards (Table 1) before being land disposed at a permitted facility.

Location-Specific ARARs

No location-specific ARARs were identified.

To Be Considereds

No To Be Considereds (TBCs) were identified.

Cost-Effectiveness

The selected remedy is cost-effective. Cost-effectiveness is determined by evaluating long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, and short-term effectiveness to determine overall effectiveness. Overall effectiveness is then compared to cost to determine cost-effectiveness. All three alternatives evaluated in this ROD Amendment are comparable in terms of overall effectiveness. Therefore, off-site reclamation, which is the least expensive alternative at a cost of \$2.06 - \$2.19 million is the most cost-effective option.

Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

EPA believes the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for treatment of the sludges at the BWP site. Of the alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence; reduction in toxicity, mobility or volume achieved through resource recovery and treatment; short-term effectiveness; implementability; and cost, and also considering the statutory preference for treatment as a principal element, and considering state and community acceptance.

Although all of the alternatives are protective of human health and the environment and comply with ARARs, and will achieve significant reductions of toxicity, mobility and volume, there are significant differences in the cost of the alternatives. Off-site reclamation is the least costly at less than half the cost of off-site incineration and five times less than the highest estimates of the cost for on-site incineration. Therefore, the criterion that provides the basis for this selection decision is cost. The selected remedy is the least costly of equally protective alternatives that were reconsidered.

State and Community Acceptance

The State of Colorado concurs with the selected remedy. The Proposed Plan for the BWP site was released for public comment in January 1991. The Proposed Plan identified off-site reclamation as the preferred remedy for the sludges. The community accepts this alternative. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, EPA determined that no significant change to the remedy originally identified in the Proposed Plan was necessary. The Responsiveness Summary for this ROD Amendment provides more detail regarding the comments received and EPA's responses to these comments.

Preference for Treatment as a Principal Element

By removing the sludge from the site and recovering the useful components of the sludge through a reprocessing facility, the selected remedy addresses the principal threat of

inhalation, ingestion and direct contact of contaminants in the sludge through the use of treatment technologies. Residues from the reclamation process will also be treated prior to disposal. Therefore, the selected remedy satisfies the statutory preference for remedies that employ treatment as a principal element.

VII. DOCUMENTATION OF MINOR CHANGES

The remedy selected in this ROD Amendment, Alternative 3 - Off-site Reclamation, was the preferred alternative presented in the Proposed Plan. However, the cost of \$2,720,000 for Alternative 3 presented in the Proposed Plan differs from the cost of \$2,058,200 - \$2,191,000 presented in this ROD Amendment. In addition, some on-site preparation of the sludges not discussed in the Proposed Plan would be required.

The total cost in the Proposed Plan was calculated by applying the unit costs for off-site reclamation (Exhibit E - Attachment 2) provided in the BIC Petition (Holland & Hart, 1990) to the liquid sludge and applying the unit costs for off-site incineration (Exhibit E - Attachment 7) to the solid sludges. For this ROD Amendment, the cost for reclamation was based on more recent information provided by BIC (ReTec, 1991). The cost for incinerating the residues from the recycling process are included in the reclamation fee charged by the facility. This difference does not change EPA's evaluation of the alternatives. It further supports the cost-effectiveness of reclamation.

To facilitate transfer of the sludges from the rail tank cars at the recycling facility, the sludges from the storage cells at the BWP site would be heated and mixed with virgin creosote in an on-site tank to make the mixture pumpable before transportation. This increased on-site activity may increase short-term risks. However, any additional risks associated with on-site preparation of the sludges are believed to be minimal because the mixture will be heated at low temperatures and no significant volatilization will occur.

VIII. REFERENCES

- EPA, 1990. *Unilateral Administrative Order for Remedial Action*, Broderick Wood Products Superfund Site (U.S. EPA Docket No. 91-01). U.S. EPA, Region VIII, October 18, 1990.
- EPA, 1991. Summary Document for Post-ROD Activities. Prepared by Jacobs Engineering Group Inc. on behalf of U.S. EPA, Region VIII, January 1991.
- Holland & Hart, 1990. *Petition for Re-Evaluation for 1988 ROD*. Holland & Hart, May 1990.
- ReTec, 1990a. Letter from Ann M. Colpitts to Jacobs Engineering Group Inc., *Projected Costs to Complete the Impoundment Sludge Removal and Storage*. ReTec, Inc., December 7, 1990.
- ReTec, 1990b. *Removal and Storage of Main and Secondary Impoundment Sludge*. ReTec, Inc., December 18, 1990.
- ReTec, 1991. *Broderick Sludge Disposition Design*. ReTec, Inc., April 26, 1991.

COMMUNITY INVOLVEMENT AND RESPONSIVENESS SUMMARY

The purpose of this community involvement and responsiveness summary is to document community involvement activities and issues during the investigation of contamination at the Broderick Wood Products (BWP) Superfund site in Adams County, Colorado. The summary is divided into the following five chapters:

A. Executive Summary

This chapter presents an overall summary of community involvement activities conducted at the BWP site, the public's reaction to the interim remedy proposed by the U.S. Environmental Protection Agency (EPA), and EPA's responses to those comments.

B. Introduction and Background

This chapter provides a brief introduction to the site and EPA's proposed interim remedies for the BWP site.

C. Community Relations Background

This chapter provides a summary of the community involvement activities conducted for the BWP site.

D. Summary of Public Comments and EPA Responses

This chapter presents individual comments received on the cleanup activities at the BWP site, particularly the proposed plan, and EPA responses to these comments.

E. Summary of BIC Comments and EPA Responses

The Broderick Investment Company (BIC), the only potentially responsible party named to date, has conducted much of the study at the site. BIC has also submitted substantial comments on the Phase II RI/FS and proposed remedy, and those comments have been addressed separately in this section.

A. EXECUTIVE SUMMARY

In the process of overseeing the investigation and cleanup of the Broderick Wood Products Superfund site near Denver, Colorado, the U.S. Environmental Protection Agency (EPA) has been carrying out a community involvement program to keep nearby residents and other individuals with an interest in the BWP site informed about the ongoing studies and proposed remedies. These community involvement activities have been carried out in compliance with the requirements of both CERCLA and the NCP.

This program has consisted of many community involvement activities, including maintenance of a mailing list, meetings with residents and government officials, establishing information repositories, distributing news releases of site-related events, mailing out fact sheets and an announcement of EPA's proposed plan for the site, conducting a public comment period and a public meeting and responding to comments received.

In February, 1988, EPA published for public review and comment a plan of specific remedies proposed to be implemented at the site. The public comment period extended from February 10 to March 4, 1988. A public meeting on the subject of the proposed plan was held near the site on February 22, 1988.

The BWP site has generated a relatively low level of interest from the general public, due primarily to its location in an industrial area of metropolitan Denver. The major concerns raised by property owners adjacent to the site and others have included the potential for contamination to migrate off-site, the potential for the proposed remedy to exacerbate this migration, the need to address contamination already off-site, the impact of Fisher Ditch on contaminant migration, and the preference to proceed quickly with the Phase III remedial investigation and feasibility study.

EPA concurred with most of the concerns expressed by the public and believes that the selected remedy will address them. EPA believes that the selected remedy will decrease the opportunity for off-site migration of contaminants by eliminating the major source of contaminants, and that the disposal of treated water in the incinerator quench process will eliminate its potential to augment off-site migration. EPA agrees that the relationship between Fisher Ditch and the ground water regime needs to be reexamined and that the Phase III RI/FS should proceed as quickly as possible.

Comments on the proposed remedy and new information were also submitted by BIC, both during and after the public comment period. BIC asked EPA to consider new information concerning the use of biodegradation to treat contaminated soils and sludge.

EPA reviewed the new information and concurred that biodegradation should be thoroughly evaluated in the Phase III RI/FS as a remedy for contaminated soils. EPA has also minimized the volume of visibly contaminated soils under the impoundments that would be subject to incineration to assure that biodegradation would be included in evaluations of remedies to address large volumes of contaminated soils. However, EPA also concluded that the new information was not sufficient to justify significant changes in the selected remedy for the impoundment sludge.

B. INTRODUCTION AND BACKGROUND

In this chapter, the history of the Broderick Wood Products Company will be summarized briefly. If a greater level of detail is required, the reader is referred to Chapters A-C of Section II of the Record of Decision.

The U.S. Environmental Protection Agency (EPA) has been involved in the investigation of contamination at the Broderick Wood Products site in Adams County, Colorado, since 1980. The owner of the site, the Broderick Investment Company (BIC), has been studying the site to determine the nature and extent of the contamination, and to study ways to clean it up. EPA has been overseeing the BIC study.

The Broderick Wood Products site is located in Adams County, Colorado, approximately one mile west of Interstate 25 and one mile north of the corporate boundary of the City and County of Denver. The Broderick Wood Products Company operated a wood treatment plant on this 64-acre site from 1947 to 1981 using creosote and pentachlorophenol in their treatment process.

The Broderick Wood Products Company was dissolved in 1982 and Broderick Investment Company (BIC) became its successor. The partners in BIC are various trust funds managed by two banks in Denver as trustees.

The site is bordered on the north by Fisher Ditch, which carries water east from Clear Creek to Copeland Lake. The site is bordered on the southwest by the Colorado and Southern Railroad and on the southeast by the Denver and Rio Grande Western Railroad. South Ditch, a buried water pipeline, crosses the eastern portion of the property. The United Water Company Ditch crosses the southern corner of the site and drains into Dewey Lake about one-half mile to the east.

Koppers Company, Inc., an active wood treating facility is located east of the site across the railroad tracks. The area north of Fisher Ditch is owned by Brannan Sand and Gravel Company. This area was extensively used for gravel mining and was later used for a landfill operation.

Eleven residences (of which ten are to the north) were identified within a half-mile, and a subdivision is within one mile southeast of the site. The nearest residences are about one-quarter mile north of the site. Some residences north of the site use ground water wells for domestic or irrigating purposes.

EPA first became involved at the BWP site in 1980 under the Resource Conservation and Recovery Act (RCRA). EPA later invoked its authority under Superfund and conducted a preliminary

assessment and site investigation, finding pentachlorophenol in soils and ground water on and off the site. The site was proposed for the National Priorities List (NPL) in September 1983 and placed on the list in September 1984.

In late 1983 and early 1984, BIC performed some preliminary site investigation activities which are now referred to as the Phase I Remedial Investigation. During 1984 and 1985, EPA and BIC negotiated over conducting further studies, concluding those negotiations with a partial consent decree (PCD) which was approved by the federal district court in 1986. The PCD required BIC to conduct a Phase II RI/FS to define the extent of contamination and develop remedies to address the problem. Additionally, a Phase III RI/FS would be required if EPA concluded that the Phase II RI/FS did not sufficiently address the problem.

BIC submitted a draft Phase II RI/FS report in December 1986. After reviewing the report, EPA concluded that further (Phase III) RI/FS studies would be required. The Phase III RI/FS will define the full nature and extent of contamination associated with the site, and develop remedies to address that contamination. After the Phase III RI/FS is completed, a remedy will be selected to address the remaining contamination.

However, EPA also concluded that the draft Phase II report was complete insofar as the information in the report was sufficient to support implementation of certain interim remedies while the Phase III RI/FS is conducted. EPA was particularly interested in those remedies relating to source control and the direct contact pathway. EPA believed that implementation of these remedies would be consistent with future studies and remedies at the site.

BIC agreed to revise the Phase II report to address interim remedies in an operable unit and the revised report was submitted in July 1987. After reviewing the revised report, EPA concluded that, with certain modifications, the report would be able to support certain interim remedies. In an August 26, 1987 meeting, EPA informed BIC that EPA would develop the proposed modifications in a supplemental RI/FS report. The supplemental RI/FS report was completed November 5, 1987.

In February, 1988, EPA published a proposed plan based on the RI/FS studies and information to that date. EPA concurrently initiated a 21-day public comment period to invite comments on the proposed plan. A public meeting was held on February 22, 1988, and comments were received through the end of the comment period. The proposed plan included the following preferred remedies:

- erecting a security fence around the entire site;
- posting warning signs around the perimeter;

- excavating and incinerating the impoundment sludge and oil;
- treating the contaminated water in the main impoundment with carbon adsorption and disposing of it on-site;
- excavating and either incinerating or stockpiling the visibly contaminated soils under the impoundments;
- filtering the "firewater" to remove asbestos fibers, treating the filtered water in the carbon adsorption unit and disposing of the treated water on-site;
- demolishing the treatment plant and shop buildings; and
- monitoring the performance of the remedies.

The final remedy was to be developed after completion of a Phase III RI/FS. This RI/FS would include characterization of the full extent of contamination related to the Broderick site.

C. EPA'S COMMUNITY INVOLVEMENT PROGRAM FOR THE BWP SITE

In compliance with the requirements of CERCLA and the NCP, EPA and the State of Colorado have conducted a program to keep nearby residents and other individuals with an interest in the BWP site informed about the ongoing studies and proposed remedies. This program has included the following:

1. Developing a list of all nearby residents and other persons interested in activities at the site.
2. Working with municipal and other local agencies to keep government officials informed about site issues and activities.
3. Establishing repositories of key information relating to the site, including RI/FS reports, the proposed plan, comments, responses and other documents so that the public would have ready access to the information.
4. Preparing and distributing news releases of significant events during the ongoing activities at the site.
5. Meeting with nearby residents, neighbors and local officials to discuss any concerns that they may have.
6. Mailing two Fact Sheets to all individuals on the mailing list. The first Fact Sheet, in January 1987, described the site and ongoing RI/FS activities. The second Fact Sheet, dated December 1987, announced EPA's proposed plan for an interim remedy at the BWP site.
7. Announcing the proposed plan in a local newspaper so that persons not on the mailing list might be informed.
8. Conducting a public comment period on the proposed plan. The comment period was from February 10 through March 4, 1988. A public meeting was held near the site on February 22, 1988.
9. Responding to the comments received during the public comment period and at the public meeting.
10. Conducting a domestic well sampling program to determine whether any site-related contaminants had reached any of the off-site wells.

D. SUMMARY OF PUBLIC COMMENTS AND EPA RESPONSES

This chapter summarizes the community's reaction to the proposed plan and other aspects of the BWP site. In general, the level of interest in the community about the BWP site has been relatively low. This has been due primarily to the industrial character of much of the surrounding properties and the relatively sparse residential population nearby.

Approximately 25 people attended the public meeting during the comment period on the proposed plan. Written comments on the proposed plan were received from only a few individuals and/or companies. These comments showed that community concerns were generally related to the following major topics:

1. Much concern has been voiced by owners of property immediately adjacent to the BWP site because of their concern about impacts from the site. Of particular note was the concern that either current site conditions or some component of the preferred remedy would exacerbate the potential for ground water or other contamination to move off-site to the north. These concerns were related to, among other things, the proposal to dispose of treated water on-site through evapo-transpiration.
2. Another significant concern was that contamination that may have already moved off-site should be addressed as soon as possible, and that the interim remedies being considered should not interfere with Phase III studies and remedy implementation.
3. There were also some concerns about the impact of Fisher Ditch on the site, both as an impediment and as an aid to off-site migration of contaminants.

Oral and written comments concerning the site were received during the public comment period of February 10 through March 4, 1988. Most of the comments were received during the public meeting of February 22, 1988. Specific comments and EPA's responses are presented below and are categorized by topic.

Phase I and II Investigations

Comment #1: Were any samples taken beyond Fisher Ditch to the north and what were the results of these samples? How far north have samples been taken?

Response: Yes. Contamination was originally discovered in a well (monitoring well 9) on BFI property. This well is located close to the BWP property line.

Also, at surface water sampling location 5 (SW-5), a seep showed relatively high levels of creosote and pentachlorophenol-related contaminants.

The Colorado Department of Health also conducted a survey of private wells used for drinking and irrigation north of the site. Samples taken from these wells were analyzed for pentachlorophenol, total volatiles, and total organics. Contamination was not detected in any of the wells sampled.

(Monitoring locations are presented in Chapter C of the Record of Decision.)

Comment #2: Clarify the differences between Phase I and II.

Response: Phase I included preliminary studies conducted in 1983 and 1984 which did not lead to any selection of remedy.

BIC began Phase II studies in late 1985 which led to a recommendation to consolidate contaminated material in the impoundments and cover them. EPA concluded that this remedy would not be sufficient but asked BIC to revise the Phase II report to develop some interim remedies that would be supported by the Phase II report. BIC then recommended an interim remedy that included fencing known areas of contamination, pumping the firewater into the secondary impoundment, demolishing the treatment plant building and monitoring the performance of the interim remedy and ground water.

After reviewing the Phase II reports, EPA developed a supplemental report which provided more information to address an interim remedy. Based on the Phase II reports and the supplemental information, EPA developed and published the proposed plan.

Off-Site Contamination

Comment #3: Fisher Ditch feeds into Copeland Reservoir to the east, and Dewey Reservoir is directly adjacent to the Koppers property. How would EPA's proposed remedy address off-site contamination?

Response: Phase I and II investigations were not sufficient to define the extent of contamination, particularly for off-site contamination. Hence, the proposed plan does not directly address off-site problems. This will be addressed during Phase III.

However, enough information was available from the Phase II report to address an interim remedy that would be consistent with a final remedy.

Comment #4: Remedial alternatives are now being discussed and implemented without sufficient investigation as to the extent and severity of off-site contamination. EPA acknowledges a visibly contaminated area north of the site across Fisher Ditch that is believed to be the result of seepage from beneath the waste lagoon on the Broderick property.

It is important that the remedial alternatives now implemented in no way inhibit or preclude remedial actions necessary to address off-site contamination. More importantly, these on-site measures should not exacerbate or enhance the movement of contaminants off-site.

Response: EPA has proposed an interim remedy that would be consistent with a final remedy. See also responses to Comments 7 and 8.

Comment #5: The continued operation of the Fisher Ditch unlined is a concern, because it appears that Fisher Ditch will create some sort of ground-water mounding which may aggravate the continued seepage of the contaminants deeper into the unsaturated soils, and also into the ground water. The effects of the continued use of Fisher Ditch should be investigated. The ground-water mound underneath the ditch when water is running in the ditch may be acting as a barrier to ground-water flow and contaminant transfer from the site to the north. Alternatively, it may be enhancing the visible seepage of contaminants to the north.

The top priority in the Phase II remedial cleanup should be lining Fisher Ditch, or other measures necessary to prevent further off-site migration. While the actual risk associated with use of contaminated Fisher Ditch water is impossible to quantify, there is no doubt that any potential problem would be very widespread. The cost of lining the contaminated portion of Fisher Ditch is small compared to the benefit of reducing the hazard to so many individuals. Adams County residents would best be served by implementation of a quick and efficient solution to isolation of Fisher Ditch water from contamination at the Broderick site. Adams County urges the EPA to proceed during Phase II, rather than at a later date, in that direction.

Response: EPA concurs that the interaction between Fisher Ditch and the ground water regime needs to be examined further. However, EPA does not believe there is enough information to support selection of any remedy (including lining) for Fisher Ditch at this time. EPA expects this issue to be a top priority for the Phase III RI/FS.

Eleven samples of Fisher Ditch water were collected and analyzed during the Phase I and II studies. In three of five samples taken adjacent to the site in Phase I, pentachlorophenol was detected at concentrations of 0.0054 to 0.05 mg/l, well below the recommended maximum contaminant level of 0.22 mg/l. No wood treating chemicals were detected in samples taken during Phase II.

Ground water mounding was a phenomenon that BIC's consultant brought up in the original draft of the Phase II report. EPA did not see evidence of this phenomenon after reviewing results of the piezometers that were installed along a few cross sections near Fisher Ditch. One or two inches of mounding were observed which is not a great differential. In some cases, the mounding was not measurable.

BIC's consultant also measured flow at certain points along Fisher Ditch to determine water gain or loss. The accuracy of these flow measurements was plus or minus 10 percent, making it very difficult to draw any definitive conclusion about whether Fisher Ditch was gaining or losing water. The calculations showed both happening with rather dramatic gains and losses over the length of the ditch. EPA attributed this to the inaccuracy in the measurement of the flow.

The selected interim remedy will eliminate the source of contamination and reduce the migration of contaminants to off-site areas. This would minimize potential contamination of water in Fisher Ditch.

Comment #6: EPA stated that a number of samples have been collected from Fisher Ditch in the past. It is not clear whether these samples consisted of water or soil samples. These sample results indicate that contaminants including pentachlorophenol and creosote may be within the Fisher Ditch system. Further definition of present contamination and the potential for future contamination of the Fisher

Ditch system including Copeland Lake must be included within the scope of the Phase III RI/FS to protect the shareholders of the ditch company. It was represented that past studies have attempted to determine whether the Fisher Ditch is gaining or losing stream. These studies are inconclusive. Therefore, it remains to be determined whether contaminants previously found in the Fisher Ditch arise from ground water infiltration into the ditch or have entered the ditch system as a result of surface runoff.

Response: The interaction of Fisher Ditch with the ground water regime at the site will be a major concern for the Phase III RI/FS. See response to Comment 5.

Comment #7: The proposed interim remedy does not take care of the obvious seep material to the north of Fisher Ditch on the Brannan property, and why is that material not being cleaned up under this remedy? It is visible contamination that no doubt originated on the BWP site and remediation of this contamination is appropriately covered by CERCLA. The seep area represents an existing source of contamination which, when left in place and uncontrolled, presents an imminent and substantial danger to the public health and the environment. It should be remedied immediately. If additional characterization of the seep area is required before remediation commences, such work should be completed as soon as possible so that the seep area remediation can be included in this phase.

If ground-water mounding is occurring beneath Fisher Ditch and enhancing the seepage of contaminants, appropriate remediation measures must be taken (e.g., line or relocate the ditch).

Response: EPA does not have enough information on how far the contaminants in this area have migrated. The best method for remediation cannot be determined until the extent of contamination is known. If there is a small quantity of contaminated material, it can be incinerated. If there is a large quantity, incineration may not be the cost effective remedy. This concern will be addressed in the Phase III RI/FS.

EPA's contractor attempted to locate the visible contamination mentioned here, but was unsuccessful. See also response to comment 5.

Remedy for the Firewater

Comment #8: The secondary impoundment should not be used for storage (short or long term) of the firewater from the treatment plant building as proposed for the interim remedy. Since this impoundment is unlined, it will create a ground-water mounding problem which may aggravate the seepage problem because that seepage will generally go to the north and the northeast onto the Brannan property. The water should be treated in place and disposed of so that no on-site ground-water mounding occurs.

The same concern is expressed for the proposed remedy to treat water from both impoundments and then discharge the treated water on site. Where will the water be discharged on site? The water treated with the carbon adsorption unit should not be discharged directly to the surface of the site. If it is discharged near those impoundments or anywhere on the site, it will create that ground-water mound which may again aggravate the seepage problem to the north and northeast onto the Brannan property. The treated water should be disposed of so that no on-site ground-water mounding occurs

Response: EPA concurs with these comments that disposing of treated impoundment water and firewater on the surface of the secondary impoundment is not the most environmentally sound method. Consequently, EPA has changed the selected remedy to include use of the treated water as quench water for the incinerator. It is possible that some of the treated water may be discharged on-site and disposed of through evapotranspiration. However, EPA believes that the discharge can be controlled not to exceed the E-T rate for the site and that there would be no negative impact on the site.

Additionally, the water being discharged out of the carbon adsorption system will be close to non-detectable levels; therefore there would not be any contaminants added to the ground water.

Comment #9: EPA seems to be proposing a remedial program without knowing where and how much firewater there is.

Response: EPA's selection is based on studies performed by BIC's consultants. Those studies indicate there is approximately 40,000 gallons of firewater. However, the location(s) of the firewater have not been fully

determined. They will be more specifically identified during the design phase.

Comment #10: How much will it cost to treat the firewater, including filtering the asbestos?

Response: After refining the costs associated with treating the firewater, EPA now estimates those costs to be about \$2,500.

Remedy Methods

Comment #11: How will the incineration affect Denver's air quality, especially the surrounding environment?

Response: EPA expects that the incinerator will not cause any adverse impact on Denver's air quality, provided the incinerator meets the RCRA 99.99 percent destruction removal efficiency (DRE) standards and proper emissions control devices are installed and operated. Before the incinerator is put into operation, it will need to pass a test burn and assure that it will pass both state air emissions and RCRA incinerator standards.

Comment #12: Treatment standards should be established for the proposed treatment activities (e.g. standards for water that is to be filtered and/or treated, standards for incinerator air emissions).

Response: EPA will ensure that state or RCRA standards are adhered to in all aspects of the interim remedy, with the possible exception of land treatment requirements for disposing of treated water. See also response to comment 11.

Comment #13: Elaborate on the carbon adsorption method.

Response: The contaminated water is passed at a low velocity through activated carbon granules. The contaminants in the water are adsorbed by the carbon granules and are thereby removed.

Comment #14: What will be the method of disposal for the carbon from the carbon adsorption system?

- Response: The carbon is burned. This is usually done by the manufacturer of the activated carbon and not on the site. The carbon, which comes in canisters, is replaced when it is spent and sent back to the manufacturer who reprocesses it.
- Comment #15: Would it be cost effective to create a new lined impoundment, consolidate all of the contaminated materials into that impoundment while learning more about the materials and the extent of contamination?
- Response: The selected remedy for contaminated soils includes a decision tree and the possibility that the suggested remedy may occur. The option of temporarily storing visibly contaminated soils in a lined area within the secondary impoundment would be implemented if the volume of soils is too great to be incinerated in the small capacity incinerator selected for the impoundment sludge. In this case, other remedies in addition to incineration would be evaluated during the Phase III RI/FS.
- EPA's preference is to address the contaminated materials permanently in this remedy if it is cost effective to do so. If the volume of soils is small it is more cost effective to incinerate them than to handle them twice. If the volume is great, it may be more cost effective to store them temporarily.
- Comment #16: The on-site stockpiling of excavated impoundment soils should not be a permanent remedy. Technical requirements should be established for such temporary stockpiling to ensure protection of public health and the environment.
- Response: On-site stockpiling of visibly contaminated impoundment soils would only be employed temporarily. Permanent remedies for these soils would be addressed during Phase III. RCRA has specific requirements for hazardous waste piles. These requirements will be adhered to.
- Comment #17: Is there any information on the physical characteristics of the contaminant material (the creosote and so forth), on how many years it takes for the existing contaminants to break down, or on how it breaks down if it were mixed with more dirt?

Response: The purpose of using creosote and pentachlorophenol in the wood treatment process is to inhibit biological activity and extend the life of the wood. Therefore, they are not that easy to break down, and have been known to last in excess of 100 years.

There have been some recent advances in biological remedies for wood treating wastes and EPA contemplates that this will be a major focus for the Phase III RI/FS. However, these processes have not been tested to the point where they can be used at the BWP site at this time.

This issue is discussed in greater detail in Chapter E of this summary.

Comment #18: Has a natural breakdown process been looked at for the contaminated soils?

Response: EPA anticipates that this will be addressed during Phase III when the surface soils will be further investigated. See response to question #17.

This issue is discussed in greater detail in Chapter E of this summary.

Comment #19: Has EPA had any discussion with Fisher Ditch on dumping the treated water into the ditch once it is filtered rather than filtering it through the contaminated site again?

Response: EPA has not had any discussions with the company that owns Fisher Ditch on this issue because such a discharge to Fisher Ditch or any off-site surface water body would require a permit and that would take some time. A permit is not required when the remedy is done completely on the site, although the substantive requirements that would apply would have to be met.

Comment #20: Would a permit be required if the treated water is discharged on the site and into the ground water?

Response: EPA's position is that CERCLA does not require a permit if the remedy is conducted completely on the site. If there is a discharge off the site, for instance to Fisher Ditch, a permit would be required. The substantive requirements that are required for off-site discharge would still have to

be met for on-site discharge; only the administrative activities and corresponding time frames for actually getting the permit(s) are omitted.

Comment #21: When does EPA anticipate it will begin treatment of the contaminated water? Can a time frame be given?

Response: This is subject to negotiations with BIC. Now that the Record of Decision (ROD) has been signed, EPA will offer the PRP, in this case BIC, an opportunity to complete the remedy selected in the ROD. If the negotiations are fruitful, they would be documented in a Consent Decree (approved by the Federal Court), and BIC would implement the remedy. If negotiations are not successful, the Superfund Trust Fund may be available. In this case, EPA would implement the selected remedy and try to recover the costs from BIC later. If the Superfund were used, the State would have to match 10 percent of the remedy cost.

Comment #22: Has distillation or boiling of this liquid been considered as a method of separating the water from the contaminants?

Response: No, that was not one of the alternatives considered. Most of the remedial alternatives were proposed and evaluated by BIC in their RI/FS reports. EPA provided comments on these methods and added to them. For example, the carbon adsorption system was proposed by EPA.

Costs

Comment #23: What does the cost of the interim remedy (\$1.3M to \$4M) include? Are these costs just for on-site material?

Response: The estimated costs (which have been revised to a range of \$2.2 M to \$3.6 M) include the selected interim remedy described in the ROD. Because off-site contamination has not been fully evaluated, a remedy for this contamination is not included in the interim remedy. This concern will be addressed in Phase III.

Comment #24: What is the estimated cost per gallon or cubic yard to incinerate the sludge?

Response: There are approximately 4,000 cubic yards of sludge material and 3,000 gallons of surface oils. Considering the physical properties of the sludge material and using the cost estimates available from various incinerator vendors, EPA found a cost range of \$281 to \$497 per cubic yard for incineration.

Monitoring

Comment #25: Explain the monitoring that will occur during the proposed interim remedy, and in particular, the monitoring that will occur with regard to the discharge from the carbon adsorption treatment.

Response: The monitoring part of the interim remedy will be fully addressed in the design stage. The following issues will be considered:

- Monthly inspections would be made of the fence to ensure that it has not been breached;
- Air emissions from the incinerator would be monitored to ensure that it meets the required emissions and efficiency standards;
- Sampling would be conducted on a regular basis to ensure that the carbon adsorption system is meeting discharge requirements;
- There would be no monitoring of contaminated soils, since a "no action" remedy was selected for the soils during the proposed interim remedy.

Comment #26: Has EPA set a monitoring standard?

Response: The monitoring standard will be developed as the remedial action design is finalized. At a minimum, the implemented remedy will comply with those monitoring procedures required by the ARARs listed in the ROD.

Potentially Responsible Party

Comment #27: Who are individuals in the Broderick Wood Products Company and the Broderick Investment Company?

Response: The Broderick Wood Products Company was owned and operated by William S. Broderick until he died in 1962. After he died, the operation of the company was taken over by two Denver banks (First Interstate Bank of Denver and Colorado National Bank) as trustees under certain trusts established by the wills of William S. Broderick and his wife. BIC is the successor to BWP. BIC is a partnership in which the two banks are general partners in their capacity as trustees.

Comment #28: Is it EPA's position that Broderick and/or Koppers should be financially responsible for the off-site contamination and its cleanup?

Response: EPA is unable to discuss the financial liabilities and responsibilities of these two entities, other than to say EPA's policy is to pursue responsible parties for recovering costs whenever possible.

Comment #29: Will there be any effort by the EPA to trace funds derived from polluting the grounds to the beneficiaries of the trusts?

Response: EPA always assumes that there will be a search for responsible or potentially responsible parties which would be liable for costs under CERCLA.

Comment #30: It is appropriate that financial responsibility for determining the extent of off-site contamination arising from activities on these properties and remedial efforts required to address such contamination be expressly assumed by BIC and Koppers. At the public meeting, counsel for EPA stated that the EPA's investigation of potentially responsible parties continues with respect to the Broderick site. In any event, to protect the interests of adjacent property owners including shareholders of the United Water Company and Fisher Ditch Company, EPA should come forward and assure members of the community that remedial actions to address off-site contamination shall be implemented if required and all costs for this program borne by the responsible parties or Superfund.

Response: If contamination to off-site properties is a result of the wood-treating process at the Broderick site, this off-site contamination will be addressed in the final remedy at the Broderick site. The costs of the remedy will be borne by either the parties responsible, the Superfund, or both.

Comment #31: What is the position of the PRP with regard to the proposed interim remedy? Are they absolutely adamantly against it or are they generally in favor of it?

Response: EPA will not attempt to characterize the position of the PRP. BIC has had an opportunity to review the administrative record and has made formal comments to EPA on their position. (These comments are contained in the formal Administrative Record and summarized in Chapter E of this summary report.)

Phase III RI/FS

Comment #32: The ground water contamination should be fully characterized in the near future. If ground water contamination is discovered, an appropriate cleanup approach should be identified and implemented as soon as possible in order to prevent the further dispersion of contaminants in the ground water aquifer.

Response: Characterizing the full extent of ground water contamination from the Broderick site will be the main objective of the Phase III RI/FS.

Comment #33: Does EPA anticipate proceeding with an investigation of off-site contamination, and will this investigation be part of the Phase III RI/FS?

Response: Yes. The Consent Decree requires a third phase of the RI/FS if EPA concludes that Phase II is not adequate. EPA is presently in the process of negotiating with BIC on the scope of work for Phase III investigations. The major focus of this investigation will be on subsurface contamination off site to the north and interaction with Fisher Ditch.

Comment #34: Are the remediation of the seep material to the north of Fisher Ditch and the general ground-water contaminant characterization very high priorities in Phase III?

Response: Yes, they are.

Comment #35: Regardless of the outcome of EPA's negotiation for the interim remedy, will EPA be going ahead with the Phase III RI/FS?

Response: Yes. This is required by the Consent Decree.

Comment #36: The investigation of the Broderick site undertaken by EPA pursuant to CERCLA has not been coordinated with the continuing investigation of the Koppers site regarding the use of wood preservatives on its property adjacent to the Broderick site. Given the present lack of information regarding ground-water flow in this area, Dewey Lake, located south of the Koppers property and southeast of the Broderick site, may have been impacted by activities on either or both properties under investigation. These independent studies undertaken by EPA should be coordinated to insure that all potential mechanisms for off-site contamination have been investigated. At the same time, coordination of these studies could result in a cost savings to EPA and/or responsible parties by eliminating duplicative efforts to define the areas affected by these properties.

Response: EPA is aware of activities at the Koppers site. The major sources of potential contamination on each site are far apart. The direction of the ground water flow is basically parallel to the Koppers-Broderick property boundary. Part of the Phase III investigation will be to address some data gaps regarding contamination detected near this property boundary.

Comment #37: What is the schedule for the Phase III RI/FS? When do you anticipate the Phase III RI/FS to begin?

Response: As mentioned in response to comment 33, EPA is presently in the process of negotiating with BIC on the scope of work for the Phase III investigation. BIC submitted their first draft of the work plan in August 1987. EPA and the State provided their comments in November, 1987. The start date is subject to negotiation with BIC.

Comment #38: Will the public have an opportunity to comment on the Phase III RI/FS?

Response: Yes, CERCLA as amended by SARA requires a public comment period for this phase.

Comment #39: When will the public comment period occur for the Phase III work plan?

Response: EPA does not anticipate a formal public comment period for the Phase III work plan.

Comment #40: Given the interest expressed at the public meeting regarding the Phase III RI/FS work plan, those present at the meeting should be given notice by mail rather than publication of the commencement of the public comment period upon the proposed work plan.

Response: As noted previously, EPA will probably not sponsor a public comment period for the Phase III work plan. EPA will, however, notify all parties on our mailing list of key Phase III activities, including the start of the Phase III RI/FS.

Comment #41: EPA should expedite the work to ensure that the ground water contamination is sufficiently characterized and remedial action plan is put together as quickly as possible so that the contamination does not spread any further than it already has.

Response: Characterization of the ground water contamination will be part of Phase III RI/FS. The completion of these studies is subject to negotiation with BIC. EPA is concerned with proceeding as soon as possible.

E. SUMMARY OF BIC COMMENTS AND EPA RESPONSES

1. INVOLVEMENT OF BIC IN THE RI/FS PROCESS

The Broderick Investment Company (BIC), the only potentially responsible party (PRP) identified thus far, has been directly involved in the Superfund activities at the BWP site since BIC was formed in June 1982. Under the terms of the partial consent decree, BIC is required to conduct the remedial investigation and feasibility study at the site. In the course of these studies, BIC has had frequent contacts with EPA and has often submitted written comments or other documents pertaining to various aspects of the study. All of these documents from BIC are contained in the Administrative Record for this site.

2. SUMMARY OF BIC COMMENTS ON THE PREFERRED ALTERNATIVE

BIC submitted comments on EPA's preferred alternative both during and after the February 10 - March 4, 1988 public comment period for the proposed operable unit remedy.

During the public comment period, BIC sent a letter dated March 4, 1988, containing comments on the preferred alternative. Appended to the March 4 letter was a copy of a December 18, 1987 letter, also from BIC, to be considered as part of BIC's comments. The December 18 letter contained BIC's comments on the EPA supplemental Phase II RI/FS report.

After the public comment period, in letters dated May 9, June 7, June 15, June 17, June 24 and June 29, 1988, BIC and/or its consultants submitted further comments or information relating to the selection of interim remedies at the BWP site.

EPA notes at the outset that BIC's comments included several issues on which BIC had changed its position to accord with EPA's preferred remedy. These areas of agreement included the preference to fence the entire site and the preference to treat contaminated water with a carbon adsorption system. This discussion will not address these areas of agreement in detail, but rather will focus mainly on areas where BIC's position differs from EPA's position.

EPA also notes that, although BIC has been conducting the RI/FS for over two years, many of the comments were received well after the end of the public comment period. However, EPA has decided to include these documents and data in the Administrative Record for the Record of Decision and did consider them prior to selecting the remedy.

The major points of the BIC submittals include the following:

a. Incineration of Impoundment Contents

It is BIC's position that incineration of the impoundment sludge and soils should not be selected as a remedy at this time. BIC characterizes incineration of wood treating wastes as experimental and unprecedented, and believes that the Phase III RI/FS may generate more information, leading to stabilization, biotreatment, or other technologies that may be more cost effective than incineration. BIC believes that selection of incineration at this time will preclude consideration of these other remedies during Phase III.

To support this contention, BIC recently (June 1988) met with EPA and submitted data on the biodegradation of creosote and penta in contaminated soils. These data showed reductions of carcinogenic polynuclear aromatic hydrocarbons (PAHs) to levels under 10 ppm in soil.

BIC also submitted information on EPA's selected remedies for other wood treating Superfund sites. Many of these remedies included elements of biodegradation technology to address PAHs in the soils.

BIC notes that there is some uncertainty regarding the amount of visibly contaminated soils under the impoundments, and that this uncertainty makes selecting incineration of these soils infeasible.

BIC believes that the environmental impact of incineration of the sludge has not been adequately studied.

b. No Imminent Threat

BIC believes that there is no evidence that remediation of the impoundments is necessary to protect public health during the nine to eighteen months that it will take to conduct the Phase III RI/FS. BIC believes that once a fence is in place to secure the entire site, direct contact exposure would be virtually eliminated and ingestion of contaminated ground water in offsite wells would be the only remaining potential route of exposure of any concern.

BIC's consultants have employed a ground water transport model which has indicated that the contaminant plume is "tens of years" away from the nearest receptor wells. BIC notes that sampling of receptor wells by CDH has not shown any site-related contamination, "eliminating any immediate concerns about public health impacts."

c. Extent of Visible Contamination Under the Impoundments

BIC was interested in knowing the basis for EPA's belief that the visible contamination may extend only six or twelve inches into the soils under the impoundments. The experience of BIC's contractor has been to the contrary.

d. ARARs

BIC contended that the K001 sludge in the impoundments is the only listed RCRA hazardous waste on site. BIC also asserted that the K001 sludge is the only hazardous waste present at the site.

e. New Interim Remedies

In the June 24 letter to EPA, BIC submitted information regarding a new option for addressing the impoundment sludge by dewatering it prior to disposal, storage or incineration. This technique would significantly reduce the volume to be shipped, stored on-site or incinerated, thereby reducing costs of these options.

f. Ability to pay. Mixed funding.

BIC believes that implementation of the preferred alternative would not be an effective use of BIC's limited resources, noting that the total cost of the preferred remedy is beyond BIC's current liquid assets. BIC also noted that its obligation to perform the Phase III RI/FS is mandated by the consent decree and has suggested that EPA use mixed funding for the interim remedy, thereby minimizing BIC's contribution to that remedy and assuring sufficient funds for Phase III.

BIC believes that the only way that BIC could obtain adequate funds for a final remediation would be through cleaning up and selling portions of the BWP property. Consequently, BIC believes that remedies to address the facilities area and surface soil contamination should be given a higher priority than the impoundments.

3. EPA RESPONSES TO BIC COMMENTS

EPA's responses to these comments are as follows:

a. Incineration of Impoundment Contents

Based on the information contained in the Phase II RI/FS reports, and other supporting documents, EPA believes that incineration of the impoundment sludge and soils is the most appropriate remedy that could be selected to address these segments of the contamination at the BWP site. In particular, EPA believes that incineration of the sludge is the only technology that will reliably, effectively and permanently eliminate this major source of site contamination.

EPA's major reasons for selecting incineration of impoundment sludge and soil at this time are as follows:

- (1) EPA notes that the main and secondary impoundments are the major sources of contamination at the site and believes that the studies of these sources completed thus far are sufficient to support selection of a remedy for them. As stated in a letter to BIC dated March 26, 1987, EPA's main objective in revising the Phase II report was to make use of the information available in the draft Phase II report to address obvious and concentrated hazards such as the impoundments and facilities area. EPA expected that source control and direct contact remedies would be considered to address these hazards. EPA believes that the Phase II RI/FS, as revised and supplemented, provides a sufficient base to select a remedy for the impoundments, and that no further (Phase III) RI/FS work needs to be performed to support these remedies.
- (2) The impoundments continue to be in contact with the ground water regime and are significant contributors of contamination to that regime. This fact is supported by historical information which indicates that contaminants were migrating from the site in an observable fashion within as little as five years of the construction of the main impoundment. This information also indicates that the main impoundment once extended much closer to the north boundary of the site and Fisher Ditch.

EPA is not asserting that the incineration remedy will completely address the endangerment posed by the ground water pathway. However, EPA believes that removing the major source of contamination into that pathway will be an effective long-term remedy.

- (3) EPA believes that incineration will be the most effective technology to address the dioxins and furans in the sludge and oil. Incineration offers destruction removal efficiencies (DREs) in excess of 99.99% for all contaminants, including dioxins and furans. EPA is concerned that any other technology would not be able to permanently eliminate these contaminants. EPA also notes that recently proposed RCRA regulations define Best Demonstrated Available Technology (BDAT) treatment standards for disposal of K001 wastes based on the incineration of the waste.
- (4) The removal of the impoundment contents will be consistent with any future remedial actions at the site. EPA believes that, particularly because of their dioxin and furan components, the impoundment contents are fundamentally different from other contaminated media on the site and that they need to be treated as such.
- (5) The removal of pond sludge will also be consistent with the Phase III RI/FS study of soils. It will be necessary to remove the impoundment contents to expose the contaminated soils underneath.
- (6) This action is also consistent with similar actions at other wood treatment Superfund sites. While incineration of similar wastes has been selected at other Superfund sites, biodegradation of impoundment contents with dioxin components has not been implemented. BIC submitted examples of RODs in which EPA selected remedies other than incineration for wood treating contamination. In many of these cases, the most concentrated contaminants either had already been or were about to be removed for land disposal. Land disposal of the BWP sludge was not selected both because it was not cost effective and because it was not likely to comply with ARARs.
- (7) The impoundments continue to represent a potential fire hazard. The impoundments once caught fire from the sparks of a passing train.
- (8) Although BIC has asserted that timing is not a significant issue for addressing the pond contents, EPA is concerned that waiting to remove the contents until after the completion of the Phase III RI/FS will allow more contaminants to enter the ground water regime. BIC's consultant has projected that the Phase III RI/FS will take from nine to eighteen months to complete. The basis for EPA's concern is discussed in greater detail below.

- (9) The presence of the oil layer on the main impoundment means that water falling on that impoundment can't evaporate. Thus the water continues to provide a head to push contaminants into the ground water.

EPA reviewed the biotreatment data submitted by BIC and concluded that there was insufficient cause to change the remedy for the sludge. In particular, there were no data to support selection of biotreatment as a reliable, effective technology to treat dioxin-contaminated sludge. The application of the technology to sludge would involve mixing the sludge with less contaminated soils, thereby diluting the contamination to levels in which the microorganisms would be effective. EPA is concerned that this technology has not been proven, and has particular concerns about the fate of the dioxins in the sludge during this process.

EPA acknowledges the uncertainty about the exact volume of visibly contaminated soils under the impoundments. EPA did not want to make a commitment at this time to large-scale incineration or biodegradation because it might establish an on-site plant that would artificially influence the Phase III engineering sensitivity analysis. Consequently, EPA is limiting the incineration option of this remedy to only the small volume of soils that would be compatible with the small-scale sludge incinerator. In other words, EPA's remedy provides that visibly contaminated soils will only be incinerated as part of the interim remedy if the volume of soils does not exceed 2500 cubic yards. If the volume does exceed such amount, these soils will be temporarily stored to allow further study during the Phase III RI/FS.

EPA also acknowledges that a site-specific assessment of risk from incinerating the impoundment contents has not been conducted. However, EPA notes that incineration is a proven, reliable, much tested remedy, wherein destruction efficiencies in excess of 99.99% can be expected.

Additionally, studies have shown that increased cancer risks resulting from incineration of similar wastes are expected to be less than 1×10^{-6} for the most exposed individual. In accordance with the applicable regulations, a test burn/treatability study will be performed before the remedy is implemented.

b. No Imminent Threat

EPA has reviewed BIC's assertion, based on a ground water model, that contaminants are "tens of years" away from receptor wells. EPA is not convinced of this assertion because of the following concerns:

- (1) The Denver Formation is quite variable in its geology, containing both fractures and sandstone lenses, making it difficult to characterize movement of ground water. This variability also means that ground water and contaminants could migrate more quickly than through a homogeneous medium.
- (2) The Phase II ground water monitoring program included only three monitoring wells in the unweathered bedrock. None of these three wells were downgradient from the impoundments or off-site to the north. However, all three wells showed some ground water contamination.
- (3) EPA believes that the Phase II ground water monitoring program did not catch the worst of the contaminant plume migrating offsite. EPA notes that visual or odorous evidence of contaminants was present in many of the geologic logs completed for monitoring well installation (IT-1, 2, 3, 4, 5, 7, 8, 10), but that only two wells (IT-4 and IT-7) were screened in the intervals capable of monitoring the sinking or floating phases of contamination. Hence, contamination may be migrating off-site more rapidly than indicated by the model used by BIC's consultants.
- (4) EPA is concerned with some uncertainties in the ground water model, particularly regarding velocities. The Phase II draft report included calculations showing ground water velocities to be three times greater in the bedrock than in the alluvium, when one would normally expect the opposite.
- (5) EPA notes that the off-site receptor wells were last sampled in 1986 (by CDH) and that the results of that sampling program can no longer be relied upon to assure that contaminants are not reaching those wells. The wells will need to be sampled on a regular basis starting with the Phase III RI/FS.

c. Extent of Visible Contamination Under the Impoundments

EPA's experience at a similar, but much larger wood treating facility was that the visible contamination did not extend beyond six or twelve inches into the soils under the impoundments, except for "stringers" of contamination that followed fractures and other geologic features. EPA is not assuming that this is the case at BWP, only that this is a possibility. EPA has designed a decision tree to address these soils in a way that will be consistent with future remedies, regardless of the volume.

d. ARARs

EPA notes that the CERCLA cleanup of the BWP site will concern itself with all hazardous substances as defined by CERCLA, not just RCRA listed hazardous wastes. EPA is concerned that there may be other RCRA hazardous wastes and other hazardous substances at the site which have not yet been identified. Identification and characterization of these wastes will be one of the main objectives of the Phase III RI/FS.

EPA believes that the sludge is fundamentally different from the rest of the site because of the higher concentrations of dioxins and the fact that it is a listed waste.

e. New Interim Remedies

EPA has reviewed the recently submitted information on dewatering the sludge prior to disposal, storage or incineration. While the information will not impact the selection of incineration as the chief remedy for addressing the sludge, EPA will consider implementing this remedy prior to incineration, particularly with respect to volume reduction and cost savings. This further consideration will occur during the design stage of remedy implementation.

f. Ability to pay. Mixed funding.

EPA notes that, while cost-effectiveness of particular remedies is a criterion against which remedies are evaluated, the ability of the PRP to pay for a particular remedy is not. The only time when the source of funding for a remedy is an issue is when the cost is so great that it would have a significant impact on the Superfund Trust Fund.

EPA intends to explore all options in assuring that the selected remedy is implemented.

Regarding the issue of remedies for the facilities area and surface soils cleanup, the Phase II RI/FS was not sufficient to address these areas. These areas will be addressed in the Phase III RI/FS.

EXHIBIT 2

WRITTEN COMMENTS RECEIVED FROM STATE OF COLORADO



**COLORADO
DEPARTMENT
OF HEALTH**

April 4, 1991

Mr. Brian Pinkowski
U.S. EPA, Region VIII
One Denver Place, Suite 500
999 18th Street
Denver, CO 80202

ROY ROMER
Governor

RE: State Acceptance of ROD Amendment for Broderick Wood
Products

JOEL KOHN
Interim Executive Director

Dear Brian:

4210 East 11th Avenue
Denver, Colorado 80220-3716
Phone (303) 320-8333

Telefax Numbers:
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First National Bank Building/Denver
(303) 355-6559

Grand Junction Office
(303) 248-7198

As you requested, the Colorado Department of Health (CDH) is informing you of its decision concerning the proposed ROD Amendment for the Broderick Wood Products Superfund site. EPA's preferred alternative is off-site reclamation to a chemical recycling plant in Birmingham, Alabama.

It is CDH's understanding that the proposed recipient of the waste is to be Allied Signal Co. As I have informed EPA on several occasions, CDH has one major concern regarding this remedy. That is, whether EPA has performed a sufficient analysis of Allied Signal Co. to determine whether or not its RCRA permit is in order, whether it has been cited for any violations of its permit, or whether the company has any known environmental problems associated with its operations.

CDH concurs with EPA's preferred alternative. However, since the remedy is so closely tied to one commercial facility, we would reserve acceptance of this choice until the concerns mentioned above have been addressed fully. If other facilities offering the same service as Allied exist, their viability should be reviewed.

Thank you very much for the opportunity to comment on this project. If you have any questions, please call.

Sincerely,

Roger Schimmel
Project Officer
Hazardous Materials and
Waste Management Division

RS/dm

EXHIBIT 3

WRITTEN COMMENTS RECEIVED FROM BIC

HOLLAND & HART
ATTORNEYS AT LAW

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BRENT WAITE
(303) 295-8371

February 14, 1991

Mr. Brian Pinkowski
U.S. Environmental Protection
Agency, Region VIII
One Denver Place
999 Eighteenth Street, 6th Floor
Denver, CO 80202-2405

RE: Broderick Investment Company's Comments on EPA's
Proposed Reconsideration of the June 1988 ROD for the
Broderick Wood Products Superfund Site.

Dear Brian:

Broderick Investment Company ("BIC") submits the following comments on the Proposed Plan to amend the June 30, 1988 Record of Decision ("ROD") for the Broderick Wood Products Superfund Site ("Broderick site").

A. Introduction.

On June 30, 1988, the Regional Administrator of Region VIII of the U.S. Environmental Protection Agency ("EPA") signed a ROD creating an interim cleanup remedy for the Broderick site (an inoperative wood treating facility located in southern Adams County, Colorado). That remedy, known as "Operable Unit 1," called for onsite incineration of waste contained in impoundments in the northwest corner of the site. EPA has categorized this waste as "K001 waste": it is a mixture of creosote and pentachlorophenol contained in the bottom sediment sludge that resulted from the steam wood preserving process employed from 1945 to 1981 at the Broderick site.

BIC is the current owner of the Broderick site. Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") and the terms of a Partial Consent Decree approved by the United States District Court on May 21, 1986, BIC has conducted an extensive Remedial Investigation/Feasibility Study of the site. The last phase of that study (Phase III) is drawing to a close and will result in a new ROD later this year covering cleanup of the portions of the site not covered by Operable Unit 1. Based on data discovered during the partially completed Phase III investigation and other new

HOLLAND & HART
ATTORNEYS AT LAW

Mr. Brian Pinkowski
February 14, 1991
Page 2

information, BIC filed a Petition for Reconsideration of the June 1988 ROD on May 24, 1990. After review of the Petition (and after BIC voluntarily removed the K001 sludge from the unlined impoundments and stored it onsite in lined storage cells), EPA issued the January 1991 Proposed Plan to amend the ROD. The Proposed Plan calls for offsite reclamation of the K001 sludge at the Allied wood treating facility in Alabama, which was one of the alternative remedies that BIC proposed in its Petition for Reconsideration.

- B. Although BIC believes bioremediation is the best remedy for cleanup of the sludge, offsite reclamation is clearly preferable to the originally adopted onsite incineration remedy.

1. Bioremediation.

The Petition for Reconsideration (at pages 15 through 28) describes the considerable advantages of bioremediation of the sludge. As you know, BIC reserves its position that bioremediation is the most cost-effective remedy for the sludge.

EPA rejects bioremediation in the January 1991 "Summary Document -- Post-ROD Activities" prepared by Jacobs Engineering to support ROD reconsideration. That rejection is premised on assertions that bioremediation could not achieve action levels in a reasonable period of time and could not satisfy the requirements for a "no-migration" petition. These cursory assertions ignore the analysis of the applicability of the Resource Conservation and Recovery Act ("RCRA") land disposal restrictions as discussed on pages 26 through 28 of the Petition for Reconsideration. They also do not specify what aspect of bioremediation automatically fails the requirements of a no-migration petition. Thus, they do not justify summary rejection of bioremediation.

2. Offsite Reclamation.

Subject to the reservation of rights described above, BIC supports EPA's decision to revise the ROD to use offsite reclamation to treat the sludge. Under the reclamation alternative, described at pages 28-29 of the Petition for Reconsideration, the sludge will be transported to the Allied facility in Alabama. Allied will refine the sludge to produce relatively pure creosote/pentachlorophenol constituents. It will then either sell these constituents to a RCRA permitted wood treating facility or use them in its own wood treating process. If the material is not recyclable, Allied will blend it as fuel

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and burn it in properly permitted onsite incinerators to provide steam for the wood treating process.

This proposal more fully accomplishes the purposes of CERCLA than the incineration remedy described in the ROD. First, it is much more cost effective: BIC's consultant, Remediation Technologies ("ReTeC"), estimates that the cost of offsite reclamation is between 2 and 3 million dollars. This cost is nearly a five-fold savings over the 11 million dollar onsite incineration cost estimated in the Army Corps of Engineers' 1989 design document. As indicated in our letter of January 14, 1991 (enclosed as Exhibit 1), offsite réclamation also complies with all RCRA land disposal restrictions, which are the principal applicable or relevant and appropriate requirements ("ARARs") for cleanup of the sludge. Reclamation also promotes EPA's goals of recycling and pollution prevention by reusing a significant portion of the sludge. Finally, as the community members that attended the public meeting regarding the ROD reconsideration on February 5, 1991 demonstrated, the surrounding community has serious concerns about incineration. The reclamation alternative is thus a more acceptable alternative to the community. It is clearly preferable to onsite incineration.

- C. Preliminary information indicates that EPA should not include the wood treating materials remaining in the building, vessels and drums in its proposed offsite reclamation remedy.

Shortly after EPA opened the comment period for reconsideration of the ROD, EPA and BIC discussed the possibility of reclaiming the wood treating materials contained in the onsite building, vessels and drums as part of Operable Unit 1. At that time, both EPA and BIC speculated that reclamation of this material as part of Operable Unit 1 would be the most cost-effective treatment alternative (other than bioremediation) because the volume of this material was small compared to the volume of the sludge, and thus the marginal cost of reclaiming it would also be small. EPA requested that BIC investigate reclamation of this material and, if that investigation confirmed EPA and BIC's initial speculation, provide EPA with the necessary information to include the building, vessel and drum materials in the revised Operable Unit 1.

At BIC's request, ReTeC has analyzed reclamation of the building, vessel and drum wood treating material. Based on currently available information, ReTeC has concluded that EPA should not reclaim building, vessel and drum materials as part of Operable Unit 1. There are two reasons for this conclusion: first, much of the wood treating materials in the vessels is not

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readily accessible. Expensive demolition of these vessels is necessary prior to removal of the wood treating materials. Because all of the buildings and vessels will probably be demolished after completion of the Phase III studies, ReTeC has concluded that demolishing the vessels that contain wood treating materials at the same time as the other site buildings and vessels is both more implementable and more cost-effective. Second, after discussions with Allied, ReTeC has determined that the marginal savings associated with treating the building, vessels and drum contents now is small. Allied charges the same reclamation fee regardless of the quantity of material reclaimed. Therefore, even if it were easily removed from its current containers, it is not more cost-effective to reclaim the building, vessel and drum material as part of Operable Unit 1.

Because it is based on preliminary information, ReTeC's analysis of this issue is also preliminary. Information that develops during the remedial design may lead to a different result. However, based on currently available information, EPA should not include building, vessel, and drum contents in Operable Unit 1. If you wish to review ReTeC's detailed analysis of this issue, please let us know.

D. EPA's Summary Document contains some minor factual errors.

ReTeC has reviewed the Summary Document on behalf of BIC and has noted some factual errors. Most of these factual errors are minor and are discussed in the enclosed Exhibit 2.

BIC hopes that these comments will prove useful to EPA in amending the ROD. Please call John Shepherd (295-8309), Brent Waite (295-8371), or Frank Prager (295-8398) if you have any questions.

Very truly yours,



Frank P. Prager
Brent A. Waite
for Holland & Hart

Attorneys for
Broderick Investment Company

BAW/cg

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February 14, 1991
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cc: Joann G. Ward, Esq.
Francis W. Collopy, Esq.
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Ann M. Colpitts
Roger Schimmel
Richard Sisk, Esq.
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February 13, 1991

Mr. Frank Prager
Holland and Hart
555 Seventeenth Street
Suite 2900
Denver, CO 80202

Dear Frank:

I have reviewed the "Summary Document - Post ROD Activities - June 1988 to December 1990" for the Broderick Wood Products site as you requested. The document was prepared by U.S. EPA for public information and provides background and justification for changes in the June 1988 ROD. Most of my comments are directed at the portions of the document that deal with the hydrogeological description. Overall, the document is accurate in this area, however, there are several points that need updating, because the document used draft data from the draft RI or draft data from meetings with U.S. EPA.

Specifically, the areas that are inaccurately portrayed include the following:

Page 4, Section 1.2.1, 5th paragraph: The weathered bedrock does not contain vertical fracturing as indicated here. The sentence should read "The upper seven to 15 feet of the Denver Formation includes weathered bedrock with broken or fragmented material, which decreases with depth."

Page 5, Figure 3: The cross section did not reproduce well and the reader cannot distinguish the strata descriptions nor the difference between "odor detected" and "oil in section".

Page 7, Section 2, fifth paragraph: We are not familiar with the December, 1982 inspection conducted by EPA where a trench was observed at the site. Presently, there is no evidence of this trench at the site. We have requested a copy of the report from Jacobs Engineering.

Page 11, Section 3.2, first paragraph: This is an outdated description of the water levels in the impoundments and how they interact with groundwater. First, the Figure 4 was a draft figure originally prepared for a meeting with EPA on December 18, 1989 (over one year ago) and was updated for the Level 2, Draft and Final RI reports. The Final RI report contains the version that BIC believes accurately portrays the flow between the impoundment and the groundwater. Second, after the impoundments were dewatered

and the sludge removed in the fall, 1990, it became evident that the sludge was self-sealing and, in fact, the water level in the impoundment was artificially higher than the groundwater table because the water could not flow in or out of impoundment. The sludge apparently clogged the pore spaces of the soil surrounding the impoundment and therefore limited water movement.

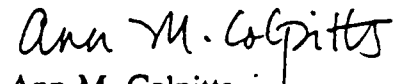
The recent information obtained on the current water levels around the impoundments indicates that the water levels in the impoundments are not higher than the surrounding groundwater table. Therefore, because of the self-sealing effect described above, the impoundments could not have exhibited a "mounding" effect and, before the sludge was removed, could not have created a gradient which would drive contaminants away from the impoundments.

Page 11, Section 3.2; second paragraph: The second sentence states that "it was determined that the volume of visibly contaminated soil in or beneath the impoundments is much greater than the quantity in the June 1988 ROD". When was this determination made and what is the reference for this statement?

If you have any questions regarding the contents of this letter, please call.

Sincerely yours,

REMEDIATION TECHNOLOGIES, INC.


Ann M. Colpitts
Sr. Hydrogeologist

cc: A. Middleton
D. Morgan



REMEDIATION
TECHNOLOGIES INC

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February 22, 1990

Mr. Brian Pinkowski (8HWM-SR)
US Environmental Protection Agency
Region VIII
999 18th Street, One Denver Place
Denver, Colorado 80202

Dear Brian:

Frank Prager with Holland and Hart sent a letter to you dated February 14, 1991 regarding comments on EPA's proposed reconsideration of the June 1988 ROD. Attached to that letter was a February 13, 1991 letter from me to Frank Prager discussing the "Summary Document - Post ROD Activities". On behalf of Broderick Investment Company and Holland and Hart, I would like to point out an error in that letter. The last comment on page 2 of my letter refers to Page 11, Section 3.2 of the Summary Document and the entire comment should be withdrawn from your consideration. I apologize for any confusion this may have caused but felt it was important for you to be aware that the comment does not require a response. Please call me if you have any questions concerning this matter.

Sincerely yours,

REMEDIATION TECHNOLOGIES, INC.

Ann M. Colpitts
Sr. Hydrogeologist

cc: Prager, F.
Middleton, A.

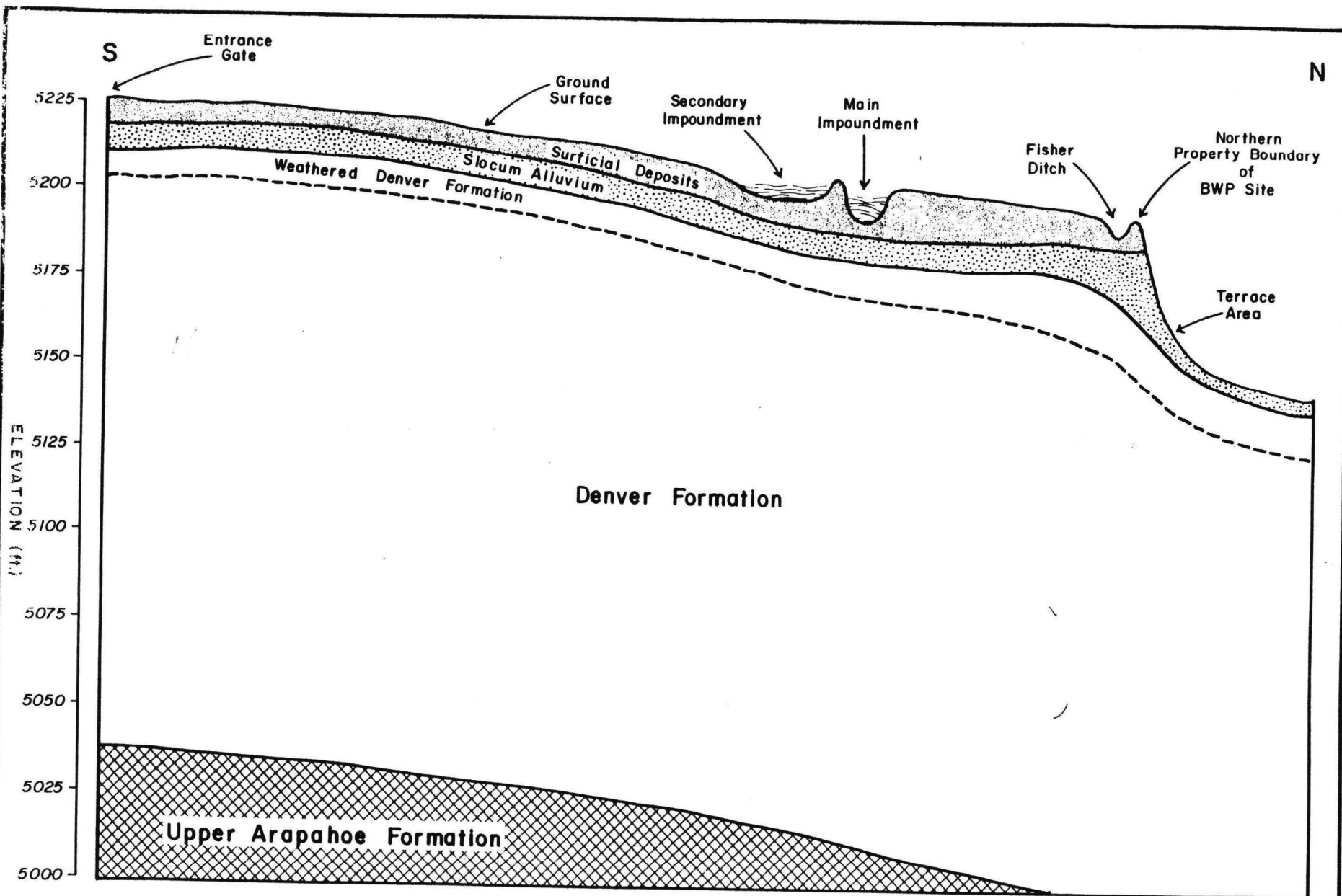
EXHIBIT 4

ERRATA SHEET FOR THE SUMMARY DOCUMENT

**ERRATA
SUMMARY DOCUMENT
POST-ROD ACTIVITIES
JUNE 1988 TO DECEMBER 1990**

The following changes should be made to the Summary Document. Text to be deleted is enclosed within brackets. Replacement text is underlined.

- 1) Page 4, Section 1.2.1, 5th paragraph: The second sentence should read as follows: "The upper seven to 15 feet of the Denver formation includes [are weathered] bedrock with broken or fragmented material [vertical fracturing], which decreases with depth."
- 2) Page 5, Figure 3: This Figure has been reproduced with better clarity and is attached.
- 3) Page 7, Section 2, 5th paragraph: The reference to the trench should be deleted and the paragraph modified as follows: "EPA conducted another inspection of the site in December 1982. This inspection revealed the possibility of serious contamination at BWP, [including a 10-foot by 50-foot trench that was observed about 40 feet north of the impoundments. This trench had reportedly been used only for the disposal of solid wastes; however, a black stain and oily puddle were noted at the bottom of the trench.] Also, in December 1982, Browning Ferris"
- 4) Page 11, Section 3.2, first paragraph: Figure 4 should be deleted and replaced with the attached revision. Although outdated, the piezometric levels shown in the original Figure are similar to those in the replacement Figure. Consequently, the conclusions/hypotheses presented in the Summary Document are still valid. It should be noted that the piezometric levels shown in Figures 5 and 6 are intended as conceptual illustrations and do not represent measured data.



APPROXIMATE SCALE

Horizontal: 1" = 300'

Vertical: 1" = 40'

Figure 3

**Schematic Geological Cross Section
of the Broderick Wood Products Site**