

**SIXTH FIVE-YEAR REVIEW REPORT FOR
BRODERICK WOOD PRODUCTS SUPERFUND SITE
ADAMS COUNTY, COLORADO**



Prepared by

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Region 8
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LIST OF ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
BIC	Broderick Investment Company
BWP	Broderick Wood Products
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
FYR	Five-Year Review
HQ	Hazard Quotient
IC	Institutional Control
LNAPL	Light Non-Aqueous Phase Liquid
LTU	Land Treatment Unit
µg/kg	Micrograms Per Kilogram
µg/L	Micrograms Per Liter
MCL	Maximum Contaminant Level
mg/kg	Milligrams Per Kilogram
NAPL	Non-Aqueous Phase Liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NS	Not sampled
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PCP	Pentachlorophenol
PEC	Probable Effect Concentration
PFAS	Per- and Polyfluoroalkyl Substances
PQL	Practical Quantitation Limit
PRP	Potentially Responsible Party
PWTS	Packaged Water Treatment System
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SBCW	Soil/Bentonite Cutoff Wall
TCDD	Tetrachlorodibenzodioxin
TEC	Threshold Effect Concentration
UU/UE	Unlimited Use and Unrestricted Exposure

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the sixth FYR for the Broderick Wood Products Superfund Site (Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of three operable units (OUs). OU1 is the interim action/source control remedy (impoundments). OU2 is the final remedy (soil, groundwater, sediments, and buildings, vessels, and drums). OU3 is the Union Pacific Railroad Company Project, which is described in more detail in the *Status of Implementation* section of this FYR Report. This FYR addresses all OUs.

The EPA Remedial Project Manager (RPM), Andrew Schmidt, led the FYR. Participants included Colorado Department of Public Health and Environment (CDPHE) Project Manager Ross Davis and EPA FYR support contractor Skeo staff Treat Suomi and Kelly MacDonald. The potentially responsible party (PRP) was notified of the initiation of the FYR. The review began on 7/29/2020.

EPA has determined in the five-year review that more information is needed before it can determine the protectiveness of the cleanup at the Broderick Wood Products Superfund Site. More information will be obtained with the collection of additional groundwater data.

Site Background

The 64-acre Site is in unincorporated Adams County near Denver, Colorado. The Broderick Wood Products (BWP) Company operated a wood treating facility to treat power poles, fence posts, railroad ties and other wood products from 1947 to 1981. Wood preserving agents used in the treatment process were creosote and pentachlorophenol (PCP). During facility operations, waste was disposed of on site, primarily in unlined impoundments in the northwest corner of the Site. Historical operations and disposal practices contaminated soil, sediment and groundwater with hazardous chemicals. The Broderick Investment Company (BIC) is the successor to BWP Company's business interest and is the Site's PRP.

The Site is bound on the north by the Fisher Ditch (an open unlined irrigation canal), on the west by the Burlington Northern Santa Fe rail line tracks, and on the east by the Union Pacific Railroad Company rail line tracks (Figure 1). The southern boundary is approximately the crossing of the Burlington Northern Santa Fe and Union Pacific Railroad Company tracks. Current uses on the Site include a gravel business (on Lot 1), storage (on Lot 8, which BIC sold in 2019), and a Union Pacific Railroad Company bypass line across the Site (Figure 4). BIC owns Lots 2, 7, 9 and Tract A. Remedial surface features on site currently include land treatment units (LTUs), a packaged water treatment system (PWTS), a surge pond, pumping infrastructure, bioventing equipment and wells (Figure 2). The Site properties are fenced and secure.

Three hydrogeological units underlie the Site: the surficial aquifer (the surficial aquifer alluvium and weathered Denver Formation, down to 25 feet below ground surface (bgs)), the Denver aquifer (the unweathered Denver

aquifer, 25 to 180 feet bgs) and the upper Arapahoe aquifer (>180 feet bgs). Groundwater flow at the Site is toward the north in the surficial and Arapahoe aquifers and toward the northeast in the Denver aquifer. Groundwater contamination at the Site was found primarily in the surficial and Denver aquifers. Groundwater under the Site in all three aquifers was deemed a potential drinking water source during remedy selection.

Appendix A lists the resources referenced during development of this FYR Report. Appendix B provides the Site's chronology of events.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Broderick Wood Products		
EPA ID: COD000110254		
Region: 8	State: Colorado	City/County: Adams County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	Has the Site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Andrew Schmidt		
Author affiliation: EPA Region 8 with support from Skeo		
Review period: 7/29/2020 – 7/15/2021		
Date of site inspection: 10/13/2020		
Type of review: Statutory		
Review number: 6		
Triggering action date: 9/29/2016		
Due date (five years after triggering action date): 9/29/2021		

Figure 1: Site Vicinity Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1980, the EPA became involved with the Site when the BWP Company applied for a permit as required under the Resource Conservation and Recovery Act (RCRA). In November 1981, the BWP Company ceased operations as a wood treating facility, citing market conditions. After inspections in 1981 and 1982, the EPA identified numerous RCRA violations. A waste disposal company operating north of the Site reported that wood treating chemicals had been detected in one of its monitoring wells. In March 1983, the EPA invoked CERCLA authority and conducted a preliminary assessment and site investigation. Contamination was detected in soil and groundwater samples taken both on site and off site. The EPA proposed the Site for listing on the Superfund program's National Priorities List (NPL) in September 1983 and finalized its listing on the NPL in September 1984. In 1985, a contractor hired by BIC to dismantle the wood treating plant started a fire that destroyed the process building and resulted in further contamination.

Remedial investigation/feasibility study (RI/FS) activities took place in three phases: Phase I, completed in March 1984; Phase II, completed in December 1986; and Phase III, completed in June 1991. Remedial investigations identified many minor and two primary contaminant sources (the Former Impoundment Area and the Former Process Area) at the Site (Figure 2).

As part of the Phase III RI/FS, the EPA and BIC prepared an Endangerment Assessment for OU2 in January 1991. Primary pathways with unacceptable risk included inhalation and ingestion of soils for on-site resident young children and industrial workers, and ingestion of groundwater for on-site resident adults, off-site resident adults, and on-site industrial workers. The chemicals of probable concern for the Former Impoundment Area and Former Process Area were polycyclic aromatic hydrocarbon (PAHs), PCP, dioxins and furans, and, in a historical engine house area, heavy metals such as arsenic, cadmium, lead and zinc. In addition, environmental risk to ecological receptors was present due to PAH contamination in Fisher Ditch sediments.

Response Actions

Remedial action objectives (RAOs) and remedy components are listed below, by OU, in Tables 1 and 2. The EPA issued the OU1 Record of Decision (ROD) in June 1988 as an interim remedy to address sludges in the two impoundments. Based on technical data and cost information obtained after the 1988 OU1 ROD, the EPA issued a 1991 OU1 ROD Amendment to change the disposal method for the impoundment sludges. EPA selected the OU2 remedy in the Site's 1992 ROD as the final remedy for the Site, addressing soil, groundwater and sediment contamination and buildings, vessels, and drums. The EPA updated the OU2 remedy with a 1995 Explanation of Significant Differences (ESD) after additional data were collected and treatability studies indicated that treatment levels for groundwater were unattainable on the property. There is no decision document for OU3 because the EPA set up OU3 to better manage the Union Pacific Railroad Company Project at the Site (described in more detail in the *Status of Implementation* section of this FYR Report).

Table 1: OU1 (Interim Action/Source Control) RAOs and Remedy Components

Decision Document	RAOs	Remedy Components
1988 ROD	<ul style="list-style-type: none"> • Addressing the contents of the impoundments as the greatest concentration of contaminants on-site; measures to address these contaminants would necessarily address all applicable or relevant and appropriate requirements (ARARs) that govern such measures. • Mitigating the following risks or pathways: <ul style="list-style-type: none"> ○ Ingestion of hazardous substances in the surface soils and the impoundments. 	<ul style="list-style-type: none"> • Restriction of Site access. • Excavation and incineration of impoundment sludges. • Stockpiling or incineration of visibly-contaminated soils found beneath the impoundments. • Treatment of water in the impoundments and buildings.
1991 ROD Amendment	<ul style="list-style-type: none"> ○ Direct dermal contact with hazardous substances in surface soils and the impoundments. ○ Inhalation of airborne hazardous substances. ○ Ingestion of contaminated groundwater. 	<ul style="list-style-type: none"> • Off-site reclamation of the useful components of the sludge, and incineration and disposal of the residues.

Table 2: OU2 (Final Remedy) RAOs and Remedy Components

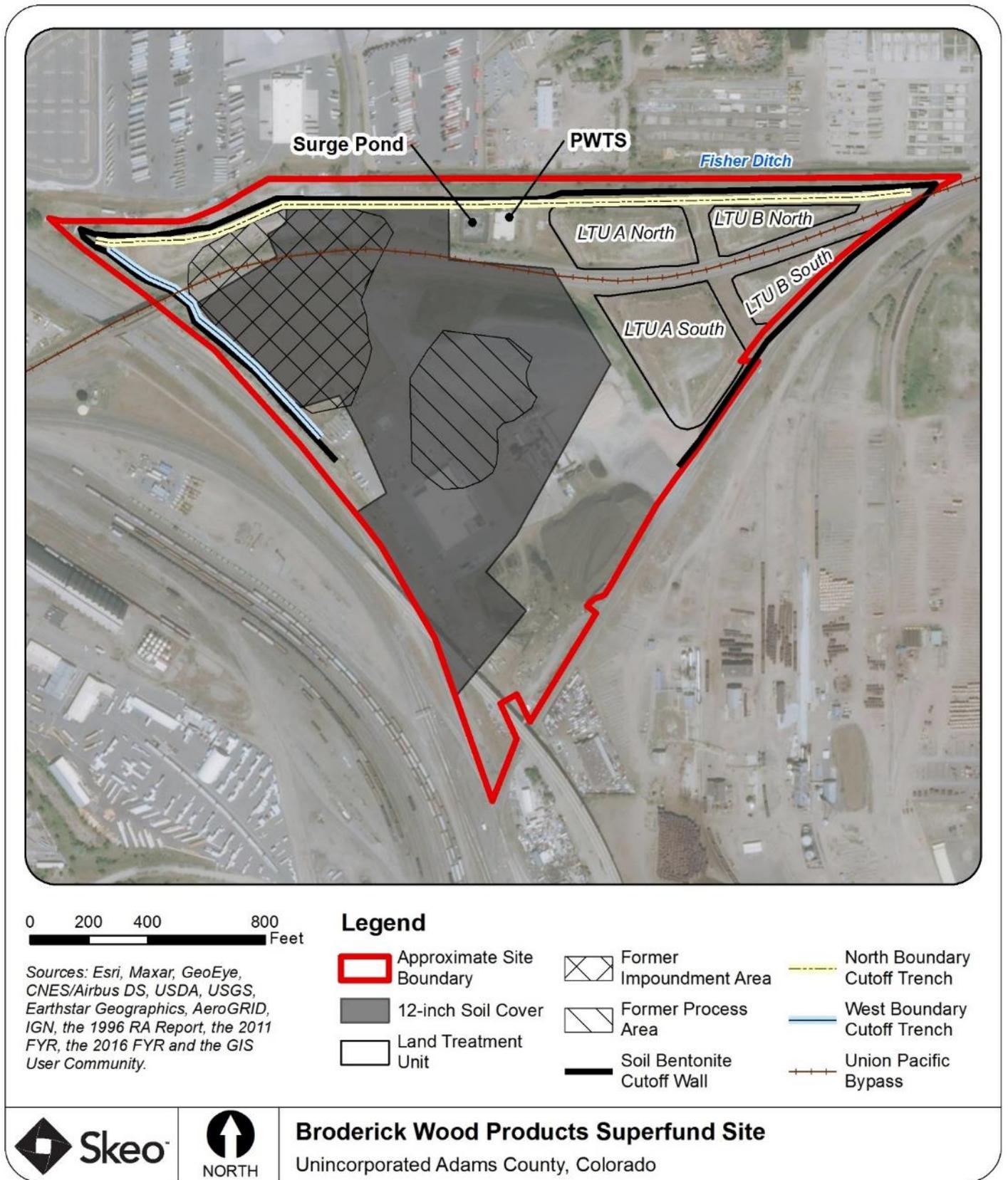
Decision Document	RAOs	Remedy Components
1992 ROD	<ul style="list-style-type: none"> • Control present and future risks posed by direct contact to and/or ingestion of and/or inhalation of contaminated soils, sediments, and groundwater. • Control the migration of contaminants from the soil to the aquifer systems. • Prevent significant future human exposure to residual contamination in the soils, sediments and groundwater. • Remove and properly dispose of the buildings, vessels, and drums and their contents including asbestos. 	<ul style="list-style-type: none"> • Soil/sediment <ul style="list-style-type: none"> ○ Excavation of site soil and bioremediation of organics-contaminated soil in an LTU. The length of the total treatment process was estimated at seven years. Since the Land Disposal Restrictions will not be met at the time of placement in the LTU, these Land Disposal Restrictions are waived under an interim measures waiver.¹ The LTU will be designed, operated and closed in compliance with RCRA regulations. The EPA included, as extra protective measures, the liner and leachate collection system and closure with a multi-layered cap. ○ Excavation of organics-contaminated sediments in the Fisher Ditch and treatment to remove water, in preparation for subsequent treatment with organics-contaminated soils. ○ Treatment of heavy-metals-contaminated soil through chemical fixation, and off-site disposal. ○ Closure of existing surface impoundments in accordance with RCRA requirements. ○ Implementation of institutional controls to prohibit future residential and agricultural use of the Site and control exposure to organics-contaminated soils at lower levels remaining after excavation and treatment. • Groundwater <ul style="list-style-type: none"> ○ Recovery and treatment of groundwater and light non-aqueous phase liquids (LNAPLs) from the surficial aquifer. Construction of a treatment plant to remove LNAPLs, which will be shipped to an off-site recycling facility. Remaining water will be treated and mixed with nutrients and an oxygenating chemical (ex-situ bioremediation), then reinjected into the aquifer to stimulate bacterial growth to promote further breakdown of contamination (in-situ bioremediation). ○ Collection, treatment and off-site recycling of small amounts of dense non-aqueous phase liquids (DNAPLs) and groundwater from existing monitoring wells in the Denver aquifer. ○ Groundwater monitoring in all three aquifers for 30 years to assess groundwater quality and contaminant migration. ○ Installation of additional monitoring wells in the Arapahoe aquifer to further characterize groundwater contamination. ○ Implementation of institutional controls on the property to control access to water in the surficial and Denver aquifers. Federal and state groundwater standards identified as ARARs are not expected to be met in the Denver aquifer and are waived due to technical impracticability. • Buildings, vessels and drums <ul style="list-style-type: none"> ○ Demolition of buildings and decontamination and temporary stockpiling of building debris on site. ○ Decontamination and off-site reclamation of scrap metal. ○ Pumping/excavation, on-site storage, and off-site reclamation of vessel and drum contents (organics and sludges). ○ Pumping, stabilization, drumming and off-site disposal of contaminated water in building sumps and basements. ○ Off-site disposal of building debris and asbestos-containing materials.

¹ Land Disposal Restrictions prohibit placement of hazardous waste without treatment by a particular technology or to a particular concentration.

Decision Document	RAOs	Remedy Components
1995 ESD	<p>For groundwater within the points of compliance:</p> <ul style="list-style-type: none"> • Control access to contaminated groundwater within the points of compliance on the BWP property to reduce or eliminate exposure. • Reduce the mass of contamination within the points of compliance to reduce migration of contaminated groundwater beyond the points of compliance. • Contain contaminated groundwater within the points of compliance. 	<ul style="list-style-type: none"> • Groundwater <ul style="list-style-type: none"> ○ Remediation goals will be met at and beyond the points of compliance (the boundary of the BWP Company property) for the surficial and Denver aquifers. ○ Because groundwater treatment levels were determined to be unattainable on the site property, new remediation goals will be set for contaminated groundwater in the shallow aquifer in the area within the points of compliance (see RAOs in left column). ○ A soil/bentonite cutoff wall (SBCW) will be constructed at the north boundary of the BWP Company property to contain contaminants in the surficial aquifer within the points of compliance. ○ Natural attenuation and biodegradation will be used to address the contamination in the dissolved plume north of the BWP Company property. ○ Instead of injecting oxygenated water for the in-situ groundwater remediation, bioventing of soils will be conducted. Bioventing was deemed a more effective means of transmitting oxygen to the subsurface and circulating it through the subsurface than via oxygenated groundwater, due to low hydraulic conductivity and the heterogeneity of the surficial aquifer.

Figure 2 shows Site remedy components.

Figure 2: Site Features Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Tables 3, 4, and 5 below show the soil excavation action levels, sediment excavation level and LTU treatment levels selected as part of the OU2 remedy. The 1992 OU2 ROD listed health-based excavation levels for soil. It also specified that the decision on the method to be used to determine soil excavation levels would be made during the remedial design. The EPA, CDPHE, and consultants conducted an evaluation of what action levels were needed to obtain a 1×10^{-5} risk in an industrial scenario and concluded that sampling for polychlorodibenzodioxins and furans (reported as 2,3,7,8-TCDD [tetrachlorodibenzodioxin] equivalents) provides an accurate representation of the total risk represented by surface and subsurface soils. They also concluded that the action levels below in Table 3 represented a 1×10^{-5} risk level. These action levels were selected by the EPA because they were felt to be the most protective action levels without being overly conservative.

Table 3: OU2 Soil Excavation Action Levels

Media	Contaminant	Soil Excavation Action Levels (µg/kg)
Surface soil (ground surface to 1 foot bgs)	2,3,7,8-TCDD equivalents	0.6
Subsurface soil (> 1 foot bgs)		4.4
<i>Notes:</i> <i>Source:</i> Appendix A of the 1996 OU2 Remedial Action Report. µg/kg = micrograms per kilogram		

Table 4: Fisher Ditch Sediment Excavation Action Level

Contaminant	Sediment Excavation Action Level (mg/kg)
Carbazole	23.2
<i>Notes:</i> <i>Source:</i> Page 57 of the 1992 OU2 ROD. Cleanup goal based on ecological risk factors. mg/kg = milligrams per kilogram	

Table 5: LTU Treatment Levels

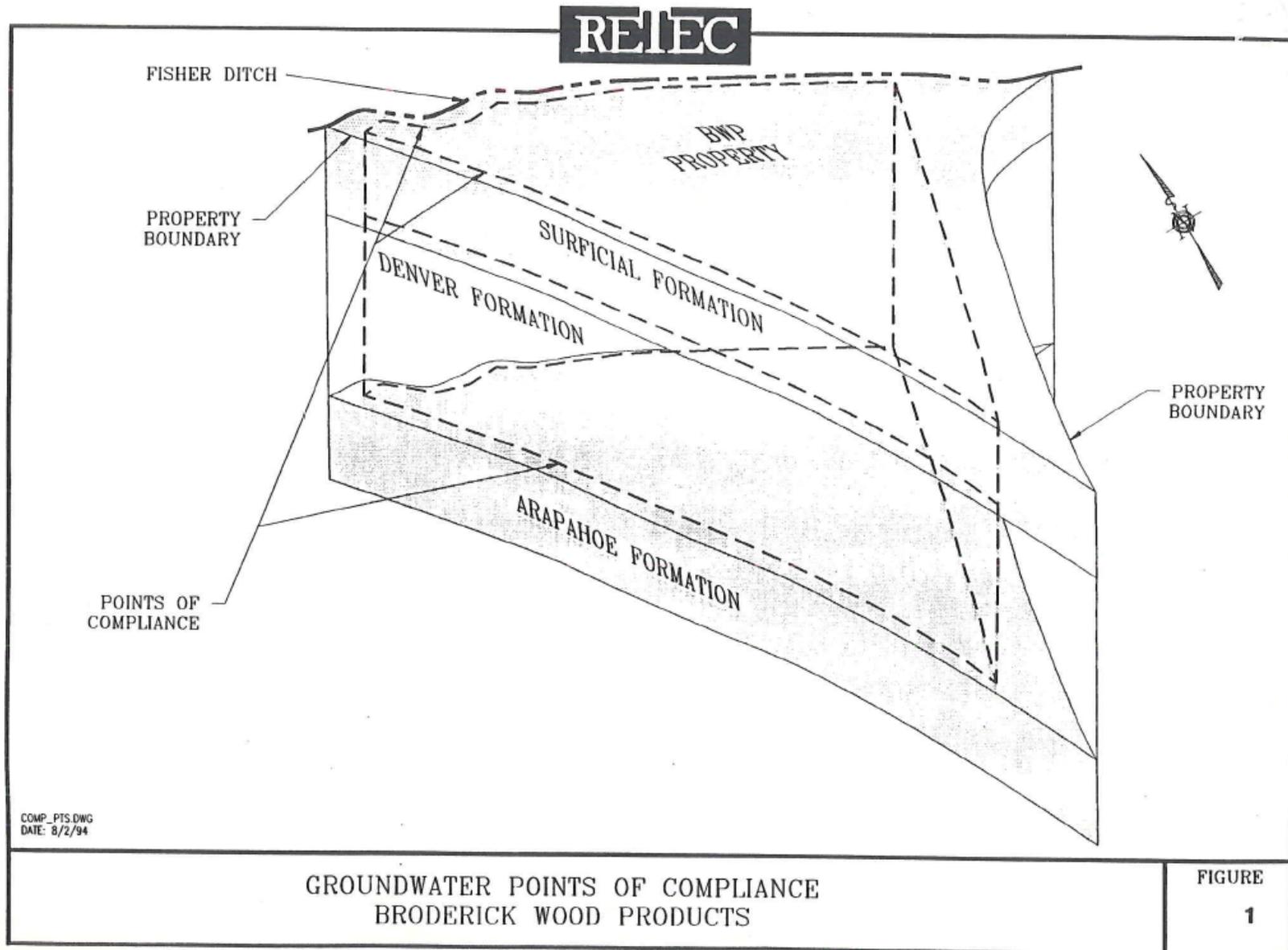
Contaminant	LTU Treatment Levels
<i>Organics</i>	
2,3,7,8-TCDD equivalent	0.0006 ^a mg/kg
<i>Total PAHs</i>	
Benzo(a)pyrene	15.2 mg/kg
Dibenzo(a,h)anthracene	13.9 mg/kg
<i>K001 Constituent</i> ^b	
Naphthalene	95-99%
PCP	90-99%
Phenanthrene	95-99%
Pyrene	95-99%
Toluene	0.5-10 mg/kg
Xylene (Total)	0.5-10 mg/kg
Lead	99-99.9%
<i>Metals</i>	
Arsenic ^c	5.0 mg/kg
Cadmium ^c	1.0 mg/kg
Lead ^c	5.0 mg/kg
<p><i>Notes:</i> <i>Source:</i> Table 12 of the 1992 OU2 ROD.</p> <ol style="list-style-type: none"> Laboratory detection limitations may not allow measurement to this level. In that case, the detection limit will be the treatment level. The currently recognized detection level of 1 µg/kg corresponds to a cancer risk level close to 10⁻⁵. Remedy will comply with Land Disposal Restrictions through a treatability variance. Treatment levels or percent reduction ranges that ex-situ bioremediation will attain are presented. Action levels are based on non-wastewater toxicity characteristic leaching procedure (mg/L). 	

Table 6 below shows the groundwater treatment levels for the surficial aquifer. ARARs were waived for the Denver aquifer due to the technical impracticability of meeting them. The 1995 OU2 ESD determined that the groundwater treatment levels were unattainable on the Site property for the surficial aquifer. They continue to apply at and beyond the points of compliance. Figure 3 shows the points of compliance.

Table 6: Groundwater Treatment Levels for the Surficial Aquifer

Contaminant	Groundwater Treatment Levels (micrograms per liter (µg/L))	Basis
<i>Carcinogenic Chemicals</i>		
2,3,7,8-TCDD equivalent	5 x 10 ⁻⁵	Proposed maximum contaminant level (MCL)
Trichloroethylene	5.0	Colorado basic groundwater standard
Tetrachloroethylene	1.6	Risk-based level
Carbazole	4.1	Risk-based level
<i>Non-Carcinogenic Chemicals</i>		
Naphthalene	41.6	Risk-based level
Acenaphthene	623.0	Risk-based level
Fluorene	416.0	Risk-based level
Anthracene	3,120.0	Risk-based level
Fluoranthene	416.0	Risk-based level
Pyrene	312.0	Risk-based level
Phenol	623.0	Risk-based level
2-Methylphenol	520.0	Risk-based level
4-Methylphenol	520.0	Risk-based level
2,4-Dichlorophenol	31.2	Risk-based level
2,4,5-Trichlorophenol	1,040.0	Risk-based level
PCP	1.0	Proposed MCL
<i>Notes:</i>		
<i>Source:</i> Table 13 of the 1992 OU2 ROD.		

Figure 3: Points of Compliance, from Figure 1 of 1996 Preliminary Close-Out Report



Status of Implementation

OU1

Site access was restricted through construction of a fence in January 1990. Stockpiling or incineration of visibly-contaminated soils found beneath the impoundments was deferred to OU2 when EPA determined that the volume of visibly-contaminated soil was significantly greater than estimated in the 1986 Phase II RI/FS. Treatment of water in the impoundments and buildings was also deferred to OU2 because cost evaluations as part of the remedial design indicated that it would be more cost effective to treat the water during the OU2 remedial action.

Per the 1991 ROD Amendment, impoundment sludges were excavated, blended and processed on-site, and transported to Allied Signal's plant in Fairfield, Alabama, and reclaimed. Residues were incinerated and the ash disposed of in a permitted landfill. The OU1 remedial action finished in December 1993.

OU2

The EPA divided the OU2 remedy implementation into two stages. The EPA conducted Stage 1, which began in June 1993 and finished in April 1994. OU2 Stage 1 remedial action activities included:

- Excavation of about 81,000 cubic yards of contaminated soils and subsequent stockpiling on-site
- On-site fixation and disposal of about 3,900 cubic yards of metals-contaminated soils
- Construction of LTUs consisting of a bermed area with a clay layer and a synthetic liner, a leachate collection system, and an irrigation system
- Initial filling in of the LTUs, which consisted of placing cement-stabilized metals-contaminated soil in some areas and organic-contaminated soil in the remainder of the LTU. Cement-stabilized soil was placed about 16 inches thick, and the organic-contaminated soil was placed about 14 inches thick.
- Construction of a clay layer and synthetically lined temporary stockpile area with a synthetic cover and a leachate collection system
- Construction of a North Boundary Cutoff system consisting of eight buried drain lines, eight small drain line pump stations, and associated piping and electrical equipment
- Installation of a PWTS on a concrete slab and subsequent installation of a building to house the PWTS
- Construction of a lined surge pond
- Demolition and disposal of about 30 buildings and miscellaneous vessels, metalwork, railroad lines, and other site debris
- Disposal of about 21,200 gallons of creosote and PCP sludges
- Installation of a composting system for treatment of soil contaminated with debris. This material was a mixture of crushed demolition debris (from building demolition) and excavated debris removed from under the LTUs (principally wood and steel banding).
- Performing asbestos abatement for contaminated buildings.

The 1992 OU2 ROD called for excavation of contaminated sediments from Fisher Ditch. Additional sampling of Fisher Ditch sediments in July 1993 showed remediation would not be necessary because contaminant levels were below the sediment excavation action level established in the ROD (Appendix K).

Concurrent with Stage 1, the EPA conducted more Site characterization and treatability studies. Based on findings from these studies, the EPA recognized that the groundwater cleanup goals established in the 1992 ROD would not be attainable within the site property for the surficial and Denver aquifers. The EPA then issued the 1995 OU2 ESD.

The EPA operated the OU2 Stage 1 remedial action until February 1995, when BIC took over the operation via Unilateral Administrative Order. In a 1995 Consent Decree with the EPA, BIC agreed to perform the remedial design and remedial action for Stage 2. OU2 Stage 2 began in May 1995 and finished in September 1996. OU2 Stage 2 included the following remedial action activities:

- Installation of a north boundary soil/bentonite cutoff wall (SBCW)
- Construction of a non-aqueous phase liquid (NAPL) recovery and dewatering system
- Construction of an in-situ phased bioventing program
- Modification of the existing PWTS
- Installation and abandonment of specific monitoring wells
- Placing a one-foot soil cover over all areas with greater than 0.6 µg/kg dioxin equivalency
- Removal of clay pipe.

Groundwater is not currently treated in the PWTS. Water from the North Boundary Cutoff and West Boundary Cutoff trenches is currently pumped and stored on site in the surge pond or applied on the surface of the LTUs, where the water evaporates.

OU3

In 2003, Union Pacific Railroad Company approached the EPA, CDPHE and BIC about a regional project that included the construction of a rail line embankment across the Site. Union Pacific Railroad Company operates a complex set of rail lines, yards and switches in the Denver metropolitan area and has sought ways to improve service and reduce congestion through realignment activities. After technical review and discussions with the EPA, CDPHE, BIC and other stakeholders, the option of the rail line embankment crossing the Site was selected. The result of this process was called the Utah Junction Re-Alignment Project (Union Pacific Railroad Company Project in this report). As described above, the EPA established the Union Pacific Railroad Company Project as OU3 of the Site for management purposes; OU3 does not have any decision documents. This project required OU2 design considerations for: 1) building on or through the LTUs; 2) spanning the product recovery and bioventing systems; 3) replacing some monitoring wells; and 4) groundwater control measures and surface water drainage.

The following modifications to the remedy, though not called for in a decision document, were designed and implemented at OU2 by the Union Pacific Railroad Company to allow for the completion of the Union Pacific Railroad Company Project:

- Impacted and non-impacted soils were excavated (13,300 cubic yards and 39,000 cubic yards, respectively).
- Non-impacted soils were used for embankment materials for the new rail line.
- Impacted soils were placed and treated in the LTUs.
- Debris encountered during excavations was removed and disposed of off-site.
- The LTUs were modified to allow the new rail line to pass over and through them.
- Bioventing wells were modified for use after embankment construction.
- Product recovery trenches were extended to reach beyond the slope of the embankment.
- Decontamination facilities and utilities were relocated and upgraded to facilitate post-construction operation.
- Monitoring wells in the location of the new rail line work were abandoned and relocated (15 wells).
- Utilities crossing under the Union Pacific Railroad Company embankment were encased.
- Security fencing and vegetation impacted by the construction were restored.
- An SBCW and West Boundary Cutoff drain line were installed along the west boundary of the Site.
- An SBCW was installed along the east boundary.

Note that the west SBCW, West Boundary Cutoff drain line, and east SBCW were installed to address concerns regarding the potential for off-site migration of potentially impacted groundwater from the Site and to manage groundwater during construction activities. The existing rail line running north to south along the western edge of the property had to be lowered by about 8 feet to accommodate the Union Pacific Railroad mainline bridge. This excavation had the potential to impact groundwater flow directions in the northwest corner of the Site. To minimize the potential for contaminated groundwater to flow westward and migrate off site into the subsurface

drainage channel, the existing North SBCW and North Boundary Cutoff drain line were extended along the west property boundary. In addition, the existing North SBCW was extended south along the east boundary to 1) prevent off-site migration of groundwater around the northeast corner of the Site; 2) block migration of potentially impacted groundwater from the neighboring Koppers Site onto the Site; and 3) prevent off-site migration of any potential leakage from the LTUs.

Post-Construction Remedy Implementation Activities

In 2011, CDPHE implemented new permit requirements for PWTs-treated water discharging into Clear Creek, which included adding discharge requirements for additional constituents and lowering the discharge limits for many existing constituents. BIC has had issues meeting these permit requirements due to the PWTs technology. BIC discontinued discharging treated water from the PWTs in September 2014 to avoid violating the permit and has not discharged water off site since. CDPHE responded to BIC and amended the discharge permit to eliminate some requirements. Despite this, water from the North Boundary Cutoff and West Boundary Cutoff trenches are currently pumped and stored on site in the surge pond or applied on the surface of the LTUs, where the water evaporates. This change was not formally approved by the EPA or CDPHE.

The 2020 BIC Planned Operations and Maintenance (O&M) Activity document states that the following remedy operation activities have been completed:

- LTU treatment of stockpiled impacted soils
 - The LTUs are no longer operated to treat soil but remain available for any Site soils excavated during development activity and as a place to dispose of expired clay and/or carbon media from the PWTs.
- NAPL recovery in the Former Impoundment Area
- Bioventing in the Former Process Area and Lot 8
- Groundwater concentrations of contaminants of concern (COCs) in most off-site surficial aquifer wells have been reduced or eliminated, and observable PCPs in on-site surficial aquifer wells have been reduced.
- Groundwater concentrations of COCs in most on-site Denver aquifer wells have been reduced or eliminated, and there remains no detection of COCs in off-site Denver aquifer wells.
- There have been no detections of COCs above the specified treatment levels in the Arapahoe aquifer (6 on-site wells and 1 off-site well).

The EPA is reviewing documentation from BIC and has requested additional documentation to confirm these findings.

The 2020 BIC Planned O&M Activity document states that the following remedy operation activities remain:

- Completion of activity to meet performance criteria for bioventing in the Former Impoundment Area (Lot 7).
- Tri-annual sampling of designated wells for an indefinite period
- Maintenance of an inward gradient across the North Boundary Cutoff and West Boundary Cutoff trenches for two more years
- The LTUs are currently used for surficial water evaporation or disposal of site development soils. Closing of the LTUs will be needed at some time in the future when they are no longer needed.
- Decommissioning of the PWTs and abandonment of wells, sumps and monitoring points.

The EPA is currently reviewing Site documentation and Agency approvals to determine whether these remaining remedy requirements are appropriate.

Institutional Control (IC) Review

Site institutional controls are summarized below in Table 7 and depicted in Figure 4. The 1992 OU2 ROD required institutional controls for prohibiting residential and agricultural uses of the Site, controlling exposure to organics-contaminated soils at lower levels remaining after excavation and treatment, and controlling access to groundwater in the surficial and Denver aquifers. Institutional controls are currently in place at the Site via a 2007 Environmental Covenant. Use restrictions on the property include:

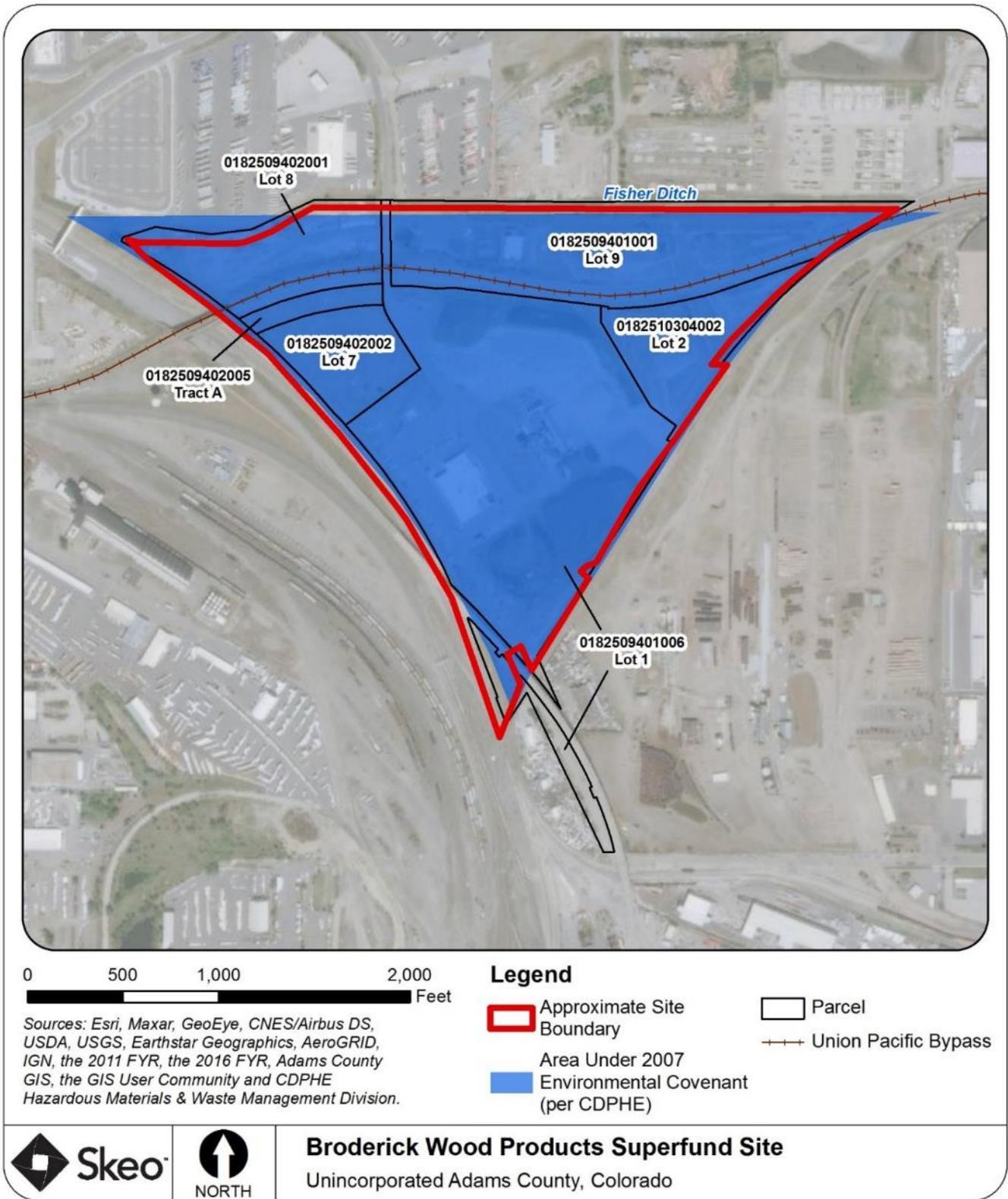
- Prohibition on residential and public uses
- Prohibition on agricultural use.
- Restriction on excavation (No excavation of any soils at the property or underneath the soil cover shall occur except pursuant to the Materials Management and Health and Safety plan.)
- Prohibition on use of water
- Prohibition on well construction
- Protection of the integrity of CERCLA remedial actions.

Appendix C includes the 2007 Environmental Covenant in full, as well as a CDPHE summary of the institutional control.

Table 7: Summary of Planned and/or Implemented Institutional Controls (ICs)

Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	See Figure 4	Control access to groundwater	2007 Environmental Covenant
Soil	Yes	Yes	See Figure 4	Prohibit residential and agricultural uses of the Site	2007 Environmental Covenant

Figure 4: Institutional Control Map



Note: Due to the differences in geospatial data, there are slight discrepancies between the institutional control boundary and the site boundary. It appears the intent of the institutional control is to cover the site area.

Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Systems Operations/Operation and Maintenance (O&M)

The Site is currently managed pursuant to the 2013 O&M Plan. The remedy components still underway are outlined in the 2013 O&M Plan and include:

- Operation of the PWTS
- Operation of the North Boundary Cutoff trench and West Boundary Cutoff trench
- Land treatment operations and closure
- Bioventing, dewatering, and re-injection in the Former Impoundment Area
- Groundwater Monitoring.

Most Site infrastructure is between 15 and 18 years old and requires attention to support remedial activities. The recent sale of Lot 8 has provided BIC the funding necessary to address deferred maintenance issues, as described below.

The North Boundary Cutoff and West Boundary Cutoff trench recovery pumps operate to draw down the groundwater elevation as necessary to maintain an inward gradient across the north and east. The recovery pumps and associated remedial equipment need to be cleaned, inspected and replaced as necessary. The above-ground containment boxes and/or the electrical control panels associated with the North Boundary Cutoff trench on Lot 8 should be properly protected to ensure they are not damaged in the future.

BIC noted that the Former Impoundment Area (i.e., Lot 7) met the oxygen consumption level criteria in 2019 and needs to be biovented and tested again to complete the process. BIC currently plans to dismantle and sell the Lot 7 bioventing system following Agency approval of the completion of bioventing.

The PWTS is not currently in operation. However, the PWTS needs to be available as a backup in case of unusually wet site conditions. Per the 2020 Planned O&M Activity document, several repairs or upgrades are needed at the PWTS. The electrical and plumbing systems in the PWTS need to be inspected and all necessary repairs need to be made. In addition, the piping needs to be reconfigured to allow for ease of bypassing unnecessary components in handling water from the North Boundary Cutoff and West Boundary Cutoff trenches. BIC maintains that North Boundary Cutoff and West Boundary Cutoff trench water should be pumped directly to the surge pond once repairs there are completed and that water from the surge pond can then be pumped to the LTUs or the PWTS as needed.

The surge pond is a lined containment facility next to the PWTS. It is designed to take overflow water from the PWTS. BIC currently plans for the surge pond to be an important element in handling surficial water from the North Boundary Cutoff and the West Boundary Cutoff trenches. BIC noted that it plans to drain and inspect the surge pond for integrity and make any necessary repairs. BIC also noted that a sprinkling system should be added to the surge pond to enhance the rate of evaporation from the pond (i.e., a pump and separate piping installed to transport excess water to the LTUs for storage and evaporation from the LTUs). Note that the use of the LTUs to manage water, other than irrigation for soil treatment, is not part of the operations identified in the 2013 O&M plan.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR Report as well as the recommendations from the previous FYR Report and the status of those recommendations.

Table 8: Protectiveness Determinations/Statements from the 2016 FYR Report

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	Institutional controls are in place to restrict use of the contaminated groundwater and the residents/businesses in the area are served by the municipal water system. The remedial action at OU1 is protective of human health and the environment.
2	Not Protective	The remedial action at OU2 is not protective because O&M and monitoring activities have only been conducted on a limited/sporadic basis since 2012. This is mainly due to the PRP's limited financial resources and the difficulties encountered when attempting to upgrade the water treatment system to meet the more stringent requirements of a 2013 CDPS ² discharge permit. The remedy must be returned to normal operation, maintenance and monitoring to ensure protectiveness.
Sitewide	Not Protective	Because OU2 is not protective, the Site is not protective of human health and the environment.

Table 9: Status of Recommendations from the 2016 FYR Report

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
2	Since 2012, O&M and monitoring activities have only been conducted on a limited/sporadic basis.	Return remedy to normal operation, maintenance and monitoring.	Ongoing	Some O&M activities have resumed. The PRP resumed groundwater monitoring in 2017 and 2020. Groundwater is not currently treated in the PWTS. Water from the North Boundary Cutoff and West Boundary Cutoff trenches is currently pumped and stored on site in the surge pond or applied on the surface of the LTUs, where the water evaporates.	N/A

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available by posting on the EPA Site Profile Page (Appendix D). It stated that the FYR was underway and invited the public to submit any comments to the EPA. The results of the review and the report will be made available on the Site Profile Page (<http://www.epa.gov/superfund/broderick-wood>) and at the Site's information repositories, EPA Superfund Records Center, located at 1595 Wynkoop Street, Denver, Colorado 80202-1129 and CDPHE Hazardous Materials and Waste Management Division Records Center, 4300 Cherry Creek Drive South, Denver, Colorado 80246-1530.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy implemented to date. The interviews are summarized below and included in full in Appendix E.

Ross Davis of CDPHE said that his overall impression is that significant surficial cleanup has been conducted, maintenance of remedy components focused on subsurface cleanup has been lacking, and reuse is the main driver to completing cleanup at the Site. Portions of the Site have been sold for industrial reuse. Groundwater data suggests treatment levels have not been achieved in the surficial aquifer for naphthalene, pentachlorophenol and

² CDPS is Colorado Discharge Permit System.

phenol and in the Denver aquifer for naphthalene and pentachlorophenol. Since groundwater has not achieved treatment levels, he noted that he would like to see operation of the PWTS. Mr. Davis shared that the PWTS was having difficulty achieving dissolved manganese standards in the discharge, and CDPHE facilitated a permit review and was able to eliminate the manganese standard. The discharge permit was changed in 2017, but since that time the PWTS has not operated. He also noted he was comfortable with the institutional controls at the Site.

Tom Connolly of BIC said the remedial activities at the Site have been successful. He stated that the groundwater analysis from 2020 indicates that nearly all wells have experienced a 90-95% reduction in COCs with many having COCs below the target levels set by the 1992 OU2 ROD. He said that the active phase of the remedy has been completed, and what remains is containment, monitoring and reporting. Mr. Connolly also noted that implementation of the remedy components resulted in placing large portions of the Site back into productive use. He stated that none of the surrounding properties have been significantly impacted by the site conditions and that he was not aware that there has ever been a complaint or inquiry from any resident related to this Site in the last 20 years.

Data Review

Groundwater monitoring is conducted to assess groundwater quality and contaminant migration. BIC currently samples groundwater every three years. Figure 5 shows monitoring well locations and Figure 6 shows monitoring wells with COC exceedances in this FYR period. Historical groundwater monitoring data are included in Appendix H. Per the remedy, ARARs were waived for the Denver aquifer (below the BWP Company property) due to the technical impracticability of meeting them, and cleanup goals for the surficial aquifer were deemed unattainable on the site property but are to be met at and beyond the points of compliance (Figure 3). However, point of compliance wells are not designated in monitoring reports, and there is very limited off-site groundwater sampling to verify compliance. Therefore, for this data review, all groundwater data from this FYR period for all aquifers was compared to the cleanup goals to capture the current status. Groundwater sampling during this FYR period is summarized below in the following order:

- Groundwater COCs
- Surficial aquifer groundwater monitoring data
- Denver aquifer groundwater monitoring data
- Arapahoe aquifer groundwater monitoring data
- Off-site groundwater

Groundwater COCs

Groundwater COCs identified in the ROD include 2,3,7,8-TCDD equivalent, acenaphthene, anthracene, carbazole, 2,4-dichlorophenol, fluoranthene, fluorene, 2-methylphenol, 4-methylphenol, naphthalene, PCP, phenol, pyrene, tetrachloroethylene, trichloroethylene and 2,4,5-trichlorophenol. Not all COCs were analyzed in all aquifers during this FYR period (Table 10). In addition, contaminants not identified as COCs were included in the groundwater monitoring. Data tables from the groundwater monitoring reports do not include comparison to any standards for non-COC contaminants. A justification and explanation for which contaminants are monitored or not at which wells is needed, with comparison to appropriate standards if relevant.

Table 10: COCs Monitored and Not Monitored in FYR Period

Aquifer	COCs Monitored	COCs Not Monitored
Surficial and Denver Aquifers	Acenaphthene Anthracene Fluoranthene Fluorene 2-Methylphenol 4-Methylphenol Naphthalene PCP Phenol Pyrene 2,4,5-Trichlorophenol	2,3,7,8-TCDD equivalent Carbazole 2,4-Dichlorophenol Trichloroethylene Tetrachloroethylene
Arapahoe Aquifer	Naphthalene Phenol	2,3,7,8-TCDD equivalent Acenaphthene Anthracene Carbazole 2,4-Dichlorophenol Fluoranthene Fluorene 2-Methylphenol 4-Methylphenol PCP Pyrene Tetrachloroethylene Trichloroethylene 2,4,5-Trichlorophenol

Surficial Aquifer

Groundwater was sampled during this FYR period in the surficial aquifer in wells BFI-9, CH-14D, CH-15D, CH-17D, CH-18D, LTU-1, LTU-2 (relocated), LTU-3, E-1, E-2, E-4, E-5, E-6 and W-2. Sampling events took place in 2017 and 2020. Of the COCs monitored, the only contaminants detected above their cleanup goals were naphthalene and PCP (Table 11).

Naphthalene exceedances (treatment level of 41.6 µg/L) in the surficial aquifer were limited to wells CH-14D, with concentrations of 536 µg/L in March 2017 and 159 µg/L in September 2020, and CH-15D, with concentrations of 47.8 µg/L in March 2017 and 89.1 µg/L in September 2020. Both wells are located on the northwestern boundary of the Site. There does not appear to be a well sampled downgradient of these wells, which would be necessary to delineate the contamination.

PCP exceeded its cleanup goal in 12 of 14 sampled wells at the Site, with highest concentrations in well W-2, which is located on the western boundary of the Site. PCP was not detected in wells CH-15D and E-2 in this FYR period, though in some instances the detection limits exceeded the groundwater treatment level (5 or 10 µg/L compared to 1 µg/L). There does not appear to be a well sampled downgradient of these wells, which would be necessary to delineate the contamination.

In general, PCP and naphthalene concentrations show a decrease when compared to historical levels, except for PCP concentrations in CH-14D, CH-18D and W-2. PCP concentrations in CH-14D have fluctuated over time. Concentrations in CH-18D were historically non-detect but have exceeded the treatment level consistently since 2011. Concentrations in W-2 demonstrated a decrease within this FYR period, but the March 2017 concentration was the highest observed in this well during its sampling history.

Table 11: COC Exceedances in Surficial Aquifer in FYR Period

Well	Sample Date	COC Concentration in Surficial Aquifer (µg/L)	
		Naphthalene	PCP
<i>COC:</i>		41.6	1
<i>Groundwater Treatment Levels:</i>		41.6	1
BFI-9	7/14/2017	4.03	178
	9/27/2020	3.1	89
CH-14D	3/27/2017	536	10 U
	9/27/2020	159	35.7
CH-15D	3/27/2017	47.8	10 U
	9/27/2020	89.1	1 U
CH-17D	5/31/2017	0.2 U	1.12
	9/23/2020	0.2 U	1 U
CH-18D	9/27/2020	0.2 U	12.4
LTU-1	6/28/2017	0.2 U	47.3
	10/4/2020	0.2 U	24.4
LTU-2 (relocated)	6/30/2017	0.2 U	1 U *
	10/4/2020	0.2 U	6.5
LTU-3	6/28/2017	0.2 U	16.2
	10/4/2020	0.2 U	17.3
E-1	8/2/2017	0.2 U	8.81
	9/27/2020	0.2 U	1 U
E-2	8/2/2017	0.2 U	5 U
	9/27/2020	0.2 U	1 U
E-4	8/2/2017	0.2 U	7.76
	9/27/2020	0.401	5.47
E-5	7/31/2017	0.2 U	23.6
	9/27/2020	0.2 U	21.2
E-6	7/31/2017	0.2 U	22.8
	9/27/2020	0.2 U	20.6
W-2	3/28/2017	10 U	26,000
	11/11/2017	15.5	314
	4/20/2020	NS	225
	10/4/2020	0.2 U	54.8

Notes:
Source: Table 9 of the 2020 O&M Report.
 U = The analyte was not detected and the quantitation limit is reported.
 NS = Not sampled.
Bold = Exceedance of groundwater treatment level
 * Finding indicates that PCP results were not validated for this sampling event.

Denver Aquifer

In this FYR period, groundwater was sampled in the Denver aquifer in wells D-1, D-2, D-4, D-5 (relocated), D-6 and IT-2. Sampling events took place in 2017 and 2020.

Exceedances of site COCs monitored in this FYR period are summarized below in Table 12. Exceedances of naphthalene and PCP were each found in five of six wells sampled. There was one phenol exceedance in this FYR period in well IT-2. The highest PCP concentrations were in wells D-5 and IT-2, both orders of magnitude above the treatment level. The highest naphthalene concentrations were in wells D-1, D-4 and IT-2. All concentrations demonstrate a decline from historical highs, except for D-5. There do not appear to be wells sampled downgradient of these exceedances, which would be necessary to delineate the contamination.

Table 12: COC Exceedances in Denver Aquifer in FYR Period

Well	Sample Date	COC Concentration in Denver Aquifer (µg/L)		
		Naphthalene	PCP	Phenol
<i>Groundwater Treatment Levels:</i>		41.6	1	623
D-1	11/11/17	1,170	1 U	10 U
	8/25/20	0.2 U	6.85	10 U
D-2	11/11/17	359	1 U	10 U
	9/18/20	115	1 U	10 U
D-4	3/28/17	476	10 U	11.1
	9/04/20	1,930	23.4	10 U
D-5 (relocated in 2004)	11/02/17	10 U	1,410	10 U
	9/03/20	ND	5,820	ND
D-6	3/27/17	136	10 U	10 U
	9/03/20	371	2.74	10 U
IT-2	4/03/17	3,780	340	862
	9/27/20	287	264	10 U
<p><i>Notes:</i> <i>Source:</i> Table 10 of the 2020 O&M Report. U = The analyte was not detected and the quantitation limit is reported. ND = Not detected. Bold = Exceedance of groundwater treatment level</p>				

Arapahoe Aquifer

Point of compliance wells are not designated in monitoring reports, and there is very limited off-site groundwater sampling to verify compliance. Therefore, for this data review, all groundwater data from this FYR period for all aquifers was compared to the cleanup goals to capture the current status.

In this FYR period, groundwater was sampled in the Arapahoe aquifer in wells 90-10AR, 90-7AR, 90-8AR, A-2, A-3, A-4 and A-5. Sampling events took place in 2017 and 2020. The constituents monitored included benzoic acid, benzyl alcohol, bis(2-ethylhexy)-phthalate, naphthalene, phenol and 4-methylphenol. Of these, only naphthalene and phenol are site COCs with treatment levels. Naphthalene and phenol were not detected above their treatment levels in the Arapahoe aquifer in this FYR period.

Off-site Groundwater

The 2016 BIC O&M report noted that on-property groundwater flow in the surficial aquifer is to the north and in the Denver aquifer is to the northeast. The report also states that groundwater is contained on property due to the SBCW with localized increases of water levels along the northern property boundary and that Fisher Ditch appears to be actively recharging the aquifer along the northern property boundary. Maps with potentiometric surfaces and groundwater elevations are not available and should be included in future reports to aid in analysis of groundwater flow.

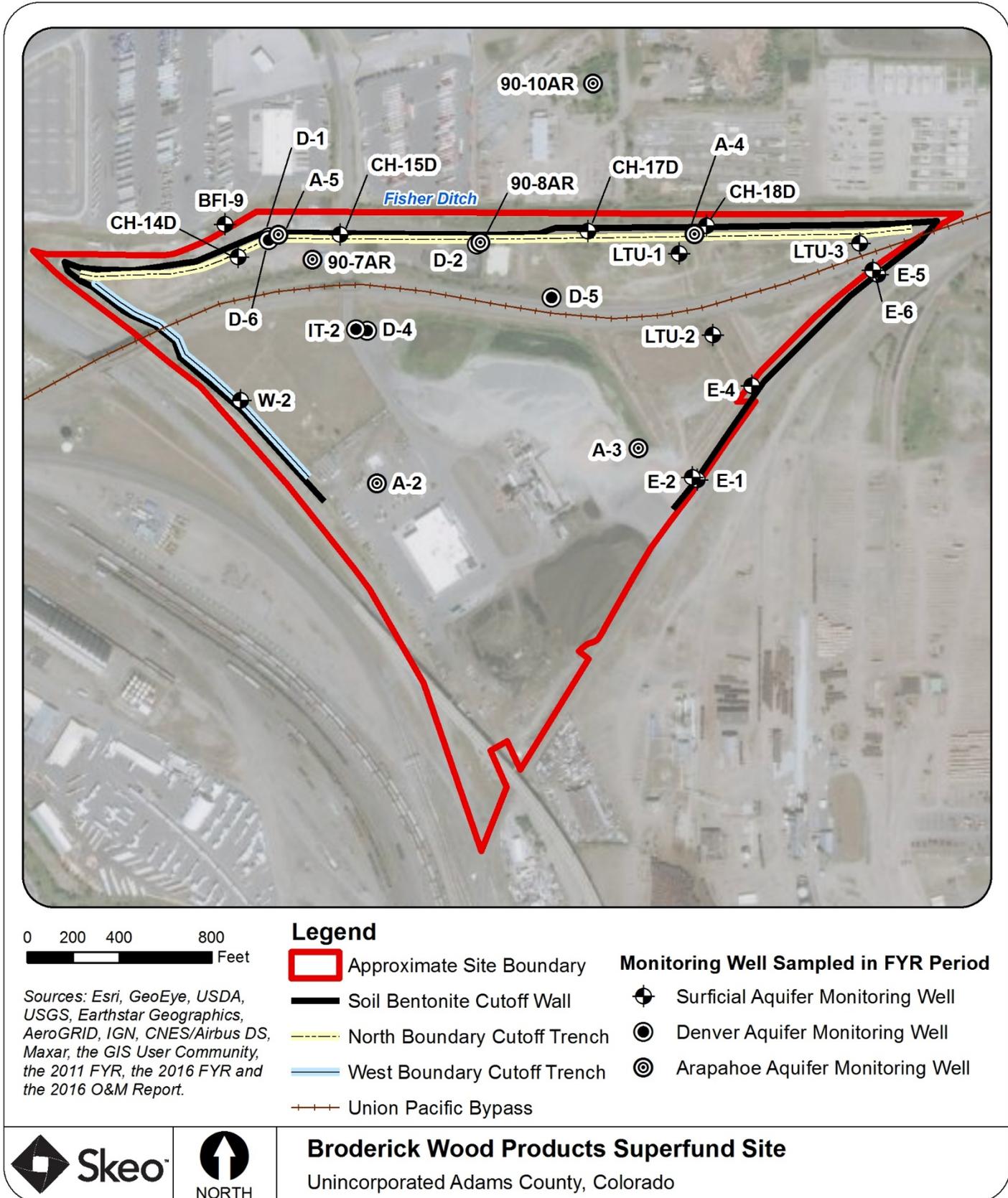
Only two off-site wells were sampled during this FYR period: 90-10AR is in the Arapahoe aquifer, and BFI-9 is in the surficial aquifer and is slightly north of the SBCW and North Boundary Cutoff trench. BFI-9 has PCP exceedances during this FYR period, indicating that there is groundwater contamination downgradient of the SBCW in the surficial aquifer. There are no off-site wells sampled in the Denver aquifer in this FYR period to determine whether groundwater contamination in this aquifer is contained to the Site. It is unclear whether natural attenuation is occurring in off-site groundwater.

A review of private wells in the vicinity of the Site was conducted using a well geospatial dataset from the

Colorado Division of Water Resources Well Permit Research Viewer (Figure 7).³ There are private domestic and irrigation wells downgradient of the Site within the depths of the surficial and Denver aquifers (to 180 feet bgs). Additional off-site groundwater monitoring is needed to delineate off-site groundwater contamination and confirm it is not impacting these wells. Sampling of private wells could be considered.

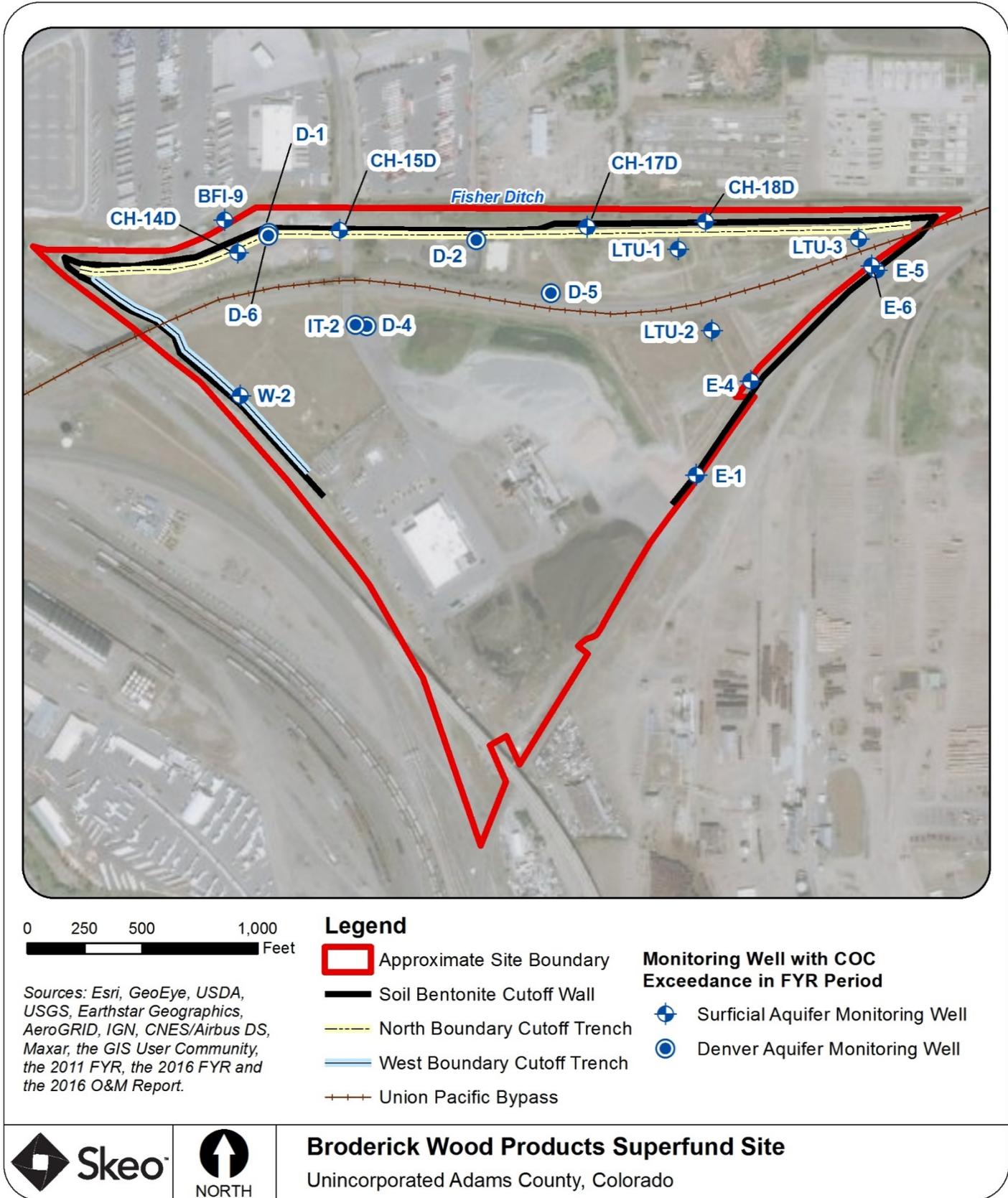
³ Available at <https://maps.dnrgis.state.co.us/dwr/Index.html?viewer=dwrwellpermit>.

Figure 5: Monitoring Well Map



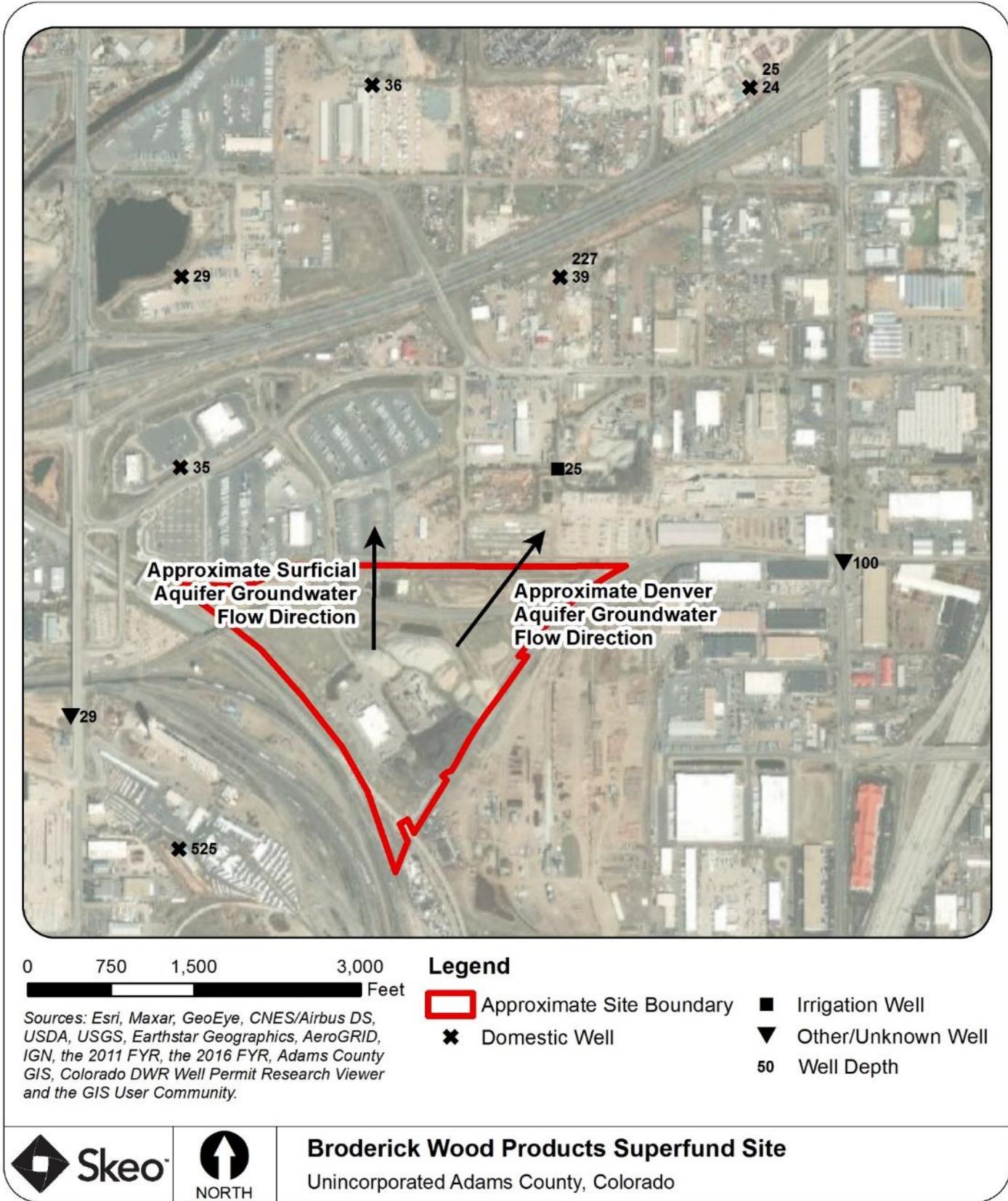
Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 6: Monitoring Wells with Exceedances Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 7: Private Well Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Site Inspection

The site inspection took place on 10/13/2020. Participants included EPA RPM Andrew Schmidt, CDPHE project manager Ross Davis, BIC contractor Mark Molen, BIC contractor Rich Greenwood, BIC representative Tom Connolly and Treat Suomi from EPA support contractor Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. Site visit participants met at the PWTS and then proceeded to walk the Site and observe remedy components, including the LTUs, sumps, wells, the Former Process Area, the Former Impoundment Area and the NAPL recovery system. The Site was relatively well maintained. Some O&M issues were identified related to piping and sprinkler systems taking water to the LTUs, monitoring wells, and ensuring steps are taken to protect remedy components on Lot 8. The Trustee contractors indicated they are working on addressing all noted maintenance needs. Appendices F and G provide the site inspection checklist and site visit photographs.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

The remedy is partially functioning as intended. BIC stated that it has completed many components of the remedy. However, the EPA does not have documentation to support these claims. The EPA has requested documentation in order to confirm that the remedy has been appropriately implemented with oversight and to determine appropriate, EPA-approved next steps. Some of these components needing documentation include but are not limited to:

- pumping/excavation, on-site storage, and off-site reclamation of vessel and drum contents
- pumping, stabilization, drumming and off-site disposal of contaminated water in building sumps and basements.

The OU1 interim remedy is complete and addressed the impoundment sludges. The OU2 remedy addressed metals-contaminated soil via chemical fixation and organics-contaminated soil via treatment in LTUs. Treatment of soil in the LTUs has concluded (the EPA is reviewing BIC documentation of this). The LTUs currently remain open and have accepted additional soil from site redevelopment activities; the LTUs have been acting in this instance as a soil repository, rather than being used for treatment. The LTUs will need to be closed over the long term. BIC has indicated that NAPL recovery has concluded. Bioventing has concluded in the Former Process Area and Lot 8 and is ongoing in the Former Impoundment Area (Lot 7). An SBCW is in place around the northern, western and eastern edges of the Site to limit off-site groundwater flow. Groundwater is currently recovered via the North Boundary Cutoff and West Boundary Cutoff trenches. Institutional controls have been implemented at the Site via a 2007 Environmental Covenant. It includes restrictions on residential and agricultural uses, excavation, water use and well construction and requires protection of the remedial elements.

Groundwater is not currently treated in the PWTS. NAPL recovery is also not currently conducted. Collected groundwater is instead sprayed onto the LTUs, which was not approved by EPA or CDPHE. The recent practice of using the LTUs as evaporation pads for extracted groundwater and leachate is inconsistent with the remedy as described by the decision documents, and may be leading to the application, or redistribution, of contaminants through leaching. If spraying collected groundwater onto the LTUs is deemed inappropriate, the EPA and CDPHE will determine whether the original remedy of treating water via the PWTS should be reinstated or if other actions are needed to handle contaminated groundwater.

Groundwater monitoring currently occurs every three years. During monitoring, several Site COCs are not sampled, and several non-COCs are sampled but are not compared to any standards. In future monitoring events BIC should sample wells for all COCs and should compare those COCs to groundwater treatment levels. Groundwater contamination above treatment levels is present on site in the surficial and Denver aquifers and does not appear to be fully delineated. In general, concentrations in this FYR period indicate a downward trend from

historical highs. Limited off-site groundwater sampling occurred during this FYR period. Although the 1995 ESD determined that it was technically impracticable to actively remediate the Denver aquifer and waived ARARs for that portion of the Denver aquifer under the BWP Property, identification of point of compliance wells is necessary to evaluate whether the contamination in the Denver Aquifer is extending beyond the technically impracticable zone. There are downgradient, private wells. Additional off-site groundwater sampling is needed to delineate off-site groundwater contamination, determine whether containment is working, determine whether monitored natural attenuation is occurring, and confirm contamination is not impacting these wells.

For several years, BIC did not have adequate funds to conduct O&M or monitoring activities. O&M upgrades are needed and are now underway after a recent property sale provided BIC with financial resources.

Remedial action reports indicate that during Stage 2 of the OU2 remedy implementation, placement of a 1-foot soil cover over all areas with greater than 0.6 µg/kg dioxin equivalency (about 24.7 acres) occurred (Figure 2). This remedy component does not appear to be part of the formal remedy as documented in decision documents, and there is no ongoing maintenance or monitoring conducted to ensure this cover remains in good condition. There is currently an institutional control in place on the Site to prevent excavation, so this does not appear to be a concern for current protectiveness. However, the justification for the soil cover should be determined, as well as whether it should be documented as a formal part of the remedy and whether soil-cover maintenance and monitoring are needed on an ongoing basis.

Lot 8 is being used as storage by new owners. During the Site inspection, extraction pump house 2 appeared to be encroached upon by the new owners' operations (see site inspection photos in Appendix G). BIC needs to evaluate O&M procedures to ensure storage operations adequately protect site remedy components.

To allow for completion of the Union Pacific Railroad Company Project, modifications were made to the OU2 remedy. These changes have not been documented in a decision document. The EPA will evaluate whether a decision document is needed to document changes to the remedy.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Question B Summary:

The exposure assumptions and RAOs all remain valid.

Groundwater treatment levels were established in the 1992 OU2 ROD. Some were based on ARARs, and some were risk-based. An ARAR evaluation was conducted to determine whether any groundwater standards have changed since the issuance of the remedy (Appendix I). The state and federal standards for 2,3,7,8-TCDD equivalent are now more stringent than the treatment level from the ROD. This cleanup goal may need to be updated to reflect the current standards. Groundwater treatment levels for seven contaminants (acenaphthene, anthracene, fluorene, fluoranthene, pyrene, 2,4-dichlorophenol and 2,4,5-trichlorophenol) are less stringent than current standards (though these were not originally based on ARARs). The treatment standards that exceed current standards warrant further review to determine whether they should be updated to reflect current standards.

For groundwater contaminants where no federal or state standards were available, a screening-level risk assessment was conducted instead to evaluate risk (Appendix J). The groundwater treatment levels correspond to risk below the EPA's acceptable risk range and therefore remain valid.

Soil excavation action levels were selected during the OU2 remedial design. To evaluate whether the action levels selected remain valid, a screening-level risk assessment was conducted (Appendix J). The excavation action levels for surface soil correspond to risk below or within EPA's acceptable risk range and therefore remain valid. The excavation action levels for subsurface soil correspond to risk outside the EPA's acceptable risk range. However,

this does not affect protectiveness because an institutional control on the property limits soil excavations to only those compliant with the Materials Management and Health and Safety plan.

The 1992 OU2 ROD included a sediment excavation action level for Fisher Ditch. A cleanup goal review was conducted as part of this FYR and is included in full in Appendix K. It concluded that the sediment cleanup goal remains valid.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

The gravel business operating on part of the Site has proposed purchasing Lot 4 of parcel 0182510304002 from BIC (Figure 4). This Lot currently includes the LTUs south of the rail line. BIC has stated that soil treatment levels have been met for all lifts of soil in the LTUs. The EPA and CDPHE have completed a review of the most recent analytical data for the LTUs south of the rail line to determine compliance with ROD treatment levels and found that insufficient data is available to determine whether all lifts of soil have achieved treatment levels. In addition to the lack of adequate confirmation data for early lifts in the LTU, the recent practice of using the LTUs as evaporation pads for extracted groundwater and leachate is inconsistent with the remedy as described by the decision documents, and may be leading to the application or redistribution of contaminants through leaching. Sampling is needed to determine the present concentrations of contaminants in each lift of the LTUs and an appropriate path forward.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations	
OU(s) without Issues/Recommendations Identified in the FYR:	
<i>1 and 3</i>	

Issues and Recommendations Identified in the FYR:
--

OU(s): 2	Issue Category: Operations and Maintenance			
	Issue: BIC no longer operates the PWTS or NAPL recovery system, and instead sprays collected groundwater onto the LTUs. This is not part of the official Site remedy, was not approved by the EPA or CDPHE and was not included in the 2013 O&M Plan.			
	Recommendation: Determine whether spraying collected groundwater onto the LTUs is appropriate. If not, determine whether the original remedy of treating water via the PWTS should be reinstated or if other actions are needed to handle contaminated groundwater.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA/State	EPA/State	9/29/2023

OU(s): 2	Issue Category: Remedy Performance			
	Issue: BIC maintains that several remedial activities are complete. The EPA and CDPHE have not received documentation to support these claims.			
	Recommendation: Provide documentation that remedial activities are completed.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	9/29/2023

OU(s): 2	Issue Category: Monitoring			
	Issue: There were no off-site wells sampled in the surficial and Denver aquifers during this FYR period. Contamination in these aquifers does not appear to be delineated. PCP was present above its cleanup goal in well BFI-9, which is north of the SBCW and North Boundary Cutoff trench. It is currently unknown whether any off-site groundwater contamination above treatment levels is present and whether containment is successful.			
	Recommendation: Sample off-site groundwater to delineate off-site groundwater contamination, determine whether containment is working, determine whether monitored natural attenuation is occurring and confirm contamination is not impacting private wells.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
Yes	Yes	PRP	EPA/State	9/29/2023

OU(s): 2	Issue Category: Monitoring			
	Issue: Point of compliance wells are not designated in monitoring reports, and there is very limited off-site groundwater sampling to verify compliance.			
	Recommendation: Designate point of compliance wells in monitoring reports and conduct off-site groundwater sampling to verify compliance.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	9/29/2023

OU(s): 2	Issue Category: Operations and Maintenance			
	Issue: The 1-foot soil cover does not appear to be part of the formal remedy as documented in decision documents, and there is no ongoing maintenance or monitoring conducted to ensure this cover remains in good condition.			
	Recommendation: Determine the justification for the implementation of the soil cover, whether it should be documented as a formal part of the remedy, and whether soil cover maintenance and monitoring are needed on an ongoing basis.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA/State	EPA/State	9/29/2023

OU(s): 2	Issue Category: Monitoring			
	Issue: The state and federal standards for 2,3,7,8-TCDD equivalent are now more stringent than the groundwater treatment level from the ROD. Groundwater treatment levels for seven contaminants (acenaphthene, anthracene, fluorene, fluoranthene, pyrene, 2,4-dichlorophenol and 2,4,5-trichlorophenol) are greater than current standards (though these were not originally based on ARARs).			
	Recommendation: Consider whether the treatment levels for 2,3,7,8-TCDD equivalent, acenaphthene, anthracene, fluorene, fluoranthene, pyrene, 2,4-dichlorophenol and 2,4,5-trichlorophenol should be updated to reflect current standards; document in a decision document if needed.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA/State	EPA/State	9/29/2023

OU(s): 2	Issue Category: Operations and Maintenance			
	Issue: During the site inspection, extraction pump house 2 on Lot 8 appeared to be encroached upon by storage operations.			
	Recommendation: Evaluate O&M procedures to ensure storage operations adequately protect site remedy components.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA/State	9/29/2023

OU(s): 2	Issue Category: Other			
	Issue: To allow for completion of the Union Pacific Railroad Company Project, modifications were made to the OU2 remedy. These changes have not been documented in a decision document.			
	Recommendation: Evaluate whether changes made to the OU2 remedy that occurred as part of the Union Pacific Railroad Company Project (tracked as OU3) need to be more clearly documented in the site file.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA	EPA	9/29/2023

OTHER FINDINGS

Additional recommendations were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

- Groundwater monitoring reports do not currently include standard report elements such as potentiometric surface maps or groundwater contaminant plume maps. Update groundwater monitoring reports to include the elements recommended in the EPA's 2016 *Best Practices for Environmental Site Management: Recommended Contents of a Groundwater Monitoring Report*.⁴
- Historical site documents indicate that a contractor hired by BIC to dismantle the wood treating plant started a fire that destroyed the process building in 1985. Some fire-fighting foams have been found to contain PFAS. Consider conducting additional research or sampling to determine whether PFAS are present at the Site.
- The EPA will continue to evaluate the PRP's financial ability to conduct necessary O&M at the Site.

⁴ EPA, *Best Practices for Environmental Site Management: Recommended Contents of a Groundwater Monitoring Report*, September 2016. Available at: <https://semspub.epa.gov/work/HQ/500024623.pdf>

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
<i>Operable Unit: 1</i>	<i>Protectiveness Determination:</i> Protective
<i>Protectiveness Statement:</i> The remedy at OU1 is protective of human health and the environment.	

Protectiveness Statement(s)		
<i>Operable Unit: 2</i>	<i>Protectiveness Determination:</i> Protectiveness Deferred	<i>Planned Addendum Completion Date:</i> 12/31/2023
<i>Protectiveness Statement:</i> A protectiveness determination of the remedy at OU2 cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions: sample off-site groundwater to delineate off-site groundwater contamination, determine whether containment is working, and confirm contamination is not impacting private wells. It is expected that these actions will take approximately one year to complete, at which time a protectiveness determination will be made.		

Sitewide Protectiveness Statement	
<i>Protectiveness Determination:</i> Protectiveness Deferred	<i>Planned Addendum Completion Date:</i> 12/31/2023
<i>Protectiveness Statement:</i> A protectiveness determination of the remedy at the Site cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions: sample off-site groundwater to delineate off-site groundwater contamination, determine whether containment is working, and confirm contamination is not impacting private wells. It is expected that these actions will take approximately one year to complete, at which time a protectiveness determination will be made.	

VIII. NEXT REVIEW

The next FYR Report for the Broderick Wood Products Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

- Record of Decision, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. EPA Region 8. February 1988.
- Amendment to the Record of Decision, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. EPA Region 8. September 1991.
- Record of Decision, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. EPA Region 8. February 1992.
- Memorandum, Fisher Ditch Sediment Sampling and Analyses, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. CH2M HILL. September 1993.
- Explanation of Significant Difference, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. EPA Region 8. February 1995.
- Remedial Action Report, Operable Unit 1, Broderick Wood Products Superfund Site, Adams County, Colorado. US Army Corps of Engineers. September 1995.
- Stage 1 Operable Unit 2 Remedial Action Report, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. August 1996.
- Certification of Completion of Remedial Action and Construction Completion Report, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. Remediation Technologies, Inc. August 1996.
- Preliminary Close Out Report, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. EPA Region 8. September 1996.
- Modification of the Remedial Systems on the Broderick Superfund Site, Adams County, Colorado. CH2M HILL. August 2005.
- Interim Status Report, LTU Operations and Maintenance Report, Broderick Wood Products Superfund Site, Adams County, Colorado. March 2006.
- Fifth Five-Year Review Report, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. EPA Region 8. September 2016.
- 2016 Operations and Maintenance Report, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. Broderick Investment Company. November 2017.
- Operations and Maintenance Plan, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. Broderick Investment Company. 2020.
- Comments on 2020 Operations and Maintenance Plan, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. EPA Region 8. November 2020.
- 2020 Operations and Maintenance Report, Broderick Wood Products Superfund Site, Unincorporated Adams County, Colorado. Broderick Investment Company. April 2021.

APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
W.S. Broderick purchased the Site	December 1945
Operations began at the Site	1946
Site discovery	1980
BWP ceased wood treatment operations	November 1981
Phase I Investigation Report issued	March 1984
EPA listed the Site on the NPL	September 1984
Consent Decree with workplan for Phase II and Phase III RI/FS	May 1986
Phase II RI/FS Report with supplement issued	November 1987
EPA issued the OU1 ROD	June 1988
RA for OU1 (Step 1) – started	September 1989
RA for OU1 (Step 1) – completed	May 1990
Phase III RI Report issued	December 1990
Phase III FS Report with addendum issued	December 1991
EPA issued the ROD amendment for OU1	September 1991
EPA issued the ROD for OU2	March 1992
Remedial action for OU1 (Step 2) – started	June 1992
Remedial action for OU2 (Stage 1) – started	July 1993
Remedial action for OU1 (Step 2) – completed	December 1993
Remedial action for OU2 (Stage 1) – completed	April 1994
Consent Decree signed for OU2 (Stage 2) – remedial design/remedial action and full operations	January 1995
EPA issued the ESD for OU2	March 1995
EPA issued Site’s first FYR Report	March 1995
Remedial action for OU2 (Stage 2) – started	May 1995
Remedial action for OU2 (Stage 2) – completed	August 1996
Construction Completion milestone achieved	September 1996
EPA issued Site’s second FYR Report	January 2001
Initiation of Union Pacific Railroad Company Project	July 2004
Completion of Union Pacific Railroad Company Project	November 2004
EPA issued Site’s third FYR Report	September 2006
EPA issued Site’s fourth FYR Report	September 2011
EPA issued Site’s fifth FYR Report	September 2016

APPENDIX C – INSTITUTIONAL CONTROL AND CDPHE INSTITUTIONAL CONTROL SUMMARY

**CORRECTED RECORDING
ENVIRONMENTAL CONVENANT**

RECORDED AS RECEIVED

This property is subject to an Environmental Covenant held by the Colorado Department of Public Health and Environment pursuant to section 25-15-321, C.R.S.



ENVIRONMENTAL COVENANT

Broderick Investment Company ("BIC") grants an Environmental Covenant ("Covenant") this 14 day of August, 2006 to the Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and the Environment ("the Department") pursuant to § 25-15-321 of the Colorado Hazardous Waste Act, § 25-15-101, et seq. The Department's address is 4300 Cherry Creek Drive South, Denver, Colorado 80246-1530.

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WHEREAS, BIC is the owner of certain property commonly referred to as Broderick Wood Products Superfund Site, located at 5800 Galapago Street, Adams County, Colorado, more particularly described in Attachment A, attached hereto and incorporated herein by reference as though fully set forth (hereinafter referred to as "the Property"); and

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WHEREAS, pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § § 9601, et seq. ("CERCLA"), the Property is the subject of an enforcement and remedial action pursuant to the Broderick Wood Treatment Site Record of Decisions ("ROD"), Broderick Wood Products Operable Units 1 and 2, dated March 24, 1992 and the Explanation of Significant Differences ("ESD") dated February 1995, modifying the ROD, the Consent Decree between the United States of America, the Department, and BIC in Civil Action No. 86-Z-369, entered June 26, 1995 ("Consent Decree"), and the Statement of Work ("SOW") required pursuant to that Consent Decree (collectively "the CERCLA Remedial Action Documents"); and

WHEREAS, BIC desires to subject the Property to certain covenants and restrictions as provided in Article 15 of Title 25, Colorado Revised Statutes, which covenants and restrictions shall burden the Property and bind BIC, its heirs, successors, assigns, and any grantees of the Property, their heirs, successors, assigns and grantees, and any users of the Property, for the benefit of the Department and the United States Environmental Protection Agency ("EPA") as a third party beneficiary.

NOW, THEREFORE, BIC hereby grants this Environmental Covenant to the Department, and declares that the Property as described in Attachment A shall hereinafter be bound by, held, sold, and conveyed subject to the following requirements set forth in paragraphs 1 through 11, below, which shall run with the Property in perpetuity and be binding on BIC and all parties having any right, title or interest in the Property, or any part thereof, their heirs, successors and assigns, and any persons using the land. As used in this Environmental Covenant, the term OWNER means the record owner of the Property and, if any, any other person or entity otherwise legally authorized to make decisions regarding the transfer of the

Certified to be a full, true and correct copy of the Recorded Document consisting of 26 pages in my custody.

KAREN LONG, Adams County Clerk & Recorder

By *[Signature]* Date 1/22/07

X X

{00320693.2}

X

RETURN TO:
DUFFORD AND BROWN
1700 BROADWAY, SUITE 2100
DENVER, CO 80202
ATTN: AMY WILSON

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*** This Environmental Covenant is being re-recorded to include the complete version of Figure G-1.

[Handwritten mark]

Property or placement of encumbrances on the Property, other than by the exercise of eminent domain.

1. Use Restrictions

A. Prohibition on Residential and Public Use. No residential use shall be permitted on the Property, including, but not limited to, any single family or multi-family residential dwelling or living unit, whether permanent or temporary, and no playgrounds, parks, schools, daycare centers (whether independent or ancillary to a permitted use), recreational facilities of any type, community centers, hospitals, or adult care centers shall be located at the Property.

B. Prohibition on Agricultural Use. No agricultural use of the Property is permitted, including but not limited to, the cultivation or storage of any crop or the grazing, feeding or keeping of any animal for agricultural or commercial purposes. Ornamental landscaping may be permitted at the Property, provided all such landscaping activities are done in accordance with the Materials Management and Health and Safety Plan set forth in Subparagraph C, immediately below.

C. Restriction on Excavation. No excavation of any soils at the Property or underneath the soil cover shall occur except pursuant to the Materials Management and Health and Safety Plan (the "Plan"), attached hereto and incorporated herein as if set forth in full.

D. Prohibition on Use of Water. No development of surface water on the Property or groundwater under the Property shall occur except as provided in the CERCLA Remedial Action Documents.

E. Prohibition on Well Construction. No digging, boring, drilling, or constructing of well of any kind on the Property shall occur except for those wells used for groundwater monitoring purposes as provided in the CERCLA Remedial Action Documents.

F. Protection of the Integrity of CERCLA Remedial Actions. Owner shall not use the Property in any way that interferes with the operation and/or maintenance of the CERCLA Remedial Actions, including, but not limited to, the groundwater monitoring wells, any equipment or infrastructure constructed or used for the CERCLA Remedial Actions, or any cap or other covering intended to prevent contact with contaminated materials in the ground or at the surface.

2. Purpose of This Covenant. The purpose of this Covenant is to ensure protection of human health and the environment by minimizing the potential for exposure to any hazardous substances that remain on the Property. The Covenant will accomplish this by minimizing those activities that result in disturbing the ground surface, and by implementing the institutional controls called for in the CERCLA Remedial Action and by insuring that no action interferes with the CERCLA Remedial Action features at the Property.

3. Modifications This Covenant runs with the land and is perpetual, unless modified or terminated pursuant to this paragraph. BIC or its successors and assigns may request that

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the Department approve a modification or termination of the Covenant. The request shall contain information showing that the proposed modification or termination shall, if implemented, ensure protection of human health and the environment. The Department shall review any submitted information, and may request additional information. If the Department determines that the proposal to modify or terminate the Covenant will ensure protection of human health and the environment, it shall approve the proposal. No modification or termination of this Covenant shall be effective unless the Department has approved such modification or termination in writing. Information to support a request for modification or termination may include one or more of the following:

- a) a proposal to perform additional remedial work;
 - b) new information regarding the risks posed by the residual contamination;
 - c) information demonstrating that residual contamination has diminished;
 - d) information demonstrating that the proposed modification would not adversely impact the remedy and is protective of human health and the environment; and other appropriate supporting information.
4. Conveyances. Owner shall notify the Department at least fifteen (15) days in advance of any proposed grant, transfer or conveyance of any interest in any or all of the Property.
5. Notices to Lessees. Owner agrees to incorporate either in full or by reference the restrictions of this Covenant in any leases, licenses, or other instruments granting a right to use the Property.
6. Notification for Proposed Construction and Land Use. Owner shall notify the Department simultaneously when submitting any application to a local government for a building permit or change in land use.
7. Inspections. The Department shall have the right of entry to the Property at reasonable times with prior notice for the purpose of determining compliance with the terms of this Covenant. Nothing in this Covenant shall impair any other authority the Department may otherwise have to enter and inspect the Property.
8. No Liability. The Department does not acquire any liability under State law by virtue of accepting this Covenant, nor does EPA acquire any liability under State law by virtue of being a third-party beneficiary.
9. Enforcement. The Department may enforce the terms of this Covenant pursuant to § 25-15-322, C.R.S. BIC and the EPA may file suit in district court to enjoin actual or threatened violations of this Covenant.
10. Owner's Compliance Certification. OWNER shall submit a Report to the Department detailing any lack of compliance with terms of this Covenant. This Report shall be submitted to the Department within 20 days of the OWNER reasonably becoming aware of the events prompting the need to provide such a Report.

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11. Notices. Any document or communication required under this Covenant shall be sent or directed to:

Broderick Wood Treatment Superfund Site Project Officer
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and the Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

And to:

Robert J. Eber
Assistant Attorney General
Environment and Natural Resources Section
Hazardous and Solid Waste Unit
Colorado Department of Law
Denver, CO 80203

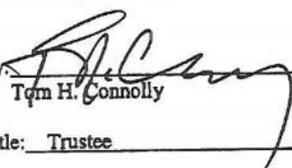
With reference to the Broderick Wood Products Superfund Site

And to:

Remedial Project Manager (8EPR-SR)
Broderick Wood Treatment Superfund Site
U.S. Environmental Protection Agency
999 18th Street
Suite 300
Denver, CO 80202-2466

BIC has caused this instrument to be executed this 14 day of December, 2006.

Broderick Investment Company
390 Interlocken Crescent, Suite 490
Broomfield, CO 80021

By: 
Tom H. Connolly
Title: Trustee

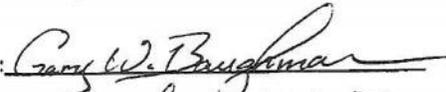
STATE OF Colorado)
COUNTY OF Broomfield) ss:

The foregoing instrument was acknowledged before me this 14th day of December, 2006 by Tom H. Connolly on behalf of BIC.


Notary Public
390 Interlocker Cres. # 490
Address
Broomfield, Co 80021

My commission expires: 1-25-2008

Accepted by the Colorado Department of Public Health and Environment this 18th day of January, ~~2006~~ 2007

By: 
Title: Director, HMWMD

STATE OF Colorado)
COUNTY OF Cherokee) ss:

The foregoing instrument was acknowledged before me this 18th day of January, 2007 by Gary W. Baughman on behalf of the Colorado Department of Public Health and Environment.


Notary Public
4310 Cherry Creek Blvd
Address
Denver Co 80246

My commission expires: 2-29-08

TABLE 2
 Soil Treatment Levels

Chemical	Mean Concentration Surface/Subsurface (milligrams per kilogram)	Treatment Level
Organics		
Benzo(a)pyrene	35.9/4.5	15.2
Dibenzo(a,h)anthracene	41.8/6.5	13.9
2,3,7,8-TCDD equivalent	--	0.0006*
K001 Constituent**		
Naphthalene	367/142	95 - 99%
Pentachlorophenol	653/380	90 - 99%
Phenanthrene	556/75	95 - 99%
Pyrene	356/28	95 - 99%
Toluene	0.6/1.2	0.5 - 10
Xylene (Total)	2.7/7.5	0.5 - 10
Lead	NA	95 - 99%
Metals		
Arsenic***	29.7/3.8	5.0
Cadmium***	24.7/0.2	1.0
Lead***	838.2/26.7	5.0

Source: Record of Decision for Operable Unit 2, March 1992.

- * Laboratory detection limitations may not allow measurement to this level. In that case, the detection limit will be the treatment level. The currently recognized detection level of 1 ug/kg corresponds to a cancer risk level close to 1×10^{-6}
- ** Remedy will comply with LDRs through a Treatability Variance. Treatment levels or percent reduction ranges that exist/in-situ/bioremediation will attain are presented.
- *** Action levels are based on non-wastewater TCLP (milligrams per liter).

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Broderick Investment Company - Operations and Maintenance Plan
 Revision: 0
 Date: 3/2005

Table 3
Alternate Treatability Variance Levels

Constituent	Concentration Range (mg/kg)	Threshold Concentration (mg/kg)	Percent Reduction Range
Organics			
Benzo(a)pyrene	0.5-15.2	100	90-99.9
Dibenzo(a,h)anthracene	0.5-13.9	100	90-99.9
K001 Constituent*			
Naphthalene	0.5-20	400	95-99
Pentachlorophenol	0.5-40	400	95-99
Phenanthrene	0.5-20	400	95-99
Pyrene	0.5-20	400	95-99
Toluene	0.5-10	100	90-99.9
Xylenes (total)	0.5-10	100	90-99.9
Lead	0.1-5	300	NA
*Source: Superfund LDR Guide No. 6A (2 nd Edition) Obtaining a Soil Debris Treatability Variance for Remedial Actions, September 1990.			

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ATTACHMENT A

KNOW ALL MEN BY THESE PRESENTS THAT BROOKRICK INVESTMENT COMPANY, A COLORADO LIMITED PARTNERSHIP, BEING THE OWNER OF A PARCEL OF LAND BEING A PART OF THE SOUTHEAST ONE-QUARTER OF SECTION 9 AND THE SOUTHWEST ONE-QUARTER OF SECTION 10, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF SAID SECTION 9, WHENCE THE EAST ONE-QUARTER CORNER OF SAID SECTION 9 BEARS $N00^{\circ}13'48''W$ 2639.40 FEET, ITS SOUTH ONE-QUARTER CORNER BEARS $S88^{\circ}46'53''W$ 2886.47 FEET AND THE SOUTH ONE-QUARTER CORNER OF SAID SECTION 10 BEARS $N88^{\circ}52'30''E$ 2638.80 FEET;

THENCE ALONG THE SOUTH LINE OF SAID SOUTHEAST ONE-QUARTER, $S88^{\circ}46'54''W$ A DISTANCE OF 36.98 FEET;

THENCE PARALLEL WITH THE EAST LINE OF SAID SOUTHEAST ONE-QUARTER, $N00^{\circ}13'48''W$ A DISTANCE OF 36.00 FEET;

THENCE $N28^{\circ}09'33''W$ A DISTANCE OF 897.89 FEET, TO A POINT OF NON-TANGENT CURVE ON THE SOUTHEASTERLY RIGHT-OF-WAY LINE OF THE UNION PACIFIC RAILROAD AS DESCRIBED IN THE DOCUMENT RECORDED IN BOOK 1885 AT PAGE 480;

THENCE ALONG THE ARC OF A CURVE TO THE LEFT WHOSE RADIUS POINT BEARS $S81^{\circ}40'58''E$, HAVING A RADIUS OF 820.00 FEET, A CENTRAL ANGLE OF $18^{\circ}50'28''$ AND AN ARC LENGTH OF 162.23 FEET, TO A POINT OF NON-TANGENT CURVE ON THE NORTHEASTERLY RIGHT-OF-WAY LINE OF THE BURLINGTON NORTHERN RAILROAD;

THENCE ALONG THE ARC OF A CURVE TO THE LEFT WHOSE RADIUS POINT BEARS $S88^{\circ}44'57''W$, HAVING A RADIUS OF 4881.18 FEET, A CENTRAL ANGLE OF $12^{\circ}28'18''$ AND AN ARC LENGTH OF 1078.84 FEET, TO A POINT OF COMPOUND CURVE;

THENCE ALONG THE ARC OF A CURVE TO THE LEFT WHOSE RADIUS POINT BEARS $S57^{\circ}16'41''W$, HAVING A RADIUS OF 2914.93 FEET, A CENTRAL ANGLE OF $29^{\circ}48'43''$ AND AN ARC LENGTH OF 1814.98 FEET, TO A POINT OF NON-TANGENCY;

THENCE $N27^{\circ}28'58''E$ A DISTANCE OF 23.42 FEET;

THENCE $N72^{\circ}13'19''E$ A DISTANCE OF 135.50 FEET;

THENCE $S82^{\circ}41'41''E$ A DISTANCE OF 230.00 FEET;

THENCE $N82^{\circ}28'19''E$ A DISTANCE OF 170.00 FEET;

THENCE $N64^{\circ}08'19''E$ A DISTANCE OF 270.00 FEET, TO THE NORTH LINE OF SAID SOUTHEAST ONE-QUARTER;

THENCE ALONG SAID NORTH LINE OF THE SOUTHEAST ONE-QUARTER, $N88^{\circ}58'19''E$ A DISTANCE OF 1208.50 FEET, TO THE NORTHWEST CORNER OF SAID SOUTHWEST ONE-QUARTER OF SECTION 10;

THENCE ALONG THE NORTH LINE OF SAID SOUTHWEST ONE-QUARTER, $N88^{\circ}30'43''E$ A DISTANCE OF 1203.28 FEET, TO THE NORTHWESTERLY RIGHT-OF-WAY LINE OF SAID UNION PACIFIC RAILROAD AS DESCRIBED IN DOCUMENT RECORDED IN BOOK 146 AT PAGE 418;

THENCE ALONG SAID NORTHWESTERLY RIGHT-OF-WAY LINE OF THE UNION PACIFIC RAILROAD THE FOLLOWING FIVE (5) COURSES:

1. $S58^{\circ}50'58''W$ A DISTANCE OF 14.81 FEET, TO A POINT OF CURVE;

2. ALONG THE ARC OF A CURVE TO THE LEFT WHOSE RADIUS POINT BEARS $S30^{\circ}08'01''E$, HAVING A RADIUS OF 2588.80 FEET, A CENTRAL ANGLE OF $22^{\circ}18'38''$ AND AN ARC LENGTH OF 1005.53 FEET, TO A POINT OF NON-TANGENCY ON THE SOUTH LINE OF THE NORTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SAID SOUTHWEST ONE-QUARTER OF SECTION 10;

3. ALONG THE SOUTH LINE OF SAID NORTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF THE SOUTHWEST ONE-QUARTER, $N88^{\circ}36'08''E$ A DISTANCE OF 25.43 FEET, TO A POINT OF NON-TANGENT CURVE;

4. ALONG THE ARC OF A CURVE TO THE LEFT WHOSE RADIUS POINT BEARS $S32^{\circ}05'00''E$, HAVING A RADIUS OF 2588.80 FEET, A CENTRAL ANGLE OF $03^{\circ}19'45''$ AND AN ARC LENGTH OF 238.73 FEET, TO A POINT OF TANGENCY;

5. $S32^{\circ}38'15''W$ A DISTANCE OF 1166.53 FEET;

THENCE $S25^{\circ}33'48''E$ A DISTANCE OF 838.08 FEET;

THENCE PARALLEL WITH THE WEST LINE OF SAID SOUTHWEST ONE-QUARTER, $S00^{\circ}13'48''E$ A DISTANCE OF 48.82 FEET, TO THE SOUTH LINE OF SAID SOUTHEAST ONE-QUARTER;

THENCE ALONG SAID SOUTH LINE OF THE SOUTHWEST ONE-QUARTER, $S88^{\circ}52'30''W$ A DISTANCE OF 50.00 FEET, TO THE POINT OF BEGINNING.

CONTAINING AN AREA OF 2,785,861 SQUARE FEET OR 63.488 ACRES;

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**ATTACHMENT G
STANDARD OPERATING PROCEDURE
MATERIALS MANAGEMENT
AND
HEALTH AND SAFETY PLAN**

{00325274.1}



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FLC

1.0 INTRODUCTION

This Materials Management and Health and Safety Plan ("Plan") shall apply to and be implemented as part of the Environmental Covenant for the Property more specifically described in Attachment A ("Property") whenever there are plans to breach the 12-inch soil cover at the Property. This Plan was prepared to address the specific requirements as referenced in the Environmental Covenant granted by Broderick Investment Company ("BIC") to Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and the Environment ("CDPHE"). Any person undertaking activities to which this Plan is applicable, shall implement this Plan. All activities conducted by BIC associated with management of hazardous soil and water pursuant to the CERCLA remedial action shall comply with the requirements of this Plan. This Plan presents procedures for the handling of contaminated soil or materials as defined in Sections 2.4 and 2.5 during such activities. Property-specific health and safety procedures are also documented within this Plan. The activities include, but may not be limited to, the following:

Utility cuts (private sector; contractor 1, or municipal)

Natural gas (Xcel Energy)

Electrical (Xcel Energy)

Telephone (Qwest, AT&T, US Sprint, MCI)

Cable (Comcast)

Water taps (new service, repair, or modification)

Sewer taps (new service, repair, or modification)

Water Supply

Sanitary sewer

Storm sewer

Manhole alignment

Building foundations

Removal of contaminated materials.

"CONTRACTOR" shall be construed to include any contractor (plumbing, mechanical, etc.) licensed to perform Activities on or under the Property. The conditions and requirements of this Plan shall also be binding on any unlicensed contractor or other entity performing Activities on or under the Property. The property owner shall assure that any entity or person involved in any project subject to this Plan shall be properly licensed or certified pursuant to existing regulations for such Activities. The health and safety and hazard communication plans to be

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utilized for these work activities are included in Section 4. BIC agrees to accept and process all contaminated soil and water as provided in this Plan associated with materials handling on the site, without regard to whose activity generated the materials.

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2.0 MATERIALS HANDLING PROCEDURES

This section provides the requirements and controls for the anticipated work activities. The overall approach of the work is to identify, remove and transport contaminated soil to the Land Treatment Unit ("LTU") constructed as part of the CERCLA remedial action for the Broderick Wood Treatment Site, and remove, load, transport and dispose of debris. In the event that the LTU is closed or otherwise unavailable, the soil shall be sampled and profiled to determine proper off-property disposal requirements prior to loading in the containers for disposal.

2.1 Access Control

Primary access to the Property will be from the north along Lipan St. (Figure G-1).

2.2 Excavation Safety

All excavations shall be done in a safe manner. Appropriate measures shall be implemented to retain excavation side slopes and prevent cave-ins to ensure that persons in or near the excavation are protected. All other applicable procedures as provided in the Health and Safety and Monitoring Procedures shall be followed (Section 4.0, OSHA references).

2.3 Notification and Documentation

There shall be a one-time notice to EPA and CDPHE before commencing excavation in contaminated areas or when the excavation may extend deeper than one foot above the seasonal groundwater level. Notice shall be provided to EPA and CDPHE whenever unanticipated conditions necessitate activities which will deviate from the procedures and requirements set forth in this Plan. The reason for the expected deviation and a plan for implementing the new procedures shall be provided prior to taking action which will deviate from this Plan. If deviations from this Plan occur accidentally during property activities, EPA and CDPHE shall be notified and the work shall be suspended until the reason for the deviation and a plan for implementing new procedures has been provided. In the event that contaminated materials are encountered, all activities to comply with the requirements of this plan including final disposition of the materials shall be documented. The document shall include photographs of construction activities and results of all sampling activities.

2.4 Contaminated Soil

For purposes of this Plan all soil within the Property shall be considered either "contaminated" or "minimally impacted." All soil excavated from within the areas delineated on Figure G-1 (Former Impoundment Area and Former Process Area 12 inches below the ground surface (bgs)) shall be presumed contaminated and soil excavated from the LTU shall be considered contaminated ("contaminated area"). Soil excavated from within the designated contaminated areas may be considered "minimally impacted" if sample analysis indicates the soil contaminant concentrations are below treatment levels as provided in Table 2 and Table 3 attached of the Broderick Wood Products Superfund Site O&M Plan.

Soil outside of these contaminated areas is considered "minimally impacted" down to one foot

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above the seasonal high groundwater table. All other areas of the property outside the contaminated areas shall be considered "minimally impacted", unless visual observations reveal visible staining and/or olfactory observations reveal strong odors. Evaluation of the soil conditions in the area outside of the contaminated areas will be through visual inspection and observation.

During construction, soil excavated from "minimally impacted" areas will be inspected for visually observable "staining" and the presence of odors. Staining would appear to be black or very dark brown and may have a slight rainbow tint. If odor is present, it would be organic in nature and have a detectable mothball, petroleum or similar type of odor. All soil that is visibly stained or contains strong odors shall be presumed to be contaminated unless sampling and analysis indicates contaminant concentrations to be less than treatment levels as provided in Table 2 and Table 3 of the Broderick Wood Products Superfund Site O&M Plan.

2.5 Contaminated Groundwater and Surface Water Runoff

Adequate control shall be implemented for sediment and surface water runoff in accordance with applicable State and Adams County requirements. All groundwater encountered at the Property and any surface water coming in contact with contaminated soil shall be considered contaminated and subject to the requirements of this plan. If removal of groundwater from the excavation is required to facilitate construction or if surface water comes in contact with contaminated soil, ample means and devices shall be maintained to promptly remove and dispose of all contaminated water, including, as appropriate for the particular work, providing retention berms, installing temporary sumps, or sedimentation ponds for collection of water from disturbed areas and to address ponding of storm water. The removed water shall be pumped to the Broderick Wood Products Superfund Site remedial action treatment facility surge pond. All water disposed of into the surge pond will be treated and discharged by BIC under Colorado discharge permit #COG310180, or any replacement thereto.

2.6 Limits of Excavation

No excavations, other than those provided for in the CERCLA Response Action documents, including the current O&M Plan, shall occur in the LTUs without EPA and CDPHE notification, concurrence and amendment of the CERCLA response action documents. Outside of the LTU, excavations should be limited to the depths and widths, as shown on the plans or as required to accomplish the task; excavations deeper than 12 inches above the seasonal high groundwater table should be avoided to minimize contact with potentially contaminated soil and groundwater; and all disturbed areas shall be restored in accordance with the requirements of Section 3.0. Excavations outside of the LTU, which are deeper than 12 inches above the seasonal high groundwater table will comply with the requirements of Section 2.7 hereof. No excavations shall be conducted in the Former Impoundment Area, except as necessary for the extension of Lipan St. and associated utilities, until certification of partial completion of the CERCLA remedy component has been accepted by the EPA.

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2.7 Excavated Soil

All excavated soil designated as "minimally impacted", meeting the criteria listed in Section 2.4, may be placed into other areas on the Property.

Excavated "contaminated" soil shall be loaded, hauled, and stockpiled to the designated area within LTU-A North. All excavated contaminated soil shall be excavated, loaded, and hauled to the LTU in a manner that prevents, to the maximum extent possible, the spread of contamination. All haul roads shall be maintained as clean roads. All vehicles which travel within the limits of the LTU area shall be decontaminated. Soil placed within the LTU will be treated by BIC in accordance with the CERCLA Response Action documents, including the current O&M Plan.

All existing roads surfaced with pavement or gravel outside of the LTU area and on Property are considered clean of contamination and shall be used to transport contaminated soil to the LTU; however, they must be cleaned of contaminated soil upon completion of the hauling operations. Additional temporary roads shall be built using imported granular road surfacing as necessary to provide direct access to the designated disposal areas in the LTU without disturbing active treatment areas. All haul roads shall be maintained and spills shall be prevented. If a spill occurs, the area of the spill shall be cleaned by removal of all visually contaminated soil from the road surface, and the addition of 2 inches of imported granular road surfacing. Temporary roads shall be removed at the completion of the job, unless directed otherwise.

In the event that the LTU is closed and no longer accepting soil, soil shall be sampled and profiled to determine proper off-Property disposal requirements prior to loading in the containers for disposal. It shall then be transported directly to an appropriate waste disposal facility. Under no condition shall this requirement be deviated from.

2.8 Debris

If debris (non-soil material) is encountered during excavation or grading the material encountered shall be considered contaminated and shall be segregated from soil and shall be transported to a designated area within LTU-A North for later characterization and disposal. As an alternative, debris may be characterized and loaded directly into roll-off boxes or trucks for off-Property disposal. All collected debris shall be handled using either the excavator or the loader. The collected debris will be transported to the appropriate waste disposal facility. Gross amounts of soil will be removed from the waste material and the debris sampled and profiled to determine proper off-Property disposal requirements prior to transport off Property for disposal. It will then be transported directly to an appropriate waste disposal facility.

2.9 Air Monitoring

During excavation, transportation and spreading of contaminated soil, Mini RAM samplers will be used to provide real time concentrations of respirable airborne particulates. Three Mini RAMs will be used to monitor dust; one at north Property boundary near the LTUs, one between the LTU-A North and the Union Pacific Rail line, and a third "mobile" unit close to the excavation activity. In addition, appropriate dust control measures, in accordance with § 4.3.1., will be used during the excavation activities. If dust levels exceed 0.15 milligrams per cubic meter (mg/m³) at the fence line or 0.30 mg/m³ within the LTU boundaries or in the work zone,

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the operations will be modified or delayed. In addition, Mini RAM samplers should be placed such that they determine whether persons employed on the site in any capacity are exposed to contaminants at unacceptable concentrations. If so, work procedures shall be modified to reduce exposure to acceptable limits.

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3.0 RESTORATION OPERATIONS

This section provides the requirements for restoration of the surface soil cover following activities which disturb or otherwise remove the existing soil cover. The soil cover shall be replaced or restored in all areas of the property, unless final development conditions include paving, gravel surface or other permanent surfacing material. The soil cover shall include a 1-foot-thick layer of imported fill as cover over any disturbed area, except as noted above.

The existing soil cover, to the extent possible, shall be prevented from being contaminated. In the event that the soil cover material becomes intermixed with contaminated material the mixture shall be excavated, properly disposed and replaced with 12 inches of imported fill.

The current soil cover shall be surveyed prior to any activities which may disturb it. The limits of the planned disturbance shall be staked and elevations of the top surface measured and recorded. At a minimum, stakes shall be placed at the corners of the planned disturbance area and at points not greater than 100-foot intervals. Following the activities, the actual extent of the disturbance shall be measured and recorded.

The information recorded from measurements described above shall control the restoration activities. The disturbed area shall be restored to reestablish the 12 inch soil cover and shall include leveling the ground surface and placement of 12 inches of clean soil. Following soil cover placement all surfaces shall be compacted.

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4.0 HEALTH AND SAFETY AND MONITORING PROCEDURES

This section includes Property-specific health and safety procedures to be implemented during Activities at the Property to which this Plan applies pursuant to section 1.0. The Property owner shall be responsible for having this Plan on Property and assuring its implementation and adherence by all persons on Property during activities to which the Plan is applicable.

4.1 Worker Health and Safety

The principal factor in hazard control and worker health and safety is training. Workers cannot guard against hazards if they are not aware of the dangers in their workplace. The requirements of OSHA, 29 CFR 1910 regulations are used as guidance for this Plan.

The basis for this Plan is that there is potentially contaminated soil and groundwater on the Property for which workers may be exposed during activities at the Property. There are three potential pathways to humans working on the affected Property to come in contact with COCs. The potential pathways are:

1. Direct contact with materials containing COCs;
2. Inhalation of dust containing contaminated particulate, and;
3. Ingestion of contaminated materials.

4.3.1 Health and Safety Officer

A Health and Safety Officer (HSO) shall be appointed by the Contractor to supervise all aspects of implementation of this Plan, perform necessary monitoring, and collect and maintain documentation required by this Plan. The HSO will have the knowledge, responsibility and authority to apply appropriate protection regulations. The HSO shall ensure that health and safety activities are being performed in accordance with the requirements of this Plan.

The HSO shall be responsible for establishment of the exclusion zone around each work area and for ensuring that only workers with the appropriate training and documentation of such training are allowed within the exclusion zone. The HSO shall insure that the equipment utilized to characterize soil encountered during Plan Activities and to monitor worker health and safety are properly calibrated. The HSO shall also ensure that all required field measurements are obtained as required by this Plan to protect worker safety and to characterize excavated soil for segregation and subsequent testing.

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The HSO will be responsible for ensuring that contaminated soil is properly segregated, containerized and transported to the LTU. The HSO shall also ensure that the segregated soil is isolated and managed in a manner to prevent contact by other workers not involved in Plan-related Activities or by Property visitors until results of additional sampling are obtained indicating that the soil is suitable for placement back in the excavation or as general fill or alternatively until contaminated soil are transported to the LTU for on-Property treatment or disposal at a off-Property licensed disposal facility.

4.3.2 Training Requirements

Worker health and safety are regulated under OSHA as stipulated in 29 CFR 1910. Training is regulated by 29 CFR 1910.120 (e). Personnel working on the Property or that may come into contact with contaminated materials, should fall under the criteria specified below:

- Workers on-Property only occasionally for a specific limited task, and who are unlikely to be exposed over permissible exposure limits, shall receive a minimum of 24 hours of instruction, and;
- The HSO and other on-Property management or supervisors directly responsible for, or who supervise employees engaged in, Activities shall receive 40 hours initial training and three days of supervised field experience (the training may be reduced to 24 hour of initial training, if the only area of responsibility is employees as specified above).

The Property owner shall be responsible for ensuring that all Property workers provide adequate documentation certifying OSHA health and safety training in accordance with 29 CFR 1910.120. Workers who cannot provide training certification will be denied access to the controlled area.

The OSHA health and safety training for the HSO will include additional instruction for Property-specific hazards and hazard awareness.

4.3.3 Personal Monitoring

No personal monitoring is anticipated to be required.

4.3.4 Property/Area Monitoring

The Property owner shall be responsible for monitoring conditions at the worksite and immediate surrounding area. During excavation, transportation, and spreading of soil in the LTU units, Mini RAM samplers will be used to provide real time concentrations of respirable airborne particulates. Three Mini RAMs will be used to monitor dust; two at fence lines near the LTUs, and a third "mobile" unit close to the activity. In addition, appropriate dust control measures (e.g., watering) will be used during the transportation. If dust levels exceed 0.15 milligrams per cubic meter (mg/m³) at the fence line or 0.30 mg/m³ within the LTU boundaries or work zones, the operations will be modified or delayed.

4.3.5 Hazard Evaluation

Physical hazards that may be encountered include the presence of heavy equipment (i.e., backhoe, trucks), open trenches or excavations, exposure to electrical and other utility hazards, and noise. In addition, there is a possibility of slip/trip/fall hazards from holes, uneven pavement, unused construction equipment, sharp objects (i.e., nails, metal shards), and slippery surfaces.

Finally, the potential for extreme weather conditions may exist depending upon the implementation schedule. Extreme weather conditions may include excessive heat or cold, thunderstorms, high wind conditions, heavy rains, and snow/ice. Special precautions will be taken during periods of extreme weather, and work may be halted until the severe weather has subsided. For example, work will be halted under windy conditions that result in visible dust from the excavation or stockpiled soil being blown around. In addition, subcontractors may elect to independently halt their activities in the event of extreme weather conditions, especially thunderstorms.

4.3.6 Excavations and Trenches

During the excavation of utility and piping trenches, proper excavation and trenching procedures must be followed as outlined in 29 CFR 1926.650 through .653 (Subpart P. Excavations, Trenching, and Shoring). In particular, the requirements for shoring, sloping, and access/egress must be followed. In addition, all underground utilities (gas, electric, water) at the Property must be identified and marked by the subcontractor prior to the commencement of any excavation and/or trenching activity. Workers are not allowed to enter any trenches or excavations unless an observer is present outside of the excavation/trench area.

4.3.7 Operation of Mechanized Equipment and Motor Vehicles

All mechanized equipment (e.g., backhoe, bulldozers) and other motor vehicles (support trucks, dump trucks, forklifts) will only be operated by qualified personnel who have been trained by their employer in the proper use of the equipment. The equipment will be operated according to all applicable OSHA and Department of Transportation (DOT) regulations. Specifically, the requirements of 29 CFR 1926.600 through .606 (Subpart O. "Motor Vehicles, Mechanized Equipment, and Marine Operations") will be observed, including, but not limited to the following:

1. Seat belts must be worn at all times.
2. All heavy equipment must be equipped with a reverse signal alarm.
3. All earth moving equipment must be equipped with rollover protective structures.

4.3.8 Struck-By and Caught-In/Caught-Between Hazards

The potential for being struck by falling or swinging objects, or situations where an employee is caught in or caught between heavy equipment and/or other items, are to be minimized by following any and all appropriate OSHA precautions. In particular, the subcontractor should incorporate provisions of 29 CFR 1926.600 (a)(3)(i), which refers to suspension of equipment or parts, 29 CFR 1926.651(e), which refers to falling loads, and 29 CFR 1926, Subpart O.

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which refers to machinery and heavy equipment. Precautions should include, but not be limited to:

1. Property personnel must listen for back up alarms and watch for spotters and backing equipment.
2. The use of towing and lifting equipment should be in accordance with OSHA and other applicable requirements.

4.3.9 Exclusion Zone

A clearly defined exclusion zone will be established around each of the controlled (work) areas to prevent the public from contacting potentially contaminated materials. To protect other workers or other persons not involved with the Activity, these controlled (work) areas shall be marked with cones, or other suitable markings, to distinguish these areas from other areas on the Property.

The area in which potentially contaminated or contaminated material, if any, is stockpiled shall have markings (i.e., yellow caution tape or cones) to warn personnel of the potential for exposure.

Access to the controlled (work) areas will be limited to personnel who are required for performance of the subject Activities and who have documented the necessary training as described in Section 4.3.2 of this Plan. All other workers or other persons not involved in Plan-related Activities will be restricted from entering the exclusion zone. The HSO will be responsible for ensuring that only those individuals that are required to enter the exclusion zone and that have the appropriate training are allowed to enter the exclusion zone.

4.3.10 Personnel Protective Equipment

It shall be mandatory for all personnel involved in the Activity to wear Level D personnel protective equipment (PPE). The PPE required includes the following:

- Hard hat;
- Safety shoes;
- Gloves
- Pants;
- Eye protection; and
- Ear protection, as necessary.

Additional PPE may be required in the exclusion zone (including the area of stockpiled material) including latex gloves and Tyvek® suits.

4.2 Emergency Contacts

In the event of an emergency related to Property operations, notification of appropriate contacts should be made. The following persons shall be contacted in the event of an emergency:

1. Immediate supervisor of the person injured;
2. Owner or owner's representative;
3. Medical emergency requiring immediate attention - 911

In the event that an emergency call to 911 is impractical and a visit to the emergency room at a hospital is required, personnel should be familiar with the location and most direct route to the nearest hospital. The nearest hospital is North Suburban Medical Center, and the directions from the Property to the hospital are as follows:

<u>Directions</u>	<u>Miles</u>
Start: Depart 5800 Galapago Denver, CO 80202 on Lipan St (North)	0.3
1: Turn LEFT (West) onto W 62nd Ave	0.1
2: Turn RIGHT (North) onto Pecos St.	0.1
3: Merge onto I-76 East.	0.8
4: Merge onto I-25 [US-87] (North) via EXIT 5 toward FORT COLLINS	
5: Merge onto 84th Ave (East) via EXIT 219 toward THORNTON	0.4
6: Turn LEFT (North) onto GRANT ST.	1.0

End: Arrive North Suburban Medical Center (hospital), Denver, Colorado - 9191 Grant St.

4.3 Operational Considerations

Operational considerations during operations at the Property include reduction of contaminant spread and public content. The following sections describe control procedures for each of the operational considerations during Activities to which this Plan is applicable.

4.3.1 Reduction of Contaminant Spread

Contaminants may spread from the active work area to the surrounding areas through a variety of mechanisms that include, but are not limited to, the following:

- Generation of dust containing COCs;
- Movement of COCs in water; and
- Physical removal from the Property on worker's clothing or other direct mechanism.

Every effort must be made to prevent the spread of contamination or potentially contaminated materials from the Property.

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Whenever dust is generated during trenching operations, measures shall be employed to reduce the spread of contamination. For control of dust and particulates, water sprays or mists shall routinely be applied to equipment or areas releasing potentially radioactive dusts. The water spray and mists shall be applied so that no runoff, standing pools, or free water are produced. If any water does accumulate, it shall be contained, monitored, and treated as appropriate. In severe cases, including windstorms or other adverse weather conditions, advance planning to control release of potentially contaminated dusts shall be performed. Measures such as shutting down operations and covering of recently exposed, contaminated areas may be necessary to reduce the potential for dust release and dispersal.

Water shall not be introduced to (other than for dust control) or removed from the excavation to the extent practical to prevent the potential for contaminant migration through this media. If precipitation is possible, the excavation should be covered and the area around the excavation modified to prevent surface run-off from entering the excavation.

The purpose of this Plan is to provide procedures that eliminate or restrict emissions or other mechanisms of possible transport of contaminated soil off Property in an uncontrolled manner. In order to prevent uncontrolled releases of contaminants from the Property, contaminated or potentially contaminated materials shall not be removed from the Property, except as required for off-Property disposal.

4.3.2 Public Contact

Activities at the Property may draw the attention of the public. However, access to the Property is restricted by virtue of the fence, and section 4.3.9 provides for a clearly defined exclusion zone. During Activities, the HSO shall be responsible for assuring that unauthorized persons do not enter the exclusion zone and the work areas.

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5.0 DOCUMENT RETENTION

The owner shall maintain at the Property an environmental file. Such files shall contain the following:

- A Copy of this Plan
- Data resulting from sampling and analysis efforts.
- Documentation of activities as required by Section 2.3
- Maps depicting the location of contaminated materials encountered at the Property during construction activities.
- Documents and correspondence required by this Plan.

Such environmental file shall be kept in perpetuity and shall be available during normal business hours for inspection by the EPA or CDPHE.

TK



COLORADO

Hazardous Materials & Waste Management Division

Department of Public Health & Environment

Institutional Control ID: HMC0V00032

Covenant Information:

Covenant Date 12/14/2006

Last Modified 12/14/2006

Self Reporting

Media of Concern:

Surface Water:

Ground Water:

Air:

Soil:

Other:

Site Contact Information:

Owner Corp: Broderick Investment Company

Contact Name: Tom Connolly

Contact Address: 950 Spruce Street, Unit 1C

Contact City: Louisville

Contact State: CO

Contact Zip: 80027

Contact Phone: 303-861-9292

Contaminants of Concern:

PAHs, PCP, Dioxins, Furans, VOCs, AS, CD, PB, ZN

Property Restrictions:

- 1 residential and public use
- 2 agricultural use
- 3 excavations of soils
- 4 use of water or well construction
- 5 protection of the integrity of the CERCLA remedial action

Site Information:

ID: COD000110254

Name: Broderick Wood Products Site 001

Address: 5800 Galapago Street

City: Denver

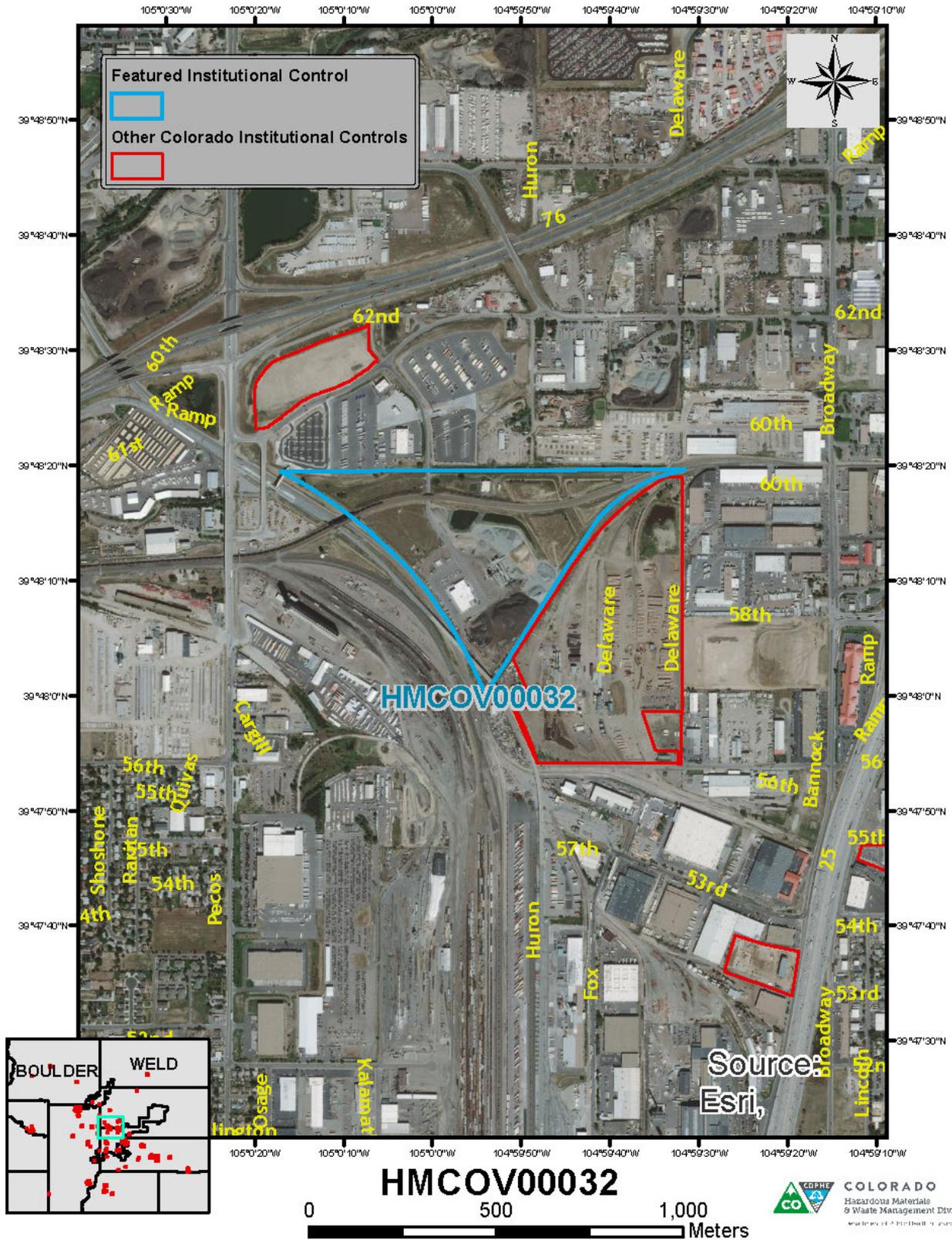
State: CO

Zip: 80216

Legal Description:

See Covenant

BRODRICK WOOD PRODUCTS



APPENDIX D – PRESS NOTICE

2/22/2021

BRODERICK WOOD PRODUCTS | Superfund Site Profile | Superfund Site Information | US EPA



BRODERICK WOOD PRODUCTS DENVER, CO

Stay Updated, Get Involved

On this page:

- [Announcements and Key Topics](#)

Announcements and Key Topics

EPA, in cooperation with the Colorado Department of Public Health and the Environment (CDPHE), is conducting the sixth five-year review (FYR) of the Broderick Wood Products Superfund site. The purpose of the FYR is to make sure that the cleanup actions to date adequately protect human health and the environment. The FYR is scheduled for completion by September 2021.

We want to hear from you!

Community members are always encouraged to share information that can help inform our findings regarding the protectiveness and effectiveness of remedies at the site. Please contact us if you would like to share your comments.

Ryan Kloberdanz
Community Involvement Coordinator
EPA Region 8
1595 Wynkoop Street (ORA-PA-C)
Denver, CO 80202-1129
Email: kloberdanz.ryan@epa.gov
(303) 312-6078

Additional information is also available at the [Public Information Repositories](#) »

FEBRUARY 22, 2021

APPENDIX E – INTERVIEW FORMS

Broderick Wood Products SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Broderick Wood Products	
EPA ID: COD000110254	
Interviewer name:	Interviewer affiliation:
Subject name: Ross Davis	Subject affiliation:
Subject contact information: ross.davis@state.co.us	
Interview date: 3/2/2021	Interview time: 1pm
Interview location: Home	
Interview format (circle one): In Person Phone Mail <u>Email</u> Other:	
Interview category: State Agency	

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)? I should preface that I do not have a long history working on this site. Through my few years of experience on this site, my overall impression is that significant surficial cleanup has been conducted, maintenance of remedy components focused on subsurface cleanup has been lacking and reuse is the main driver to completing cleanup at the site.

2. What is your assessment of the current performance of the remedy in place at the Site? The current remedy, the package water treatment plant for groundwater, is not operating, so it is difficult to comment on its performance. Groundwater data suggests that the site has not achieved treatment levels in the surficial aquifer for Naphthalene, Pentachlorophenol and Phenol. The Denver aquifer has not achieved treatment levels for Naphthalene and Pentachlorophenol.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years? I am not.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities. Yes, the package water treatment facility was having difficulty achieving dissolved manganese standards in their discharge. CDPHE facilitated a permit review and due to standards changes, was able to eliminate the manganese standard. The discharge permit was changed in 2017. Since that time the remedy has not operated.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site’s remedy? No.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues? I am comfortable with the institutional controls at the site.

7. Are you aware of any changes in projected land use(s) at the Site? Portions of the site have been sold for reuse. The current use is reflective of the intended reuse for the site, industrial.
8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? Since groundwater has not achieved treatment levels at the site. It would be good to see operation of the water treatment facility.
9. Do you consent to have your name included along with your responses to this questionnaire in the FYR report? Yes.

Broderick Wood Products SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: Broderick Wood Products	
EPA ID: COD000110254	
Interviewer name:	Interviewer affiliation:
Subject name: Tom Connolly	Subject affiliation: BIC
Subject contact information: tom@connollytrustee.com	
Interview date: 3/6/21	Interview time:
Interview location:	
Interview format (circle one): In Person Phone Mail <u>Email</u> Other:	
Interview category: Potentially Responsible Party (PRP)	

1. What is your overall impression of the remedial activities at the Site?

The remedial activities at the site over the many years have been quite successful in cleaning up what was an old contaminated industrial site. Implementation of the remedy components have resulted in placing large portions of the Site back into productive use while being protective of human health and the environment. Groundwater analysis from 2020 indicates that nearly all wells have experienced a 90-95% reduction in COCs with many having COCs below the target levels set by the ROD.

2. What have been the effects of this Site on the surrounding community, if any?

The Site has had minimal impact on the surrounding areas. The Site is surrounded by rail lines to the east and south, by industrial properties to the east, west, north east and south and to the north in the direction of ground water flow by a large landfill which has been capped and converted to industrial use. None of these surrounding properties have been significantly impacted by the conditions on the Broderick Site. There are no know domestic wells or residential properties which have been impacted by the Site conditions.

3. What is your assessment of the current performance of the remedy in place at the Site?

The active phase of the remedy has been completed. What remains is containment, monitoring and reporting. The remaining Site activity is being capably handled by the current O&M contractor. The Site O&M contractor is dealing effectively with the challenges to operating the PWTS caused by enhanced discharge standards.

4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

I am not aware that there has ever been a complaint or inquiry from any resident with respect to this Site in the last 20 years.

5. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

I am adequately informed of activities and progress.

6. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

No.

7. Do you consent to have your name included along with your responses to this questionnaire in the FYR report?

Yes.

APPENDIX F – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST																																																																																																							
I. SITE INFORMATION																																																																																																							
Site Name: <u>Broderick Wood Products</u>	Date of Inspection: <u>10/13/2020</u>																																																																																																						
Location and Region: <u>Denver, CO 8</u>	EPA ID: <u>COD000110254</u>																																																																																																						
Agency, Office or Company Leading the Five-Year Review: <u>EPA</u>	Weather/Temperature: <u>sunny and 70 degrees Fahrenheit</u>																																																																																																						
Remedy Includes: (check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> Landfill cover/containment</td> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> Monitored natural attenuation</td> </tr> <tr> <td style="border: none;"><input checked="" type="checkbox"/> Access controls</td> <td style="border: none;"><input checked="" type="checkbox"/> Groundwater containment</td> </tr> <tr> <td style="border: none;"><input checked="" type="checkbox"/> Institutional controls</td> <td style="border: none;"><input checked="" type="checkbox"/> Vertical barrier walls</td> </tr> <tr> <td style="border: none;"><input checked="" type="checkbox"/> Groundwater pump and treatment</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Surface water collection and treatment</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Other: _____</td> <td></td> </tr> </table>		<input checked="" type="checkbox"/> Landfill cover/containment	<input checked="" type="checkbox"/> Monitored natural attenuation	<input checked="" type="checkbox"/> Access controls	<input checked="" type="checkbox"/> Groundwater containment	<input checked="" type="checkbox"/> Institutional controls	<input checked="" type="checkbox"/> Vertical barrier walls	<input checked="" type="checkbox"/> Groundwater pump and treatment		<input type="checkbox"/> Surface water collection and treatment		<input type="checkbox"/> Other: _____																																																																																											
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Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached																																																																																																							
II. INTERVIEWS (check all that apply)																																																																																																							
1. O&M Site Manager <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 30%; border: none;">Name _____</td> <td style="width: 30%; border: none;">Title _____</td> <td style="width: 40%; border: none;">Date _____</td> </tr> <tr> <td colspan="3" style="border: none;">Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone : _____</td> </tr> <tr> <td colspan="3" style="border: none;">Problems, suggestions <input type="checkbox"/> Report attached: _____</td> </tr> </table>		Name _____	Title _____	Date _____	Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone : _____			Problems, suggestions <input type="checkbox"/> Report attached: _____																																																																																															
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2. O&M Staff <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 30%; border: none;">Name _____</td> <td style="width: 30%; border: none;">Title _____</td> <td style="width: 40%; border: none;">Date _____</td> </tr> <tr> <td colspan="3" style="border: none;">Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone : _____</td> </tr> <tr> <td colspan="3" style="border: none;">Problems/suggestions <input type="checkbox"/> Report attached: _____</td> </tr> </table>		Name _____	Title _____	Date _____	Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone : _____			Problems/suggestions <input type="checkbox"/> Report attached: _____																																																																																															
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3. Local Regulatory Authorities and Response Agencies (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply. <table style="width: 100%; border: none;"> <tr> <td style="width: 15%;">Agency _____</td> <td style="width: 35%;">Contact _____</td> <td style="width: 15%;">Name _____</td> <td style="width: 15%;">Title _____</td> <td style="width: 10%;">Date _____</td> <td style="width: 10%;">Phone No. _____</td> </tr> <tr> <td colspan="6" style="border: none;">Problems/suggestions <input type="checkbox"/> Report attached: _____</td> </tr> <tr><td colspan="6"> </td></tr> <tr> <td>Agency _____</td> <td>Contact _____</td> <td>Name _____</td> <td>Title _____</td> <td>Date _____</td> <td>Phone No. _____</td> </tr> <tr> <td colspan="6" style="border: none;">Problems/suggestions <input type="checkbox"/> Report attached: _____</td> </tr> <tr><td colspan="6"> </td></tr> <tr> <td>Agency _____</td> <td>Contact _____</td> <td>Name _____</td> <td>Title _____</td> <td>Date _____</td> <td>Phone No. _____</td> </tr> <tr> <td colspan="6" style="border: none;">Problems/suggestions <input type="checkbox"/> Report attached: _____</td> </tr> <tr><td colspan="6"> </td></tr> <tr> <td>Agency _____</td> <td>Contact _____</td> <td>Name _____</td> <td>Title _____</td> <td>Date _____</td> <td>Phone No. _____</td> </tr> <tr> <td colspan="6" style="border: none;">Problems/suggestions <input type="checkbox"/> Report attached: _____</td> </tr> <tr><td colspan="6"> </td></tr> <tr> <td>Agency _____</td> <td>Contact _____</td> <td>Name _____</td> <td>Title _____</td> <td>Date _____</td> <td>Phone No. _____</td> </tr> <tr> <td colspan="6" style="border: none;">Problems/suggestions <input type="checkbox"/> Report attached: _____</td> </tr> <tr><td colspan="6"> </td></tr> <tr> <td>Agency _____</td> <td>Contact _____</td> <td>Name _____</td> <td>Title _____</td> <td>Date _____</td> <td>Phone No. _____</td> </tr> <tr> <td colspan="6" style="border: none;">Problems/suggestions <input type="checkbox"/> Report attached: _____</td> </tr> </table>		Agency _____	Contact _____	Name _____	Title _____	Date _____	Phone No. _____	Problems/suggestions <input type="checkbox"/> Report attached: _____												Agency _____	Contact _____	Name _____	Title _____	Date _____	Phone No. _____	Problems/suggestions <input type="checkbox"/> Report attached: _____												Agency _____	Contact _____	Name _____	Title _____	Date _____	Phone No. _____	Problems/suggestions <input type="checkbox"/> Report attached: _____												Agency _____	Contact _____	Name _____	Title _____	Date _____	Phone No. _____	Problems/suggestions <input type="checkbox"/> Report attached: _____												Agency _____	Contact _____	Name _____	Title _____	Date _____	Phone No. _____	Problems/suggestions <input type="checkbox"/> Report attached: _____												Agency _____	Contact _____	Name _____	Title _____	Date _____	Phone No. _____	Problems/suggestions <input type="checkbox"/> Report attached: _____					
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Contact _____	_____	_____	_____
Name	Title	Date	Phone No.
Problems/suggestions <input type="checkbox"/> Report attached: _____			
4. Other Interviews (optional) <input type="checkbox"/> Report attached: _____			
III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)			
1. O&M Documents			
<input checked="" type="checkbox"/> O&M manual	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input type="checkbox"/> As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
2. Site-Specific Health and Safety Plan			
<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
<input type="checkbox"/> Contingency plan/emergency response plan	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
3. O&M and OSHA Training Records			
<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
Remarks: _____			
4. Permits and Service Agreements			
<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input checked="" type="checkbox"/> Effluent discharge	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input type="checkbox"/> Waste disposal, POTW	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Other permits: _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: <u>BIC has an effluent discharge permit but has not discharged water in recent years.</u>			
5. Gas Generation Records			
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks: _____			
6. Settlement Monument Records			
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks: _____			
7. Groundwater Monitoring Records			
<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A	
Remarks: _____			
8. Leachate Extraction Records			
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks: <u>BIC is no longer collecting leachate, as there is none to collect.</u>			
9. Discharge Compliance Records			
<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: <u>BIC has an effluent discharge permit but has not discharged water in recent years.</u>			
10. Daily Access/Security Logs			
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	
Remarks: _____			
IV. O&M COSTS			
1. O&M Organization			
<input type="checkbox"/> State in-house	<input type="checkbox"/> Contractor for state		

Remarks: <u>Part of site now being used for parking and materials storage.</u>		
3. Land Use Changes Off Site <input checked="" type="checkbox"/> N/A		
Remarks: _____		
VI. GENERAL SITE CONDITIONS		
A. Roads <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Roads Damaged <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Roads adequate <input type="checkbox"/> N/A		
Remarks: _____		
B. Other Site Conditions		
Remarks: _____		
VII. LANDFILL COVERS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		
A. Landfill Surface		
1. Settlement (low spots) <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Settlement not evident		
Area extent: _____ Depth: _____		
Remarks: _____		
2. Cracks <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident		
Lengths: _____ Widths: _____ Depths: _____		
Remarks: _____		
3. Erosion <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident		
Area extent: _____ Depth: _____		
Remarks: _____		
4. Holes <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Holes not evident		
Area extent: _____ Depth: _____		
Remarks: _____		
5. Vegetative Cover <input type="checkbox"/> Grass <input type="checkbox"/> Cover properly established		
<input type="checkbox"/> No signs of stress <input type="checkbox"/> Trees/shrubs (indicate size and locations on a diagram)		
Remarks: <u>Not applicable</u>		
6. Alternative Cover (e.g., armored rock, concrete) <input checked="" type="checkbox"/> N/A		
Remarks: _____		
7. Bulges <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Bulges not evident		
Area extent: _____ Height: _____		
Remarks: _____		
8. Wet Areas/Water Damage <input checked="" type="checkbox"/> Wet areas/water damage not evident		
<input type="checkbox"/> Wet areas	<input type="checkbox"/> Location shown on site map	Area extent: _____
<input type="checkbox"/> Ponding	<input type="checkbox"/> Location shown on site map	Area extent: _____
<input type="checkbox"/> Seeps	<input type="checkbox"/> Location shown on site map	Area extent: _____
<input type="checkbox"/> Soft subgrade	<input type="checkbox"/> Location shown on site map	Area extent: _____
Remarks: _____		
9. Slope Instability <input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map		
<input checked="" type="checkbox"/> No evidence of slope instability		
Area extent: _____		
Remarks: _____		
B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

D. Cover Penetrations <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1. Gas Vents <input type="checkbox"/> Active <input type="checkbox"/> Passive	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition	<input checked="" type="checkbox"/> N/A
Remarks: _____			
2. Gas Monitoring Probes	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition	<input checked="" type="checkbox"/> N/A
Remarks: _____			
3. Monitoring Wells (within surface area of landfill)	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input checked="" type="checkbox"/> Good condition	<input type="checkbox"/> N/A
Remarks: _____			
4. Extraction Wells Leachate	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition	<input checked="" type="checkbox"/> N/A
Remarks: _____			
5. Settlement Monuments	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed	<input checked="" type="checkbox"/> N/A
Remarks: _____			
E. Gas Collection and Treatment <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
F. Cover Drainage Layer <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
G. Detention/Sedimentation Ponds <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
H. Retaining Walls <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
I. Perimeter Ditches/Off-Site Discharge <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1. Siltation <input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Siltation not evident	Area extent: _____	
Remarks: _____	Depth: _____		
2. Vegetative Growth <input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Vegetation does not impede flow	
Area extent: _____	Type: _____	Remarks: _____	
3. Erosion <input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident	Area extent: _____	
Remarks: _____	Depth: _____		
4. Discharge Structure <input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A	Remarks: _____	
VIII. VERTICAL BARRIER WALLS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1. Settlement <input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Settlement not evident	Area extent: _____	
Remarks: _____	Depth: _____		

2. Performance Monitoring	Type of monitoring: <u>triennial groundwater monitoring</u>
<input type="checkbox"/> Performance not monitored	<input type="checkbox"/> Evidence of breaching
Frequency: _____	
Head differential: _____	
Remarks: _____	
IX. GROUNDWATER/SURFACE WATER REMEDIES <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
A. Groundwater Extraction Wells, Pumps and Pipelines <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1. Pumps, Wellhead Plumbing and Electrical	
<input checked="" type="checkbox"/> Good condition	<input type="checkbox"/> All required wells properly operating
<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N/A
Remarks: <u>Testing was recently completed to ensure the system remains in working order.</u>	
2. Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances	
<input checked="" type="checkbox"/> Good condition	<input checked="" type="checkbox"/> Needs maintenance
Remarks: <u>During the site visit the operator indicated they are still working on additional maintenance and upgrades. Extraction pump house 2 appeared to be encroached upon by the new owner's operations.</u>	
3. Spare Parts and Equipment	
<input type="checkbox"/> Readily available	<input type="checkbox"/> Good condition
<input type="checkbox"/> Requires upgrade	<input type="checkbox"/> Needs to be provided
Remarks: <u>The plant is not currently being operated but it has been tested recently.</u>	
B. Surface Water Collection Structures, Pumps and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
C. Treatment System <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1. Treatment Train (check components that apply)	
<input checked="" type="checkbox"/> Metals removal	<input checked="" type="checkbox"/> Oil/water separation
<input type="checkbox"/> Air stripping	<input type="checkbox"/> Carbon adsorbers
<input type="checkbox"/> Filters: _____	<input type="checkbox"/> Bioremediation
<input type="checkbox"/> Additive (e.g., chelation agent, flocculent): _____	
<input type="checkbox"/> Others: _____	
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
<input type="checkbox"/> Sampling ports properly marked and functional	
<input type="checkbox"/> Sampling/maintenance log displayed and up to date	
<input type="checkbox"/> Equipment properly identified	
<input type="checkbox"/> Quantity of groundwater treated annually: _____	
<input type="checkbox"/> Quantity of surface water treated annually: _____	
Remarks: _____	
2. Electrical Enclosures and Panels (properly rated and functional)	
<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Good condition
	<input type="checkbox"/> Needs maintenance
Remarks: _____	
3. Tanks, Vaults, Storage Vessels	
<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Good condition
<input type="checkbox"/> Proper secondary containment	<input type="checkbox"/> Needs maintenance
Remarks: _____	
4. Discharge Structure and Appurtenances	
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition
	<input checked="" type="checkbox"/> Needs maintenance
Remarks: <u>Discharging water onto the LTUs. Some pipes that pump the discharge to the LTUs were broken/leaking and in need of repair.</u>	
5. Treatment Building(s)	
<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Good condition (esp. roof and doorways)
<input type="checkbox"/> Chemicals and equipment properly stored	<input type="checkbox"/> Needs repair
Remarks: _____	
6. Monitoring Wells (pump and treatment remedy)	
<input type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning
	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Good condition
<input type="checkbox"/> All required wells located	<input checked="" type="checkbox"/> Needs maintenance
	<input type="checkbox"/> N/A

Remarks: <u>Some wells had damaged locks that require maintenance.</u>
D. Monitoring Data
1. Monitoring Data <input type="checkbox"/> Is routinely submitted on time <input type="checkbox"/> Is of acceptable quality
2. Monitoring Data Suggests: <input type="checkbox"/> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining
E. Monitored Natural Attenuation
1. Monitoring Wells (natural attenuation remedy) <input type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input checked="" type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A Remarks: <u>Some wells had damaged locks that require maintenance.</u>
X. OTHER REMEDIES
If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.
XI. OVERALL OBSERVATIONS
A. Implementation of the Remedy
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>The OU1 interim remedy is complete and addressed the impoundment sludges. The OU2 remedy addressed metals-contaminated soil via chemical fixation and organics-contaminated soil via treatment in LTUs. Treatment of soil in the LTUs has concluded, but they are currently open and will need to be closed over the long term. NAPL recovery has concluded. Bioventing has concluded in the Former Process Area and Lot 8 and is ongoing in the Former Impoundment Area (Lot 7). An SBCW is in place around the northern, western and eastern edges of the Site to limit groundwater flow off site. Groundwater is currently recovered via the North Boundary Cutoff and West Boundary Cutoff trenches. Institutional controls have been implemented at the Site via a 2007 Environmental Covenant. There are several O&M and monitoring issues with the remedy, described below in the <i>Adequacy of O&M</i> section.</u>
B. Adequacy of O&M
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. <u>Groundwater is no longer treated in the PWTS and is instead sprayed onto the LTUs, which was not approved by the EPA or CDPHE. If spraying collected groundwater onto the LTUs is deemed inappropriate, the EPA and CDPHE will determine whether the original remedy of treating water via the PWTS should be reinstated or if other actions are needed to handle contaminated groundwater. Additional off-site groundwater sampling is needed to delineate off-site groundwater contamination, determine whether containment is working, and confirm contamination is not impacting these wells. The monitoring plan currently in use has not been approved by the EPA and needs regulatory approval. Several minor issues require maintenance, such as locking wells and fixing leaking water pipes that pump water from the treatment plant to the LTUs. Additionally, O&M of the 1-foot soil cover may be needed.</u>
C. Early Indicators of Potential Remedy Problems
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>N/A.</u>
D. Opportunities for Optimization
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>N/A.</u>

APPENDIX G – SITE INSPECTION PHOTOS



PWTS



An extraction pump house



Surge pond



Site fencing



Pumping from the PWTS to the LTUs



Gravel business operating in Former Process Area



Location of slurry wall (subsurface), runs parallel to fence



Leak in pipe that brings water from water treatment plant to LTUs



Pond on LTU A North



Top of LTU B North



Containment berm around LTU B North with liner showing



LTU B South, viewing from LTU B North



LTU A South, viewing from LTU B North, with railroad splitting the LTUs



MP-23



Former Impoundment Area



LTU A South and gravel plant in background



Lot 8, in reuse for parking and materials storage



Lot 8, extraction pump house 2

Well	Date	COD*	YDg*	Acenaphthylene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(k)fluoranthene	Benzo(b)fluoranthene	Benzo(e)pyrene	Chrysene	2,4-Dichlorophenol	Dibenzofuran	2,4-Dibromodiphenyl ether	Dibenzylideneacetone	Fluorene	Fluorene	2-Methylphenanthrene	2-Methylphenanthrene	3,6-Dimethylphenanthrene	4-Methylphenanthrene	Naphthalene	1-Nitrophenanthrene	Phenanthrene	Phenanthrene	Pyrene	2,4,6-Trichlorophenol	2,4,6-Trichlorophenol							
CH-19D cont	01/29/98	13	846	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U							
	05/15/98	16	676	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U						
	09/17/98	10	300	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U					
	11/24/98	11	730	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U					
	09/27/99	9	270	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
	11/14/00	8.37	361	10 U	1.7 U	1.4 U	1.1 U	1.7 U	50 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
	10/30/01	19.3	10 U	1.7 U	1.4 U	1.3 U	1.9 U	50 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
	12/04/02	13	670	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
	08/12/04	7.5	480	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U			
	11/22/05	20 U	500	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		
	12/07/06	20 U	480	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		
	01/02/08	8.5 B	820	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		
	11/06/08	20 U	430	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		
	11/08/11	20 U	1.40	NS	NS	0.095 U	0.095 U	0.095 U	NS	NS	NS	0.095 U	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS			
	10/11/12	12	480	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		
LTU-1	04/22/96	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U				
	07/22/96	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		
	11/13/96	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	02/04/97	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	04/21/97	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	07/22/97	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	11/12/97	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	01/28/98	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	05/15/98	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	09/17/98	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	11/24/98	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	09/27/99	NA	NA	10 U	10 U	10 U	10 U	10 U	50 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	11/28/00	5 U	1070	10 U	1.4 U	1.1 U	1.7 U	50 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	10/30/01	NA	NA	10 U	1.7 U	1.4 U	1.3 U	1.9 U	50 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	12/07/06	NA	NA	10 U	1.7 U	1.4 U	1.3 U	1.9 U	50 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
03/12/04	32	1300	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
09/13/04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
12/19/05	40	1300	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
12/18/06	20 U	930	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
01/23/08	26	1100.3	10 U	10 U	10 U	10 U	10 U	50 U	10 U	2.3 U	10 U	10 U	8.5 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
11/19/08	9.5 B	1000	10 U	0.75 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	9.5 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
12/12/11	20 U	1100	3.8 U	3.8 U	3.8 U	3.8 U	NA	NA	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	
11/13/12	NS	NS	10 U	10 U	10 U	10 U	10 U	30 U	20 U	10 U	10 U	10 U																								

Well	Date	COD*	TDS*	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(k)fluoranthene	Benzo(l)fluoranthene	Benzo(b)fluoranthene	Benzo(e)pyrene	Chrysene	2,4-Dichlorophenol	Dibenzofuran	2,4-Dimethylphenol	Diphenylamine	Fluoranthene	Fluorene	2-Methylnaphthalene	2-Methylphenol	3,4-Dimethylphenol	4-Methylphenol	Naphthalene	N-Nitrosodiphenylamine	Perchlorophenol	Phenanthrene	Phenol	Pyrene	2,4,6-Trichlorophenol	2,4,6-Trichlorophenol
Treatment Level				623									31.2				416	416		520		520	416		1		623	312	1040		
E-6 cont	01/11/08	23	1300	10 U	10 U	10 U	10 U	10 U	50 U	10 U	2.3 J	10 U	10 U	10 U	10 U	NA	1.1 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	52	10 U	10 U	10 U	10 U	10 U	
	11/21/08	24	1100	10 U	10 U	0.56 J	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	1.4 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	51	10 U	10 U	0.85 J	10 U	10 U	
	11/30/11	20 U	1100	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	NA	NA	9.5 U	3.8 U	9.5 U	3.8 U	9.5 U	NA	3.8 U	3.8 U	3.8 U	9.5 U	9.5 U	NA	3.8 U	9.5 U	57	3.8 U	9.5 U	9.5 U	9.5 U	9.5 U	
	11/14/12	16.5	1200	10 U	10 U	10 U	10 U	10 U	30 U	20 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10.5	10 U	10 U	10 U	10 U	10 U	
	07/31/17	17	868	0.5 U	0.2 U	0.2 U	NS	0.2 U	NS	NS	NS	NS	NS	NS	NS	NA	0.2 U	0.2 U	NS	10 U	NS	10 U	0.2 U	NS	22.8	0.2 U	10 U	0.44	NS	NS	
	09/27/20	33	842	0.5 U	0.2 U	0.2 U	0.1 U	0.2 U	NS	NS	NS	NS	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	NS	20.6	0.5 U	10 U	1 U	0.2 U	NS	
W-1	05/12/05	NS	1100	NS	0.10 U	0.10 U	0.10 U	0.10 U	NS	NS	NS	0.10 U	NS	NS	NS	NA	0.10 U	0.10 U	0.10 U	NS	NA	NS	0.10 U	NS	1.3	0.10 U	NS	0.10 U	NS	NS	
	08/31/05	NS	NS	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	4.1	10 U	10 U	10 U	10 U	10 U	
	12/22/05	NS	NS	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	1 U	10 U	10 U	10 U	10 U	10 U	
	04/06/06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	2 U	NS	NS	NS	NS	NS	
	06/15/06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	09/13/06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/19/06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	01/24/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/21/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/13/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
W-2	05/12/05	130	1400	NS	0.37	0.10 U	0.10 U	0.10 U	NS	NS	NS	0.10 U	NS	NS	NS	NA	0.10 U	0.10 U	0.10 U	NS	NA	NS	0.10 U	NS	8300	0.10 U	NS	0.93	NS	NS	
	08/31/05	100	1400	15	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	1100	10 U	10 U	10 U	10 U	11	
	12/22/05	130	1400	44	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	16	10 U	NA	10 U	14	10 U	10 U	NA	10 U	43	10 U	9100	10 U	10 U	10 U	10 U	10 U	
	04/06/06	120	1400	12	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	4400	10 U	10 U	10 U	10 U	10 U	
	06/15/06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	9100	NS	NS	NS	NS	NS	
	09/13/06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	12/19/06	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	01/24/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	11/21/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	12/13/11	82	870	20 U	20 U	20 U	20 U	20 U	NA	NA	50 U	20 U	50 U	20 U	50 U	20 U	NA	20 U	20 U	20 U	50 U	NA	20 U	50 U	18000	20 U	50 U	50 U	50 U	50 U	
	11/30/12	69.3	740	119	10 U	10 U	10 U	10 U	30 U	20 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	323	10 U	10 U	10 U	10 U	10 U	
	03/28/17	135	1330	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	10 U	10 U	10 U	26000	NS	10 U	NS	NS	NS	
	11/11/17	84	1320	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	10 U	15.3	NS	314	NS	10 U	NS	NS	NS	
04/20/20	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	225	NS	NS	NS	NS	NS		
10/04/20	132	981	0.5 U	0.2 U	0.2 U	0.1 U	0.2 U	NS	NS	NS	NS	0.2 U	NS	NS	NS	NS	0.2 U	0.2 U	NS	0.2 U	NS	0.2 U	NS	54.8	ND	ND	ND	ND	NS		
W-3	04/27/05	5.0 U	750	NS	0.10 U	0.10 U	0.10 U	0.10 U	NS	NS	NS	0.10 U	NS	NS	NS	NA	0.10 U	0.10 U	0.10 U	NS	NA	NS	0.32	NS	3.3	0.10 U	NS	0.10 U	NS	NS	
	08/31/05	20 U	960	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	6.9	10 U	10 U	10 U	10 U	10 U	
	12/23/05	20 U	820	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	200	10 U	10 U	10 U	10 U	10 U	
	04/06/06	20 U	660	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10	10 U	10 U	10 U	10 U	10 U	
	06/15/06	20 U	750	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	1 U	10 U	10 U	10 U	10 U	10 U	
	09/13/06	20 U	710	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	1 U	10 U	10 U	10 U	10 U	10 U	
	12/19/06	20 U	660	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	1 U	10 U	10 U	10 U	10 U	10 U	
	01/24/08	20 U	710	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	1 U	10 U	10 U	10 U	10 U	10 U	
	11/28/08	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	12/13/11	33	910	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	NA	NA	9.9 U	4.0 U	9.9 U	4.0 U	9.9 U	NA	4.0 U	4.0 U	4.0 U	9.9 U	9.9 U	NA	4.0 U	9.5 U	1 U	4.0 U	9.9 U	9.9 U	9.9 U	9.9 U	
11/30/12	38.8	650	10 U	10 U	10 U	10 U	10 U	30 U	20 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	594	10 U	10 U	10 U	10 U	10 U		
W-4	05/12/05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NA	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	08/31/05	20 U	580	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	1.6	10 U	10 U	10 U	10 U	10 U	
	12/23/05	20 U	540	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	10 U	NA	10 U	10 U	10 U	1.8	10 U	10 U	10 U</			

Figure H-2: Historical Denver Aquifer Groundwater Monitoring Data

Well	Date	COD _{Mn}	TDS	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(k)fluoranthene	Benzoic Acid	bis(2-Chloroethyl) Ether	bis(2-Ethylhexyl)phthalate	2-Chloronaphthalene	4-Chloronaphthalene	Chrysene	1,2-Dichlorobenzene	1,4-Dichlorobenzene	2,4-Dichlorobenzene	Dibenzofuran	2,4-Dibutylphenol	Fluoranthene	Fluorene	2-Methylnaphthalene	2-Methylphenol	3,4-Methylphenol	4-Methylphenol	Naphthalene	Pentachlorobenzene	Phenanthrene	Phenol	Pyrene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol		
89-1D	04/30/96	10	574	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	07/26/96	6	540	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	14	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	11/25/96	4	528	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	02/17/97	6	558	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	04/23/97	5	566	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	07/28/97	8	580	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	11/19/97	24	2560	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	02/04/98	7	610	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	28	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	05/27/98	5	562	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	09/23/98	5	578	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	5.7 E	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	12/15/98	2	564	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	5.1 E	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	10/01/99	7	580	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	11/29/00	5 U	567	10 U	1.7 U	1.4 U	1.1 U	1.7 U	1.9 U	50 U	10 U	10 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	10/30/01	8.33	564	10 U	1.7 U	1.4 U	1.3 U	1.9 U	2.2 U	50 U	10 U	10 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	12/05/02	8.3	550	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	03/03/04	5.2	590	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
89-3D	04/29/96	10	568	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	50	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	07/30/96	12	612	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	11/27/96	6	574	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	02/18/97	6	578	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	05/05/97	4	578	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	07/25/97	9	600	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	11/25/97	13	554	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	02/06/98	8	628	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	05/26/98	8	608	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	09/24/98	4	638	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	12/08/98	4	618	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	10/13/99	5 U	610	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	22	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	11/06/00	5 U	597	10 U	1.7 U	1.4 U	1.3 U	1.9 U	2.2 U	50 U	10 U	10 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	10/30/01	19.2	10 U	10 U	1.7 U	1.4 U	1.3 U	1.9 U	2.2 U	50 U	10 U	10 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	11/22/02	7.3	609	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	02/26/04	6.7	570	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
89-9D	04/30/96	10	358	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	230	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	08/02/96	33	366	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	25	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
	12/05/96	5	358	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	02/18/97	4	360	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
	04/30/97	6	384	10 U	10 U																														

Well	Date	COD*	TDS*	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzoic Acid	bis(2-Chloroethyl)-Ether	bis(2-Ethylhexyl)phthalate	2-Chloronaphthalene	4-Chloronaphthalene	Chrysene	1,2-Dichlorobenzene	1,4-Dichlorobenzene	2,4-Dichlorophenol	Dibenzofuran	2,4-Dimethylphenol	Fluoranthene	Fluorene	2-Methylnaphthalene	2-Methylphenol	3,4,4-Methylphenol	4-Methylphenol	Naphthalene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol
D-3 cont	09/27/99	38	280	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	28	10 U	10 U	10 U	10 U	NA	10 U	10 U	50 U	10 U	31	10 U	NA	NA	
	11/20/00	41.6	298	10 U	1.7 U	1.4 U	1.1 U	1.7 U	1.9 U	50 U	10 U	10 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	19 U	1.6 U	1.6 U	10 U	NA	10 U	1.8 U	5 U	2 U	10 U	2 U	10 U	10 U	
	10/30/01	28.8	10 U	10 U	1.7 U	1.4 U	1.3 U	1.9 U	2.2 U	50 U	10 U	15 J	10 U	10 U	1.8 U	10 U	10 U	10 U	22	2 U	1.6 U	1.9 U	10 U	NA	10 U	3.9	7.7 U	2 U	23	2 U	10 U	10 U	
	12/09/02	33	300	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	19	10 U	10 U	10 U	10 U	NA	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	
	03/04/04	26	250	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	1 U*	10 U	10 U	10 U	10 U	10 U	
	08/31/04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1 U	NS	NS	NS	NS	NS	
	12/01/05	20 U	260	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	1 U	10 U	10 U	10 U	10 U	10 U	
	12/14/06	20 U	280	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	1 U	10 U	10 U	10 U	10 U	10 U	
	01/10/08	29	260	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	2.2 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2.3 J	10 U	10 U	10 U	NA	10 U	1.2 J	1 U	10 U	10 U	10 U	10 U	10 U	
	11/12/08	15 B	260	0.36 J	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2.3 J	10 U	10 U	10 U	10 U	NA	10 U	2.7 J	1 U	10 U	10 U	10 U	10 U	10 U	
	11/18/11	20 U	230	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	NA	9.8 U	9.8 U	3.8 U	9.5 U	3.8 U	NA	3.8 U	9.5 U	3.8 U	9.5 U	3.8 U	3.8 U	9.5 U	9.5 U	NA	3.8 U	1 U	3.8 U	9.5 U	9.5 U	9.5 U	9.5 U	
	10/31/12	27	270	10 U	10 U	10 U	10 U	10 U	30 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	10 U	1 U	10 U	10 U	10 U	10 U	10 U	
D-4	05/08/96	70	458	130	9.9 E	10 U	10 U	10 U	50 U	10 U	14	10 U	20 U	10 U	10 U	10 U	10 U	54	1100	10 U	55	250	580	680	NA	6600	8400	39	25	10 U	83	180	
	08/06/96	75	376	160	14	10 U	10 U	10 U	50 U	10 U	8.8 E	10 U	20 U	10 U	10 U	10 U	10 U	75	1500	10 U	73	360	690	750	NA	7600	7200	48	24	10 U	110	10 U	
	12/11/96	63	390	130	9.3 E	11	10 U	10 U	50 U	10 U	93	10 U	20 U	10 U	10 U	10 U	10 U	60	850	10 U	62	230	440	400	NA	5100	9500	48	13	10 U	71	10 U	
	02/21/97	62	480	140	10	11	10 U	10 U	50 U	10 U	17	10 U	20 U	10 U	10 U	10 U	10 U	65	1000	10 U	67	300	490	460	NA	6000	6400	45	16	10 U	77	10 U	
	05/02/97	72	442	140	9.4 E	15	10 U	10 U	50 U	10 U	5.2 E	10 U	20 U	10 U	10 U	10 U	10 U	65	890	10 U	63	200	380	390	NA	5400	7100	57	14	10 U	69	10 U	
	08/11/97	80	418	170	12	14	10 U	10 U	50 U	10 U	12	10 U	20 U	10 U	10 U	10 U	10 U	81	1100	10 U	71	320	510	550	NA	6000	7400	53	14	10 U	89	10 U	
	11/26/97	72	418	210	12	10 U	10 U	10 U	50 U	10 U	56	10 U	20 U	10 U	10 U	10 U	10 U	78	1200	10 U	69	390	580	580	NA	5600 E	6700 E	53	18	10 U	85	10 U	
	02/11/98	62	488	230	13	19	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	83	1100	6.1 E	92	400	470	460	NA	6600	7100	79	10	10 U	92	10 U	
	06/03/98	60	426	190 E	12	18	10 U	10 U	50 U	10 U	17	10 U	20 U	10 U	10 U	10 U	10 U	82	1800	10 U	81	490 E	450 E	420 E	NA	7700	7200	68	16	10 U	81	10 U	
	09/30/98	65	424	220	11	13	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	93	1100	10 U	89	390	480	440	NA	8300	6300	65	12	10 U	95	10 U	
	12/17/98	62	370	250	13	13	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	110	1300	10 U	95	550	500	490	NA	8200	5600	68	10 U	10 U	110	10 U	
	10/12/99	125	460	220	13	68	10 U	10 U	R	10 U	10 U	10 U	10 U	10 U	10 U	10 U	R	88	R	10 U	98	10 U	10 U	NA	560	7700	4300	10 U	20	10 U	83	88	
	11/30/00	112	452	400 U	69 U	57 U	44 U	69 U	76 U	200 U	400 U	400 U	400 U	400 U	72 U	400 U	400 U	400 U	840	77 U	64 U	310	480	NA	540	5900	3200	80 U	400 U	80 U	400 U	400 U	
	10/29/01			400 U	69 U	57 U	52 U	76 U	88 U	2000 U	400 U	400 U	400 U	400 U	72 U	400 U	400 U	400 U	950	80 U	67	360	560	NA	600	8000	4200	80 U	400 U	80 U	400 U	400 U	
	10/30/01	101	435	150	9	1.4 U	1.3 U	1.9 U	2.2 U	50 U	10 U	10 U	10 U	10 U	1.8 U	10 U	10 U	25	65	950 E	2.5	62	340 E	540 E	NA	570 E	1200 E	2900 E	39	27	2 U	91	10 U
	12/12/02	110	10 U	160	17	230 E J	10 U	10 U	930 E J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	32	84	1400	10 U	84	270 E J	440 E J	NA	750	8800	4900	53	31	10 U	130	10 U
	03/09/04	89	400	120	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	15	44	630	10 U	47	500 U	500 U	NA	500 U	5100	48*	10 U	20	10 U	100	500 U
	09/15/04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1000	NS	NS	NS	NS	NS	
	12/15/05	91	420	140	10 U	10 U	10 U	10 U	150 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	57	1000	10 U	57	330	670	NA	670	6500	4700	36	25	10 U	110	10 U	
	12/12/06	42	350	110	80 U	80 U	80 U	80 U	400 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U	80 U	NA	410	160	3800	80 U	80 U	80 U	130	80 U
	01/09/08	88	390	110	7.0 J	5.3 J	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	34	34	880	2.2 J	38	170	590	NA	510	3300	3600	21	24	10 U	140	3.0 J
	11/13/08	86	410	140	11	7.2 J	10 U	10 U	50 U	10 U	0.77 J	10 U	10 U	10 U	10 U	10 U	10 U	53	60	510	1.8 J	59	300 J	660	NA	590	5300	3600	36	28	10 U	180	1.0 J
	11/11/11	84	380	160	3.8 U	6.9	3.8 U	3.8 U	3.8 U	NA	9.6	9.6 U	3.8 U	9.6 U	3.8 U	NA	3.8 U	21	62	9.6 U	3.8 U	60	280	490	9.6 U	NA	5500	2000	36	22	9.6 U	9.6 U	9.6 U
	11/01/12	98.8	440	134	10 U	10 U	10 U	10 U	1940	1.0 U	10 U	184	20 U	10 U	10 U	10 U	10 U	52.9	10 U	10 U	56.6	258	556	NA	154	5070	52.7	30.7	10 U	10 U	232	10 U	
	03/28/17	529	405	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	09/04/20	71.8	276	99.3	3.69	2.11	0.1 U	0.2 U	0.1 U	0.2 U	NS	NS	NS	NS	0.2 U	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
D-5	04/30/96	16	424	10 U	10 U	10 U	10 U	10 U	50 U	10 U	13	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	310	10 U	10 U	10 U	47	34	
	07/29/96	18	376																														

Well	Date	COD*	TDS*	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b)pyrene	Benzo(k)fluoranthene	Benzoic Acid	bis(2-Chloroethyl)-Ether	bis(2-Ethylhexyl)phthalate	2-Chloronaphthalene	4-Chloronitrobenzene	Chrysene	1,2-Dichlorobenzene	1,4-Dichlorobenzene	2,4-Dichlorophenol	Dibenzofuran	2,4-Dimethylphenol	Fluoranthene	Fluorene	2-Methylnaphthalene	2-Methylphenol	3,4,4-Methylphenol	4-Methylphenol	Naphthalene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol		
Treatment Level				623		3120														416	416		520		520	41.6	1		623	312	1040				
IT-2	05/13/96	280	454	150	11	17	10 U	10 U	10 U	50 U	10 U	30	10 U	20 U	10 U	10 U	10 U	10 U	76	2800	17	78	270	3500	5700	NA	4100	12000	94	1400	9.9 E	410	390		
	08/06/96	304	388	190	14	20	10 U	10 U	10 U	50 U	10 U	25	10 U	20 U	10 U	10 U	10 U	10 U	110	3000	20	100	300	3600	6300	NA	4100	14000	120	1700	13	440	10 U		
	12/11/96	300	364	130	9.4 E	18	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	73	3400	23	72	430	4000	5700	NA	5800	22000	110	1500	15	550	10 U		
	02/21/97	272	484	290	17	21	10 U	10 U	10 U	50 U	10 U	30	10 U	20 U	10 U	10 U	10 U	10 U	130	3600	23	130	420	4100	6100	NA	6000	14000	140	1600	13	680	10 U		
	05/02/97	272	412	160	12	22	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	99	2300	13	110	200	2400	3600	NA	3800	11000	140	1000	17	400	10 U		
	08/11/97	268	482	220	15	21	10 U	10 U	10 U	50 U	10 U	36	10 U	20 U	10 U	10 U	10 U	10 U	120	1600	22	110	390	1700	2400	NA	4900	8700	130	620	17	140	10 U		
	11/26/97	248	858	270	17	10 U	10 U	10 U	50 U	10 U	16	10 U	20 U	10 U	10 U	10 U	10 U	10 U	130	3300	19	110	400	3900	5600	NA	5100	14000	140	1300	14	550	10 U		
	02/12/98	258	514	340	16	28	10 U	10 U	10 U	50 U	10 U	16	10 U	20 U	10 U	10 U	10 U	10 U	120	3500	25	140	350	3700	5600	NA	5200	16000	220	1100	19	790	10 U		
	06/03/98	244	464	220 E	16	24	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	120	3300	19	130	430 E	4000	5200	NA	5400	17000	180	1100	16	540 E	10 U		
	09/30/98	251	450	220	18	37	10 U	10 U	10 U	50 U	10 U	110	10 U	20 U	10 U	10 U	10 U	10 U	130	4000	27	140	490	4500	6500	NA	6000	16000	240	1400	16	860	10 U		
	12/17/98	252	440	270	14	20	10 U	10 U	10 U	50 U	10 U	19	10 U	20 U	10 U	10 U	10 U	10 U	130	3800	18	140	480	4400	6500	NA	5200	14000	170	1200	15	710	10 U		
	10/12/99	294	470	220	14	10 U	10 U	10 U	10 U	50 U	10 U	R	10 U	10 U	10 U	10 U	10 U	R	99	R	10 U	120	R	10 U	NA	7100	10 U	12000	10 U	10 U	13	10 U	10 U		
	11/28/00	299	477	220 E	16	25	4	1.7 U	1.9 U	50 U	10 U	13	10 U	10 U	3.4	10 U	10 U	10 U	120	3500	47	120	420	6000	NA	12000	6500	7800	180	4300	22	490 EJ	450 EJ		
	10/29/01	311	472	10 U	1.7 U	1.4 U	1.3 U	1.9 U	2.2 U	50 U	10 U	10 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	2 U	1.6 U	1.9 U	10 U	NA	10 U	16	21	2 U	10 U	2 U	10 U	10 U		
	12/12/02	280 J	450	170	19	420 EJ	10 U	10 U	10 U	180	42	10 U	10 U	2200	10 U	10 U	10 U	10 U	95	4600	18	97	240 EJ	6600	NA	11000	7700	19000	110	5500	15	380 EJ	10 U		
	03/11/04	260 Q	490	83	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	38	3300	16	35	120	4600	NA	9200	2100	85*	51	3300	10 U	620 J	10 U		
	09/16/04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	12/20/05	260 Q	470	100	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	47	3000	10 U	50	160	5100	NA	11000	2500	14000	61	3100	10 U	570	10 U		
	12/12/06	270 Q	480	200 U	200 U	200 U	200 U	200 U	200 U	1000 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	2000	200 U	200 U	280	5900	NA	11000	3700	12000	200 U	4300	200 U	980	200 U		
	01/09/08	52	76	11 J	40 U	40 U	40 U	40 U	40 U	200 U	40 U	7.6 J	40 U	40 U	40 U	40 U	40 U	40 U	6.2 J	110	8.2 J	7.2 J	14 J	310	NA	550	210	86	14 J	220	7.2 J	34 J	40 U		
	11/20/08	270 Q	410	97	7.1 J	8.3 J	0.81 J	10 U	10 U	50 U	10 U	1.6 J	10 U	10 U	0.61 J	10 U	10 U	10 U	18	49	4200	8.9 J	46	200 J	6000	NA	11000	3100	13000	51	4600	5.8 J	760 J	10 U	
	11/23/11	210	420	120	39 U	39 U	39 U	39 U	39 U	NA	97 U	97 U	39 U	97 U	39 U	NA	39 U	97 U	61	4100	39 U	88	200	5700	11000	NA	3000	16000	72	4000	97 U	760	97 U		
	11/05/12	290	480	112	10 U	10 U	10 U	10 U	10 U	1350	10 U	10 U	169	20 U	10 U	10 U	10 U	10.4	59.4	3530	11.4	61.8	255	4740	NA	2210	3380	10900	71.3	279	10 U	818	64.9		
	04/03/17	239	434	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
	09/27/20	203	330	95.1	8.26	15.7	0.1 U	0.2 U	0.2 U	NS	NS	NS	NS	NS	NS	5.44	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	289	287	264	86.5	10 U	15	82	NS
	IT-9	05/13/96	10	866	10 U	10 U	10 U	10 U	10 U	50 U	10 U	34	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	42 E	10 U	10 U	10 U	10 U	10 U		
		08/07/96	15	846	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	120	10 U	10 U	10 U	10 U	10 U		
12/12/96		12	834	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	240	10 U	10 U	10 U	10 U	10 U			
02/10/97		10	868	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	220	10 U	10 U	10 U	10 U	10 U			
04/29/97		22	838	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	200	10 U	10 U	10 U	10 U	10 U			
07/24/97		16	922	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	160	10 U	10 U	10 U	10 U	10 U			
11/19/97		20	934	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	120	10 U	10 U	10 U	10 U	10 U			
02/04/98		21	1040	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	170	10 U	10 U	10 U	10 U	10 U			
05/22/98		12	992	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	170	10 U	10 U	10 U	10 U	10 U			
09/22/98		9	998	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	230	10 U	10 U	10 U	10 U	10 U			
12/07/98		11	976	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	200	10 U	10 U	10 U	10 U	10 U			
10/08/99		10	990	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	15	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	10 U	200	10 U	10 U	10 U	10 U	10 U			
11/20/00		15.3	938	10 U	1.7 U	1.4 U	1.1 U	1.7 U	1.9 U	50 U	10 U	10 U	10 U	1.8 U	10 U	10 U	10 U	10 U	10 U	10 U	1.9 U	1.6 U	1.6 U	10 U	NA	10 U	1.8 U	100	2 U	10 U	2 U	10 U	10 U		
10/30/01	18.9	911	10 U																																

Figure H-3: Historical Arapahoe Aquifer Groundwater Monitoring Data

Well	Date	COD*	TDS*	Benzoic Acid	Benzyl Alcohol	bis(2-Ethylhexyl)-phthalate	Naphthalene	Phenol	4-Methylphenol
Treatment Level							41.6	623	
90-10AR	05/03/96	8	196	50 U	20 U	10 U	10 U	10 U	n/a
	08/01/96	4	166	50 U	20 U	10 U	10 U	10 U	n/a
	12/03/96	2	202	50 U	20 U	10 U	10 U	10 U	n/a
	02/18/97	3	174	50 U	20 U	10 U	10 U	10 U	n/a
	06/15/97	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/a
	08/04/97	2	210	50 U	20 U	10 U	10 U	10 U	n/a
	12/15/97	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/a
	02/09/98	41	262	50 U	20 U	8.7 E	10 U	10 U	n/a
	06/02/98	6	182	50 U	20 U	44	10 U	10 U	10 U
	09/29/98	2	350	50 U	20 U	120	10 U	10 U	10 U
	12/14/98	3	154	50 U	20 U	10 U	10 U	10 U	10 U
	10/13/99	5 U	200	50 U	20 U	23	10 U	10 U	10 U
	11/10/00	5 U	177	50 U	10 U	10 U	1.8 U	10 U	10 U
	10/30/01	7.71	210	50 U	10 U	110	1.8 U	10 U	10 U
	01/31/03	3.5 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U
	02/23/04	3.5 U	220	50 U	10 U	10 U	10 U	10 U	10 U
	11/17/05	20 U	210	50 U	10 U	10 U	10 U	10 U	10 U
	12/01/06	20 U	190	50 U	10 U	10 U	10 U	10 U	10 U
	12/21/07	180 Q	150	50 U	10 U	1.7 J,B	10 U	10 U	10 U
	08/24/20	40.3	555	NS	NS	NS	0.2 U	10 U	0.2 U
90-7AR	05/08/96	2	176	50 U	20 U	42	10 U	10 U	n/a
	08/01/96	1 U	148	50 U	20 U	10 U	10 U	10 U	n/a
	12/09/96	4	148	50 U	20 U	12	10 U	10 U	n/a
	02/13/97	2	182	50 U	20 U	10 U	10 U	10 U	n/a
	04/29/97	8	132	50 U	20 U	10 U	10 U	10 U	n/a
	07/31/97	2	748	50 U	20 U	11	10 U	10 U	n/a
	11/24/97	22	158	50 U	20 U	6.6 E	10 U	10 U	n/a
	02/03/98	6	240	50 U	20 U	10 U	10 U	10 U	n/a
	06/04/98	6	166	50 U	20 U	19	10 U	10 U	n/a
	09/25/98	2	146	50 U	20 U	25	10 U	10 U	n/a
	12/15/98	1 U	170	50 U	20 U	20	10 U	10 U	n/a
	10/05/99	5 U	190	50 U	20 U	10 U	10 U	10 U	10 U
	11/29/00	5 U	167	50 U	10 U	10 U	1.8 U	10 U	10 U
	10/30/01	5 U	179	50 U	10 U	10 U	1.8 U	10 U	10 U
	11/21/02	3.5 U	210	50 U	10 U	10 U	10 U	10 U	10 U
	02/16/04	3.5 U	190	50 U	10 U	10 U	10 U	10 U	10 U
	10/28/05	20 U	190	50 U	10 U	10 U	10 U	10 U	10 U
	11/20/06	20 U	190	50 U	10 U	10 U	10 U	10 U	10 U
	11/30/07	20 U	170 J	50 U	10 U	1.9 J,B	10 U	10 U	10 U
	10/23/08	20 U	200 J	50 U	10 U	10 U	0.49 J	10 U	10 U
10/21/11	20 U	200	N/A	N/A	NS	0.21	NS	N/A	
10/19/12	3 U	220	30 U	20 U	10 U	10 U	10 U	10 U	
06/05/17	18	234	N/A	N/A	NA	0.2 U	10 U	10 U	
07/17/20	55.8	181	N/A	N/A	N/A	0.2 U	NS	NS	
90-8AR	05/07/96	2	156	50 U	20 U	43	10 U	10 U	n/a
	08/02/96	4	124	50 U	20 U	10 U	10 U	10 U	n/a
	12/05/96	2	152	50 U	20 U	10 U	10 U	10 U	n/a
	02/13/97	2	152	50 U	20 U	13	10 U	10 U	n/a
	04/29/97	10	140	50 U	20 U	10 U	10 U	10 U	n/a
	07/31/97	7	138	50 U	20 U	10 U	10 U	10 U	n/a
	11/25/97	1 U	136	50 U	20 U	10 U	10 U	10 U	n/a
	02/05/98	4	178	50 U	20 U	10 U	10 U	10 U	n/a
	05/21/98	3	132	50 U	20 U	10 U	10 U	10 U	n/a
	09/25/98	8	146	50 U	20 U	10 U	10 U	10 U	n/a
	12/09/98	1 U	144	50 U	20 U	10 U	10 U	10 U	n/a
	10/11/99	5 U	170	50 U	20 U	10 U	10 U	10 U	10 U
	11/21/00	9.36	195	50 U	10 U	10 U	1.8 U	10 U	10 U
	10/30/01	5 U	10 U	50 U	10 U	10 U	1.8 U	10 U	10 U
	11/22/02	3.5 U	170	50 U	10 U	10 U	10 U	10 U	10 U
	02/23/04	3.5 U	180	50 U	10 U	10 U	10 U	10 U	10 U
	11/02/05	20 U	170	50 U	10 U	10 U	10 U	10 U	10 U
	11/20/06	20 U	180	50 U	10 U	10 U	10 U	10 U	10 U
	11/30/07	20 U	180 J	50 U	10 U	3.9 J,B	10 U	10 U	10 U
	10/23/08	38	170 J	50 U	10 U	12	10 U	10 U	10 U
10/21/11	120	190	N/A	N/A	NS	0.5	NS	N/A	
10/12/12	54	430	30 U	20 U	10 U	10 U	10 U	10 U	
08/17/20	77.1	183	NS	NS	NS	0.2 U	10U	0.2 U	

Well	Date	COD*	TDS*	Benzoic Acid	Benzyl Alcohol	bis(2-Ethylhexyl)-phtalate	Naphthalene	Phenol	4-Methylphenol
Treatment Level						41.6		623	
A-1	04/24/96	20	158	50 U	20 U	6.3 E	10 U	10 U	n/a
	07/25/96	11	182	50 U	20 U	10 U	10 U	10 U	n/a
	11/22/96	4	136	50 U	20 U	49	10 U	10 U	n/a
	02/10/97	2	144	50 U	20 U	96	10 U	10 U	n/a
	04/22/97	2	160	50 U	20 U	12	10 U	10 U	n/a
	07/30/97	7	174	50 U	20 U	15	10 U	10 U	n/a
	11/24/97	10	154	50 U	20 U	13	10 U	10 U	n/a
	02/02/98	19	200	50 U	20 U	10 U	10 U	10 U	n/a
	05/20/98	7	190	50 U	20 U	23	10 U	10 U	n/a
	09/25/98	4	138	50 U	20 U	22	10 U	10 U	n/a
	12/09/98	2	130	50 U	20 U	14	10 U	10 U	n/a
	10/06/99	5 U	180	50 U	20 U	19	10 U	10 U	10 U
	11/21/00	6.06	192	50 U	10 U	16	1.8 U	10 U	10 U
	10/31/01	5 U	183	50 U	10 U	10 U	1.9	10 U	10 U
	11/20/02	3.5 U	170	50 U	10 U	10 U	10 U	10 U	10 U
	02/16/04	3.5 U	180	50 U	10 U	10 U	10 U	10 U	10 U
	10/18/05	20 U	180	50 U	10 U	11	10 U	10 U	10 U
	11/09/06	20 U	170	50 U	10 U	10 U	10 U	10 U	10 U
	11/16/07	20 U	150	50 U	10 U	4.0 J	10 U	10 U	10 U
	10/17/08	20 U	180 J	50 U	10 U	10 U	10 U	10 U	10 U
10/25/11	20 U	180	N/A	N/A	NS	0.16	NS	N/A	
10/22/12	12	180	30 U	20 U	10 U	10 U	10 U	10 U	
WELL DAMAGED OR PLUGGED at 142 ft bgs									
A-2	04/24/96	32	382	50 U	20 U	24	10 U	10 U	n/a
	07/24/96	14	356	50 U	20 U	40	10 U	10 U	n/a
	11/21/96	12	320	50 U	20 U	13	10 U	10 U	n/a
	02/07/97	11	406	50 U	20 U	92	10 U	10 U	n/a
	04/30/97	11	322	50 U	20 U	65	10 U	10 U	n/a
	07/30/97	21	310	50 U	20 U	23	10 U	10 U	n/a
	11/20/97	11	284	50 U	20 U	10	10 U	10 U	n/a
	02/03/98	18	360	50 U	20 U	37	10 U	10 U	n/a
	05/22/98	18	266	50 U	20 U	68 E	10 U	10 U	n/a
	09/28/98	12	144	50 U	20 U	6.6 E	10 U	10 U	n/a
	12/11/98	4	242	50 U	20 U	100	10 U	10 U	n/a
	10/04/99	6	250	50 U	20 U	29	10 U	10 U	10 U
	11/28/00	14.3	228	50 U	10 U	45	1.8 U	10 U	10 U
	10/30/01	5 U	243	50 U	10 U	25	1.8 U	10 U	10 U
	11/19/02	3.5 U	210	50 U	10 U	10 U	10 U	10 U	10 U
	02/13/04	3.5 U	280	50 U	10 U	10 U	10 U	10 U	10 U
	10/28/05	20 U	330	50 U	10 U	12	10 U	10 U	10 U
	11/17/06	20 U	260	50 U	10 U	10 U	10 U	10 U	10 U
	11/29/07	20 U	260	50 U	10 U	5.2 J,B	10 U	10 U	10 U
	10/17/08	25	270 J	50 U	10 U	1.3 J	0.45 J	10 U	10 U
11/10/11	20 U	260	N/A	N/A	10 U	4 U	10 U	N/A	
10/16/12	27.8	300	30 U	20 U	10 U	10 U	10 U	10 U	
11/10/17	NS	NS	NS	NS	NS	10 U	10 U	10 U	
08/04/20	77.1	223	NS	NS	NS	0.2 U	10 U	0.2 U	
A-3	04/26/96	20	220	50 U	20 U	180	10 U	10 U	n/a
	07/24/96	22	222	50 U	20 U	13	10 U	8.2 E	n/a
	11/21/96	11	198	50 U	20 U	25	10 U	10 U	n/a
	02/11/97	17	138	50 U	20 U	40	10 U	10 U	n/a
	04/28/97	15	160	50 U	20 U	5.7 E	10 U	10 U	n/a
	07/29/97	6	192	50 U	20 U	30	10 U	10 U	n/a
	11/20/97	10	178	50 U	20 U	19	10 U	10 U	n/a
	02/02/98	33	240	50 U	20 U	19	10 U	10 U	n/a
	05/20/98	10	212	50 U	20 U	10 U	10 U	10 U	n/a
	09/28/98	5	154	50 U	20 U	11	10 U	10 U	n/a
	12/10/98	7	166	50 U	20 U	10	10 U	10 U	n/a
	09/29/99	8	200	50 U	20 U	21	10 U	10 U	10 U
	11/27/00	5 U	215	50 U	10 U	19	1.8 U	10 U	10 U
	10/30/01	5 U	198	50 U	10 U	10 U	1.8 U	10 U	10 U
	11/19/02	16	250 J	50 U	10 U	11	10 U	10 U	10 U
	02/13/04	3.5 U	260	50 U	10 U	13	10 U	10 U	10 U
	10/28/05	20 U	200	50 U	10 U	15	10 U	10 U	10 U
	11/17/06	26	260	50 U	10 U	10 U	10 U	10 U	10 U
	11/29/07	27	210 J	50 U	10 U	23 B	10 U	44	14
	05/23/08	NS	NS	50 U	10 U	16	8.8 J	4.4 J	10 U
10/17/08	20 U	210 J	50 U	10 U	3.0 J	8.1 J	2.5 J	0.55 J	
11/10/11	20 U	250	N/A	N/A	9.7 U	3.9 U	9.7 U	N/A	
10/16/12	81.1	760	30 U	20 U	10 U	10 U	10 U	10 U	
11/10/17	61	1280	NS	NS	NS	10 U	10 U	10 U	
07/22/20	3 U	178	NS	NS	NS	0.2 U	NS	NS	

Well	Date	COD*	TDS*	Benzoic Acid	Benzyl Alcohol	bis(2-Ethylhexyl)-phthalate	Naphthalene	Phenol	4-Methylphenol
Treatment Level									
A-4	04/23/96	48	590	50 U	20 U	280	41.6	623	n/a
	07/23/96	32	662	50 U	20 U	72	10 U	81	n/a
	11/20/96	29	486	50 U	20 U	29	10 U	240	n/a
	02/11/97	41	398	50 U	20 U	26	10 U	210	n/a
	05/01/97	25	552	50 U	20 U	5.4 E	10 U	130	n/a
	08/05/97	32	458	50 U	20 U	8 E	10 U	160	n/a
	11/25/97	38	326	50 U	20 U	10 U	10 U	410	n/a
	02/10/98	40	320	31 E	20 U	64	10 U	420	n/a
	05/28/98	17	326	50 U	20 U	20	10 U	180	n/a
	09/17/98	21	282	50 U	20 U	250	10 U	110	n/a
	12/11/98	27	234	50 U	20 U	19	10 U	350	n/a
	10/12/99	27	280	64	20 U	31	10 U	940	10 U
	11/27/00	9.03	255	50 U	10 U	10 U	1.8 U	10 U	10 U
	10/30/01	8.07	50 U	500 U	100 U	100 U	18 U	1000	10 U
	11/20/02	3.5 U	210	50 U	10 U	10 U	10 U	10 U	10 U
	02/23/04	3.5 U	230	50 U	10 U	10 U	10 U	10 U	10 U
	11/02/05	640	550	50 U	10 U	10 U	10 U	10 U	10 U
	11/20/06	61	270	50 U	10 U	14	10 U	10 U	10 U
	12/05/07	20 U	10 U	50 U	10 U	19	10 U	10 U	10 U
	10/23/08	82	200 J	20 J	10 U	18	10 U	10 U	10 U
10/21/11	20 U	190	N/A	N/A	NS	0.095	NS	N/A	
10/12/12	75	230	30 U	20 U	10 U	10 U	10 U	10 U	
08/24/20	134	168	NS	NS	NS	0.2 U	10 U	0.2 U	
A-5	5/17/2005	5.0 U	190	NS	NS	NS	0.28	NS	10 U
	8/24/2005	20 U	180	50 U	10 U	10 U	10 U	10 U	10 U
	10/18/2005	20 U	200	50 U	10 U	10 U	10 U	10 U	10 U
	4/5/2006	20 U	180	50 U	10 U	10 U	10 U	10 U	10 U
	6/7/2006	20 U	190	50 U	10 U	10 U	10 U	10 U	10 U
	9/6/2006	20 U	200	50 U	10 U	10 U	10 U	10 U	10 U
	11/9/2006	20 U	180	50 U	10 U	10 U	10 U	10 U	10 U
	11/16/2007	20 U	170	50 U	10 U	10 U	10 U	10 U	10 U
	10/23/2008	20 U	200 J	50 U	10 U	10 U	10 U	10 U	10 U
	10/25/2011	20 U	190	N/A	N/A	NS	0.18	NS	N/A
	10/19/2012	4.51	220	30 U	20 U	10 U	10 U	10 U	10 U
	6/5/2017	32	228	N/A	N/A	NA	0.2 U	10 U	10 U
	7/22/2020	3 U	176	NS	NS	NS	0.228	NS	S

E - The reported result is above the calibration range

The 1996-1998 data have not been validated.

J - The reported value is estimated and result is less than RL

n/s - Not sampled

* - COD an TDS reported in mg/L.

U - The analyte was not detected and the quantitation limit is reported.

B - Method Blank contamination. The associated method blank contains the target analyte at a reportable level.

Q - Elevated reporting limit. The reporting limit is elevated due to high analyte levels.

Bold Refers to analyte concentration above the laboratory detection level.

Note: The results are presented for only those analytes where a minimum of one result is above the instrument detection limit for each aquifer.

APPENDIX I – DETAILED ARARS REVIEW TABLES

Groundwater treatment levels were established in the 1992 OU2 ROD. Some were based on ARARS, and some were risk-based. However, the 1992 OU2 ROD also notes that MCLs and Colorado basic groundwater standards are ARARS. Table I-1 below includes all groundwater treatment levels compared to current federal MCLs and current Colorado basic groundwater standards. For contaminants where no federal or state standards were available (carbazole, 2-methylphenol and 4-methylphenol), a screening-level risk assessment was conducted instead to evaluate risk (see Appendix J).

Of the groundwater treatment levels based on ARARS, standards for PCP and trichloroethylene have not changed. The state and federal standards for 2,3,7,8-TCDD equivalent are now more stringent than the treatment level in the ROD. This cleanup goal may need to be updated to reflect the current standards.

Of the groundwater treatment levels not based on ARARS, seven treatment levels were greater than current standards (for acenaphthene, anthracene, fluorene, fluoranthene, pyrene, 2,4-dichlorophenol and 2,4,5-trichlorophenol), and three treatment levels were less than current standards (for tetrachloroethylene, naphthalene and phenol). The treatment standards that exceed current standards may warrant further review to determine whether they should be updated to reflect current standards.

Table I-1: Groundwater Treatment Levels Compared to Current MCLs and Colorado Basic Groundwater Standards

Contaminant	Groundwater Treatment Levels (µg/L) ^a	Basis	Current MCL (µg/L) ^b	Current Colorado Basic Groundwater Standard (µg/L) ^c
2,3,7,8-TCDD equivalent	5 x 10 ⁻⁵	Proposed MCL	3 x 10 ⁻⁵	2.2 x 10 ⁻⁷ to 3.0 x 10 ⁻⁵
Trichloroethylene	5.0	Colorado basic groundwater standard	5	5
Tetrachloroethylene	1.6	Risk-based level	5	17 or 5 ^d
Carbazole	4.1	Risk-based level	None	None
Naphthalene	41.6	Risk-based level	None	140
Acenaphthene	623.0	Risk-based level	None	420
Fluorene	416.0	Risk-based level	None	280
Anthracene	3120.0	Risk-based level	None	2,100
Fluoranthene	416.0	Risk-based level	None	280
Pyrene	312.0	Risk-based level	None	210
Phenol	623.0	Risk-based level	None	2,100
2-Methylphenol	520.0	Risk-based level	None	None
4-Methylphenol	520.0	Risk-based level	None	None
2,4-Dichlorophenol	31.2	Risk-based level	None	21
2,4,5-Trichlorophenol	1040.0	Risk-based level	None	700
PCP	1.0	Proposed MCL	1	0.088 to 1.0
<p><i>Notes:</i></p> <ul style="list-style-type: none"> a. From Table 13 of the 1992 OU2 ROD. b. Accessed at https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations on 11/12/20. c. Accessed at https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=8819&fileName=5%20CCR%201002-41 on 11/12/20. d. 5 µg/L is the drinking water MCL. <p>µg/L = micrograms per liter</p>				

APPENDIX J – SCREENING-LEVEL RISK REVIEWS

Soil

Soil excavation action levels were selected during the remedial design. To evaluate whether the action levels selected remain valid, the levels were compared to the EPA’s current regional screening levels (RSLs) for composite worker soil. RSLs incorporate current toxicity values and standard default exposure factors. Composite worker soil RSLs were selected for this evaluation rather than residential RSLs because the Site is currently in industrial use and residential use of the Site is prohibited. As shown in Table J-1, the excavation action levels for surface soil correspond to risk below or within the EPA’s acceptable risk range and therefore remain valid. The excavation action levels for subsurface soil correspond to risk outside the EPA’s acceptable risk range. However, this does not affect current protectiveness. These standards are for subsurface soil rather than surface soil, and surface soil was addressed with standards that remain valid. An institutional control currently in place on the property restricts excavation.

Table J-1: Screening-Level Risk Evaluation for Soil Excavation Levels

Contaminant	Media	Soil Excavation Action Levels (µg/kg)	Composite Worker Soil RSL (µg/kg) ^a		Cancer Risk ^b	Noncancer HQ ^c
			1 x 10 ⁻⁶ Risk	HQ = 1.0		
2,3,7,8-TCDD equivalents	Surface soil	0.6	0.022	0.72	2.7 x 10 ⁻⁵	0.83
	Subsurface soil	4.4			2.0 x 10⁻⁴	6.11

Notes:

a. November 2020 EPA RSLs were used for this screening. They are available at <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables> (accessed 11/12/20).

b. The cancer risk was calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10⁻⁶ risk: cancer risk = (action level ÷ cancer-based RSL) × 10⁻⁶.

c. The HQs were calculated using the following equation: HQ = action level ÷ noncancer-based RSL.

Bold = exceedance of EPA’s upper risk limit for cancer risk (1 x 10⁻⁴) or noncancer risk target of HQ equal to 1.
 HQ = hazard quotient

Groundwater

Groundwater treatment levels were established in the 1992 OU2 ROD. Some were based on ARARS, and some were risk based. For contaminants where no federal or state standards were available during this FYR (carbazole, 2-methylphenol and 4-methylphenol), a screening-level risk assessment was conducted instead to evaluate risk (Table J-2). To evaluate whether the treatment levels selected remain valid, the levels were compared to the EPA’s current RSLs for resident tap water. RSLs incorporate current toxicity values and standard default exposure factors. As shown in Table J-2, the groundwater treatment levels correspond to risk below the EPA’s acceptable risk range. Therefore, they remain valid. Carbazole could not be evaluated via ARARS or screening-level risk assessment, as standards and RSLs for carbazole are not available. The oral slope factor for carbazole appears to still be 0.2, which is the same as in the ROD, and therefore the toxicity has not changed.⁵

Table J-2: Screening-Level Risk Evaluation for Groundwater Treatment Levels

Contaminant	Groundwater Treatment Levels (µg/L)	Resident Tapwater RSL (µg/L) ^a		Cancer Risk	Noncancer HQ ^b
		1 x 10 ⁻⁶ Risk	HQ = 1.0		
2-Methylphenol	520	-	930	N/A	0.6
4-Methylphenol	520	-	1,900	N/A	0.3

Notes:

⁵ <https://cfpub.epa.gov/ncea/pprtv/documents/Carbazole.pdf>

- a. November 2020 EPA RSLs were used for this screening. They are available at <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables> (accessed 11/12/20).
- b. The HQs were calculated using the following equation: $HQ = \text{action level} \div \text{noncancer-based RSL}$.
- = cancer RSL not established for contaminant.
N/A = unable to calculate cancer risk due to lack of cancer RSL.

APPENDIX K – SEDIMENT DATA AND CLEANUP GOAL REVIEW⁶

The 1992 OU2 ROD included a sediment excavation action level for Fisher Ditch of 23.2 mg/kg of carbazole, based on ecological risk factors. Additional sampling of Fisher Ditch sediments in July 1993 showed remediation would not be necessary because contaminant levels were below the sediment excavation level; see Table 1 of this appendix for analytical results. The maximum concentration was <0.81 mg/kg, compared to the cleanup goal of 23.2 mg/kg.

There are currently no federal sediment guidelines. The maximum detection of <0.81 mg/kg is below carbazole benthic toxicity screening levels included in the 2018 Sediment Evaluation Framework for the Pacific Northwest.⁷ This indicates the sediment cleanup goal remains valid.

Segment	1		2		3		4	
	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"	0-6"	6-12"
Carbazole	<0.81	<0.71	<0.73	<0.71	<0.69	<0.62	<0.54	<0.46
Pentachloroophenol	<4.00	<3.60	<3.70	<3.60	<3.50	<3.10	<2.70	<2.30
Benzo(a)pyrene	<0.81	<0.71	<0.73	<0.71	<0.69	<0.62	<0.54	<0.46
Fluoroanthene	<0.81	<0.71	<0.73	1.5	<0.69	<0.62	<0.54	<0.46
Pyrene	<0.81	<0.71	<0.73	1.1	<0.69	<0.62	<0.54	<0.46

Notes:

1. Carbazole action level is 23.2 mg/kg.
2. Concentration preceded by < is Practical Quantitation Limit.

To further evaluate, sediment quality guidelines for freshwater from MacDonald et al. were compared to the practical quantitation limits (PQLs) in Table 1 (Table K-1).⁸ Those guidelines provide a Threshold Effect Concentration (TEC) and a Probable Effect Concentration (PEC). TEC predicts absence of sediment toxicity and PEC predicts sediment toxicity. For carbazole, the benchmark included above was used.

Overall, the PQLs reported in Table 1 are above TEC benchmarks. For pentachlorophenol, the PQLs are above the benchmarks for both TEC and PEC. For carbazole, the PQL is well below the cleanup action level of 23.2 mg/kg. According to the benchmark from the Northwest Regional Sediment Evaluation Team Agencies 2018 document, the PQL is still below the toxicity benchmark (benchmark = 0.9 mg/kg; PQL = 0.81 mg/kg). In Table 1, only 2 test results were above PQLs. Fluoranthene at 1.5 mg/kg is above the TEC but not the PEC. Pyrene at 1.1 mg/kg is above the TEC and just below the PEC (1.52).

⁶ From the 1993 Memorandum *Fisher Ditch Sediment Sampling and Analyses*.

⁷ Northwest Regional Sediment Evaluation Team Agencies. 2018. Sediment Evaluation Framework for the Pacific Northwest. Prepared by the Regional Sediment Evaluation Team Agencies, May 2018, 183 pp. Accessed at <https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll11/id/2548>.

⁸ MacDonald, DD, CG Ingersoll, TA Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. *Archives of Environmental Contamination and Toxicology* 39:20-31.

Because the historical carbazole PQL is still below current benchmarks, and because other site COCs were historically not detected, the cleanup goal remains valid. However, if access to Fisher Ditch or the use of water in Fisher Ditch change in the future, the sediment cleanup assumptions may need to be reevaluated.

Table K-1: Sediment Evaluation

Contaminant	TEC (mg/kg) ^a	PEC (mg/kg) ^a	Sediment Evaluation Framework (mg/kg) ^b	Lowest PQL from Table 1 (mg/kg)	Highest PQL from Table 1 (mg/kg)
Carbazole	---	---	0.9	0.46	0.81
Pentachlorophenol	0.01	0.36	---	2.30	4.00
Benzo(a)pyrene	0.15	1.45	---	0.46	0.81
Fluoranthene	0.423	2.23	---	0.46	0.81
Pyrene	0.195	1.52	---	0.46	0.81

Notes:

- a. MacDonald, DD, CG Ingersoll, TA Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. Archives of Environmental Contamination and Toxicology 39:20-31.
- b. Northwest Regional Sediment Evaluation Team Agencies. 2018. Sediment Evaluation Framework for the Pacific Northwest. Prepared by the Regional Sediment Evaluation Team Agencies, May 2018, 183 pp.

Bold = PQL is greater than TEC
Bold Highlight = PQL is greater than both TEC and PEC

