UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 Emergency Response Unit
1200 Sixth Avenue. Suite 900
Seattle, Washington 98101-3140

MEMORANDUM

DATE: July 28, 2009

SUBJECT: Approval and Funding for a Time Critical Removal Action at the Northwest Pipe and Casing/ Hall Processing Company Site (NWPC Site) and Request for a 2 Million Dollar Exemption

FROM: Kathy Parker, On-Scene Coordinator
Mark Ader, Remedial Project Manager

TO: Daniel D. Opalski, Director
Office of Environmental Cleanup

THRU: Chris D. Field, Manager
Emergency Response Unit

SITE ID: 10G8

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed time-critical removal action described herein for the NWPC Site located in Clackamas County at 9585 Mather Road, Clackamas, Oregon 97015. (See figure 1.)

This Removal Action consists of the excavation of contaminated soil that is interfering with the groundwater remedy that was implemented during the 2003 Remedial Action. This Action Memorandum also documents approval for an exemption to the two million dollar limit on removal actions established under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This action meets the criteria for initiating a removal action under the National Contingency Plan (NCP), 40 C.F.R. §300.415.

II. SITE CONDITIONS AND BACKGROUND

The CERCLIS and RCRIS ID number is ORD980988307. The Oregon State Waste ID is ORD987201126.

II.A. Site Description

II.A.1. Removal site evaluation

Pipe-coating businesses, run by the Hall Process Company and Northwest Pipe and Casing Company, operated on the southern part of the 53 acre property from 1956 to 1985. During the pipe-coating operations, contaminants were released at the Site into the soil and groundwater. These contaminants included volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs).

Remedial Action (RA) at the Site, which was divided into an Operable Unit (OU) for soil and an OU for groundwater, was performed between August 1, 2001 and September 8, 2004. The RA consisted of soil excavation and treatment of 32,010 tons of contaminated soil and installation of a two foot cap of clean soil on a portion of the Site, installation of a groundwater treatment system consisting of groundwater circulating wells (GCWs) and monitoring wells, and institutional controls to prohibit the use of groundwater at the Site.

In 2006, the Five Year Review (FYR) of the Site concluded that the groundwater remedy was not functioning as designed. As a follow up to the FYR, EPA Region 10 requested that the EPA Headquarters Remedial System Evaluation (RSE) contractor conduct an analysis of the remedy. The findings established that the groundwater treatment system should be shut down and additional site characterization of the main plume be completed to help determine the southern boundary of the plume. A site wide groundwater monitoring event was conducted in November 2007. During this event a non-aqueous phase liquid (NAPL) was discovered in monitoring well MW-207 located within the Plume 1 source area (Parametrix, 2007). Analysis indicated the sample contained PAHs and VOCs with some PCBs and metals; and that the composition of the dense non-aqueous phase liquid (DNAPL) fraction was similar to that of coal tar which was used at the Site (Parametrix, 2008). (See Table 1.)

Based on the RSE recommendations and the discovery of DNAPL in MW-207, in the fall of 2008, a Supplemental Focused Field Investigation (SFFI) was completed. The SFFI identified three DNAPL bodies, a main body and two smaller bodies within the Plume 1 Source Area. These DNAPL bodies are presumably composed of coal tars. See Figures 2 and 3 and Tables 2, 3 and 4.

Analytical results for soils collected within the DNAPL bodies indicate relatively high concentrations of chlorinated volatile organic compounds (CVOCs), naphthalene, and BTEX (benzene, toluene, ethylbenzene, xylene). In general, CVOCs and BTEX concentrations in subsurface soil are limited in extent both laterally and vertically within the DNAPL bodies. However, naphthalene concentrations in subsurface soil are more

pervasive throughout the DNAPL bodies, with detectable concentrations up to 65 feet below ground surface (bgs).

In February 2009, the Region held a conference call with Headquarters and the RSE contractor to discuss the findings, especially considering their previous recommendations and how the discovery of the DNAPL bodies, referred to as coal tar bodies, would affect the groundwater remedy. The RSE contractor indicated that no further effective action could be taken on the groundwater remedy until the coal tar bodies, determined to be sources of soil contamination, were removed or otherwise treated.

In May 2009, the EPA Region 10 Remedial Program requested assistance from the Removal Program in removing the major source of soil contamination remaining at the Site so that a new groundwater remedy could be implemented.

On June 18, 2009, a Removal Assessment site visit was conducted by EPA On Scene Coordinator (OSC) Kathy Parker, EPA Remedial Program Manager (RPM) Mark Ader, Oregon Department of Environmental Quality (ODEQ) Project Manager Debbie Bailey and contractors from Environmental Quality Management, Ecology and Environment and Parametrix. All participants concluded that further site work is necessary to remove remaining soil contamination before the Remedial Action groundwater remedy is expected to be effective.

II.A.2. Physical Location

The Site is located at 9585 SE Mather Road, Clackamas, Oregon 97015, approximately 20 miles southeast of Portland. The Site is bounded to the north by SE Lawnfield Road and to the south by SE Mather Road. There are railroad tracks along the western boundary of the site. Interstate 205 is located approximately one half mile west of the site. The precise location is 45.4149 Latitude; -122.5200 Longitude. See the Site Vicinity Map in Figure 1.

The Site is situated among land consisting primarily of light industrial and commercial properties. The closest residence is located 500 feet west of the Site. There is a small residential area approximately one half mile south of the Site. The City of Milwaukie is located approximately one mile north of the Site.

Groundwater in the wet season is at or near the surface. On-Site runoff generally drains into manmade ditches on the eastern and western boundaries of the Site, which in turn flow into Dean Creek. As part of the remedial action an on-Site wetland was constructed which drains to the ditch on the eastern property boundary and then to Dean Creek. There are no known threatened or endangered species or critical habitat on the Site.

II.A.3. Site Characteristics

Parcel B of the Site is expected to be used for a railroad spur and laydown yard by an adjoining business by the fall of 2009. Future light industrial development is anticipated or future road construction might be conducted. Parcel A is currently used by the Oregon Department of Transportation (ODOT) for multiple light industrial purposes and by Northwest Development Company (NDC) for warehouses and offices. The two previous EPA Removal Actions performed at the Site involved removal of buildings and debris and are unrelated to the issuance of this Removal Action and therefore will not apply toward the time or dollar ceilings for this Removal Action.

II.A.4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

The substances known to be on-site include tetrachloroethene (PCE), trichloroethene (TCE), 1,2, cis-dichlorothene, PCBs, vinyl chloride (VC), naphthalene and other polycyclic aromatic hydrocarbons. See Tables 2, 3 and 4 for concentrations and locations of chemical contaminants at the Site. These substances are potential hazardous substances, pollutants, or contaminants as defined by sections 101(14) and 101(33) of CERCLA, as amended, 42 U.S.C. §9601(14) and (33). Other hazardous substances may also be on-site.

The 2008 Focused Field Investigation describes the details of the type, locations and concentrations of groundwater and soil contaminants currently believed to be on the Site. Figures 2 and 3 summarize the current shallow PCE and Napthalene concentration plumes plotted on an aerial photograph of the Site.

II.A.5. NPL Status

The Site was finalized on the National Priorities List (NPL) on October 14, 1992.

II.A.6. Maps, pictures, and other graphic representations

Refer to imbedded and attached figures, maps and tables.

II.B. Other Actions to Date

II.B.1. Previous Actions

There are no known government or private actions that have been undertaken in the past that have not been previously discussed. (See section II.A.1)

II.B.2. Current actions

Current actions at the Site include monitoring and maintenance of the soil cap and mitigated wetland, monitoring of the groundwater plumes pending the completion of the source removal discussed in this action memorandum at which time a revision of the groundwater remedy is anticipated, and institutional controls.

II.C. State and Local Authorities' Roles

II.C.1. State and Local Actions to Date

ODEQ, and EPA have worked together on cleaning up this Site. ODEQ's ongoing co-management role at the Site is carried out on behalf of the State of Oregon, one of the settling plaintiffs along with the United States in each the four Consent Decrees at the Site.

II.C.2. Potential for Continued State/Local Response

EPA and ODEQ currently have a State Superfund Contract for this Site. Clackamas County Development Agency, current owner of Parcel B at the Site, ODEQ and EPA will continue to manage Parcel B of the Site in accordance with the PPA, NWPC Consent Decree and all other agreements that are currently in place for the Site. ODEQ will also continue to co-manage the Site with EPA to ensure that ODOT and NDC continue to comply with the Consent Decrees they entered into and with institutional controls at the Site. All entities are committed to staying engaged in the process of developing this property for beneficial use to the community.

On July 20, 2009, ODEQ sent EPA a letter concurring with this proposed Removal Action. Funding will be provided primarily by the Special Account that was created with the monetary Settlement that resulted from the Consent Decrees between EPA, ODEQ and responsible parties.

II.C.3. Tribal Interests

On July 15, 2009, EPA consulted with the Grande Ronde Tribe and the Siletz Tribe to determine if they had any concerns about the proposed Removal Action. Neither Tribe expressed any environmental or cultural resources concerns related to the Removal Action for EPA to consider.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The current conditions at this Site meet the following factors which indicate that the Site is a threat to the public health or welfare or the environment, and a removal action is appropriate under section 300.415(b)(2) of the NCP. Any or all of these factors may be present at a site, and any one of these factors may determine the appropriateness of a

removal action.

III.A. The availability of other appropriate federal or state response mechanisms to respond to the release (300.415(b)(2)(vii)).

The funds received from the Settlement between EPA, ODEQ, and the PRPs were deposited into a Special Account. These funds are to be used to carry out response actions at the Site. Funds have been set aside in this account to partially fund this time-critical removal action as a response action at the Site. No other federal or state agency has the additional funds or resources to conduct the proposed removal action.

III.B. Other situations or factors that may pose threats to public health or welfare of the United States or the environment (300.415(b)(2)(viii)).

The residual source of DNAPL in subsurface soils is a chronic source of dissolved hazardous substances to the groundwater underlying the Site. As long as the residual saturation of DNAPL in soil remains, the DNAPL will percolate downward through the subsurface. The slow rates of dissolution will continue to feed the groundwater plume for an indeterminate period, thus increasing the potential for contamination to migrate toward down gradient drinking water supplies. The total time and cost for eventual cleanup will increase the longer the residual source of DNAPL in subsurface soils remains unaddressed. By contrast, directly addressing the DNAPL source areas will contribute to a more effective solution in terms of total cost and cleanup time. Further, a railroad spur is proposed to be constructed over the residual DNAPL. While the railroad spur is expected to have a positive economic impact, the disruption to the railroad spur if the spur has to be removed at a later date to allow the DNAPL sources to be removed would likely cause an undue financial hardship on the project sponsor, Oregon Iron Works.

Group	Contaminant	Maximum Detected Concentration	Remedial Goal
VOCs	Tetrachloroethene (PCE)	370,000 µg/kg	7 µg/kg
	Trichloroethene (TCE)	NA	13 µg/kg
	Vinyl Chloride	NA	0.1 µg/kg
PAHs	Benzo(a)anthracene	950,000 µg/kg	2,500 µg/kg
	Benzo(b)fluoranthene	800,000 µg/kg	2,500 µg/kg
	Benzo(k)fluoranthene	530,000 µg/kg	2,500 µg/kg
	Benzo(a)pyrene	410,000 µg/kg	250 µg/kg
	Chrysene	2,100,000 µg/kg	250,000 µg/kg
	Dibenz(a,h)anthracene	89,000 µg/kg	250 µg/kg
	Indeno(1,2,3-cd)pyrene	250,000 µg/kg	2,500 µg/kg
PCBs	Total PCBs	870 mg/kg	1 mg/kg

Until the three coal tar bodies are removed from the soil at the Site, enabling effective implementation of the Remedial Action for groundwater, contaminant plumes will continue to spread in the groundwater and potentially threaten down gradient wells.

IV. ENDANGERMENT DETERMINATION

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

V. PROPOSED ACTIONS AND ESTIMATED COSTS

V. A. Proposed Action

V.A.1. Proposed Action Description

DNAPL Source Areas
EPA will excavate an estimated 4,500 tons of contaminated subsurface soil from three DNAPL source areas. The final depth and width of excavations will be determined by visual observation, field screening instruments, and laboratory analyses using the contaminant cleanup concentrations specified in the ROD. The excavated soil will be segregated on-site by hazard class and disposal method, and shipped off-site for disposal at approved hazardous waste and municipal waste facilities, as appropriate. A soil modifier will be placed in the bottom of the excavations to enhance biological degradation of residual contaminants. The excavations will be backfilled with clean soil and the top two feet of fill material will be placed to achieve the ROD barrier specifications. Groundwater intrusion into the excavations will be prevented by freeze-shoring. Any collected groundwater, surface water, or leachate will be analyzed and disposed in an appropriate manner. Disturbed areas will be graded to facilitate surface water drainage and will be revegetated with appropriate plant materials. See Figures 4 and 5.

Best-Management Practices (BMPs):
Temporary Best Management Practices (BMPs) will be employed throughout construction for control of erosion, fugitive dust, and storm water management, and to minimize and to avoid adverse impacts on wildlife and their habitats. Dust and particulate concentrations at the Site will be monitored with particulate monitors and the results used to modify work practices if particulate levels exceed the on-Site action level of 10 ppm and Site boundary action level of 3 ppm.

Assessment and characterization of known and suspected hazardous wastes and potentially contaminated soils:
Known and suspected hazardous compounds in soil, including VOCs, PAHs, and total

PCBs will be identified by sampling soil during excavation. The samples will be assessed using a combination of fast turn around laboratory analysis and field screening. Field screening methodology will include direct visual observations as well as headspace measurement with field meters and/or field test kits. These sample results will be used to determine whether additional soil excavation is necessary. After the limits of the excavations have been established, confirmation soil samples will be collected from the bottom and sides of the excavations and submitted for laboratory analyses. Samples for waste profiling will be collected from excavated soil stockpiles and submitted for analyses at a fixed laboratory.

For consistency, this Removal Action will use the Remedial Cleanup Goals (RGs) for the soil excavation action levels. Groundwater cleanup will not be addressed by this Removal Action.

Group	**Contaminant**	**Remedial Goal**
VOCs	Tetrachloroethene (PCE)	7 µg/kg
	Trichloroethene (TCE)	13 µg/kg
	Vinyl Chloride	0.1 µg/kg
PAHs	Benzo(a)anthracene	2,500 µg/kg
	Benzo(b)fluoranthene	2,500 µg/kg
	Benzo(k)fluoranthene	2,500 µg/kg
	Benzo(a)pyrene	250 µg/kg
	Chrysene	250,000 µg/kg
	Dibenz(a,h)anthracene	250 µg/kg
	Indeno(1,2,3-cd)pyrene	2,500 µg/kg
PCBs	Total PCBs	1 mg/kg

(Regional Screening Levels from the July 7, 2008 "Regional Screening Levels for Chemical Contaminants of Concern at Superfund Sites")

Excavation of contaminated material and packaging, labeling, transportation, and disposal of hazardous and non-hazardous wastes:
This proposed action will require off-site disposal of hazardous waste. To minimize the costs for disposal, all waste materials and excavated contaminated soils will be segregated by hazard class and disposal method. Excavated soils will be assessed using visual observations, field screening data, and/or laboratory results and placed in one of three categories of stockpiles: hazardous waste, non-hazardous solid waste, or soil with contaminant levels below cleanup goals suitable for on-site backfilling. Temporary stockpile cells will be constructed in a designated area of the Site. Each cell will hold approximately 300 cubic yards of soil. The cells will have edge supports (such as hay bales or concrete ecology blocks) and will be lined with plastic sheeting to allow for dewatering with containment of the water and to prevent migration of contaminated material from the stockpiles. Each stockpile will be covered with plastic sheeting until transported off-Site for disposal or used as fill material on Site if appropriate. Each

individual stockpile within the designated area will be given a unique, consecutive number for identification.

If laboratory testing indicates the waste in a cell exhibits any of the RCRA characteristics, it will be disposed of at an approved hazardous waste facility.
If the analysis of the waste in a containment cell indicates it does not exhibit any of the RCRA characteristics, it will be transported to a non-hazardous waste facility.

Wastes will be appropriately packaged for off-Site disposal at a RCRA-permitted facility and in accordance with CERCLA's Off-Site Disposal Rule. Off-site shipments of hazardous waste will be tracked with hazardous waste manifests. Off-site shipments of non-hazardous materials will be similarly tracked with bills-of-lading.

Water collected from the excavation dewatering and soil stockpile drainage will be contained in temporary storage tanks. The water from the tanks will be sampled and analyzed at a fixed laboratory. Depending on the analytical results, the water may be treated by an on-Site water treatment system and then tested to determine the contaminants remaining in the water after treatment. Depending on the analytical results for the concentrations of contaminants remaining in the treated water, the water will be disposed of either by injecting into the storm water system or the sewer system or transported off-site to an approved hazardous waste facility.

Post removal Site controls:
The need for any post-removal site control activities (e.g., maintenance of fences, signs) will be determined by the EPA Region 10 Remedial Program (Program), and will be managed by the Program pursuant to the Site RODs. The Program will also determine the need for specific institutional controls, and if needed, such controls will be managed by the Program pursuant to the Site RODs.

V.A.2. Contribution to remedial performance

The proposed removal action is integral to, and consistent with, the long-term groundwater treatment remedy. If future actions are required, the proposed removal action will likely not impede those actions based upon available information.

V.A.3. Description of alternative technologies

There are no other implementable or cost effective technologies that have been identified for the Site. Removal of waste and soil is a standard technology for these contaminants. On-Site and off-Site thermal desorption of the contaminants present at the Site were considered to attempt to reduce transport, disposal and fill costs. However, factors such as the types of contaminants, the percentage of groundwater in the soil, and permitting issues for air emissions from the thermal desorption process resulted in that technology not being implementable or cost effective at this Site.

Also considered was surrounding the contaminated soil with an impervious layer. However, the depth of the contamination makes that option difficult to implement and therefore not cost-effective. It would also have the undesirable result of requiring long term operation and maintenance of the impervious layer.

V.A.4. Engineering Evaluation/Cost Analysis (EE/CA)

This proposed action is for a time-critical removal action, therefore an EE/CA is not required.

V.A.5. Applicable or relevant and appropriate requirements (ARARs)

ARARs are defined in CERCLA Section 121 and the NCP [40 CFR Part 300]. Applicable" requirements are those cleanup standards and other environmental protection requirements promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, location, response action, or other circumstance at a site. While not applicable to a particular circumstance at a CERCLA site, "relevant and appropriate" requirements address problems or situations sufficiently similar to those encountered at a site that their use is well suited to the site.

Oregon Environmental Cleanup Rules (OAR 340-102) and TSCA Risk-Based Option for PCB Remediation (40 CFR 761.61) were considered during the development of the RGs and are described in the ROD.

Oregon Solid Waste Management Rules (OAR 340-093 through -097) are applicable to the treatment and disposal of solid waste from the Site. Section 340 093-0170 is applicable to the disposal of cleanup materials contaminated with hazardous substances that are not in themselves hazardous substances, such as petroleum contaminated soil. Such material must be disposed only in landfills meeting the RCRA Subpart D design criteria and that have been authorized to receive this type of material by ODEQ. Section 340 093-0190 is applicable to the disposal of special wastes, including construction and demolition debris and oil wastes. Solidified coal tar, to the extent it is not deemed a hazardous waste, and construction and demolition wastes from the Site will be placed in a landfill approved for handling such special wastes.

Oregon Hazardous Wastes Management Rules (OAR 340-100 through -120) are applicable to soil at the Site which exhibits a characteristic of hazardous wastes. Based on the RI data and history of past facility operations, soil at the Site does not contain state-only or listed hazardous wastes. However, some soil at the Site may exceed the Toxicity Characteristic Leaching Procedure (TCLP) concentration of 0.7 mg/L of PCE and therefore exhibit the toxicity characteristic for PCE. EPA will conduct additional tests on the suspected soil to verify the TCLP presumption prior to transporting the soil to a disposal facility. RCRA TCLP waste sent off-Site will comply with the Oregon RCRA

rules pertaining to the generation, transportation and treatment, storage and disposal of hazardous waste.

Oregon General Emission Standards for Particulate Matter (OAR 340-208-0100 through - 0210) is applicable to visible emissions and nuisance conditions from the selected soil remedy. The Site is located in a designated Special Control Area. Consequently, dust generated from earthwork or other disturbance of on-Site soils must meet a nuisance condition standard for fugitive emissions traceable directly to a specific source. In addition, opacity and particulate matter concentration standards are applicable to vehicle emissions on-site. Dust and particulate concentrations at the Site will be monitored with particulate monitors and the results used to modify work practices if dust levels are found to exceed the on-site action level of 10 ppm or the Site boundary action level of 3 ppm.

Oregon Water Quality Management Plan (OAR 340-041) is applicable to the management of storm water run-off from the Site. Site water production and run-off will be controlled with freeze-shoring, ditching, pumping, on-site storage in tanks, discharge to the municipal sewer, straw bales, silt fences or other BMPs.

Clackamas County Publicly Owned Treatment Works (POTW) discharge limits will apply to batch discharges of treated Site water to the county sewer.

V.A.6. Project Schedule

It is expected that project implementation will begin in August 2009 and will take approximately eight weeks to complete. Three weeks are needed to install the freeze-shoring and freeze the perimeter of the excavation areas. Excavation will begin after shoring is in place and is expected to last five weeks.

V.B. Estimated Costs

2009 Removal Action Extramural Costs:	
Extramural Costs	
ERRS (up to $900,000 from the regional allowance with remaining funds from the Special Account for the Northwest Pipe and Casing Site)	$2,060,000
START (from the Special Account for the Northwest Pipe and Casing Site)	$100,000
Subtotal of Extramural Costs	$2,160,000
Extramural Costs Contingency (From Special Account)	$240,000
TOTAL REMOVAL ACTION PROJECT CEILING	$2,400,000

Note: Up to $2.4 million will be used from the Special Account if regional allowance funds are

not available.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If the proposed removal action should be delayed or not taken, hazardous substances will remain as potential human health and ecological threats and hazardous substances will remain a continuing source of solid and dissolved-phase contaminants. Contamination may spread from the Site soil and groundwater to the Troutdale aquifer which serves as a municipal water supply.

VII. OUTSTANDING POLICY ISSUES

None.

VIII. EXEMPTION FROM STATUTORY LIMITS

The removal activities subject to this Removal Action Memorandum are necessary to ensure the protection of human health by preventing or reducing potential human exposure to contaminants remaining at the Site. Previous remedial efforts have reduced exposures through such means as removal of soil and capping of contaminants in place. This removal action is necessary to ensure the continued protection of human health by reinforcing previous measures taken at the Site. The costs associated with this Removal Action Memorandum are expected to exceed the statutory limit of $2 million as established by CERCLA Section 104(c)(1). Although, as noted in EPA's *Consolidated Guidance on the Establishment, Management and Use of CERCLA Special Accounts (October 4, 2002)*, CERCLA Section 122(b) special accounts are not subject to the $2 million statutory limit set by CERCLA Section 104(c)(1), as a conservative approach, this Removal Action Memorandum seeks to use the exemptions of Section 104(c)(1)(A). Section 104(c)(1)(A) authorizes exemptions where EPA can make the finding that continued response action is otherwise appropriate and consistent with the remedial action to be taken. The removal activities subject to this Removal Action Memorandum qualify for this particular exemption. In support of this exemption, EPA has made the finding (see Section V.A.2, above) that the activities proposed in this Removal Action Memorandum are consistent with the anticipated remedial action to be taken.

VIII. ENFORCEMENT

No enforcement issues remain since the Consent Decrees and Settlements between EPA, ODEQ and the responsible parties have already occurred.

IX. RECOMMENDATION

This decision document presents the selected Removal Action for the NWPC Site located at 9585 Mather Road, Clackamas County, Oregon, developed in accordance with CERCLA, as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the Site.

Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a removal and we recommend your approval of the proposed removal action. The total project extramural ceiling if approved will be $2,400,000. Of this, as much as $900,000 may come from the Regional Removal Allowance.

X. APPROVAL / DISAPPROVAL

APPROVAL:

Linda Anderson-Carnahan for

Daniel D. Opalski, Director
Office of Environmental Cleanup

7/28/09
Date

DISAPPROVAL:

Daniel D. Opalski, Director
Office of Environmental Cleanup

Date

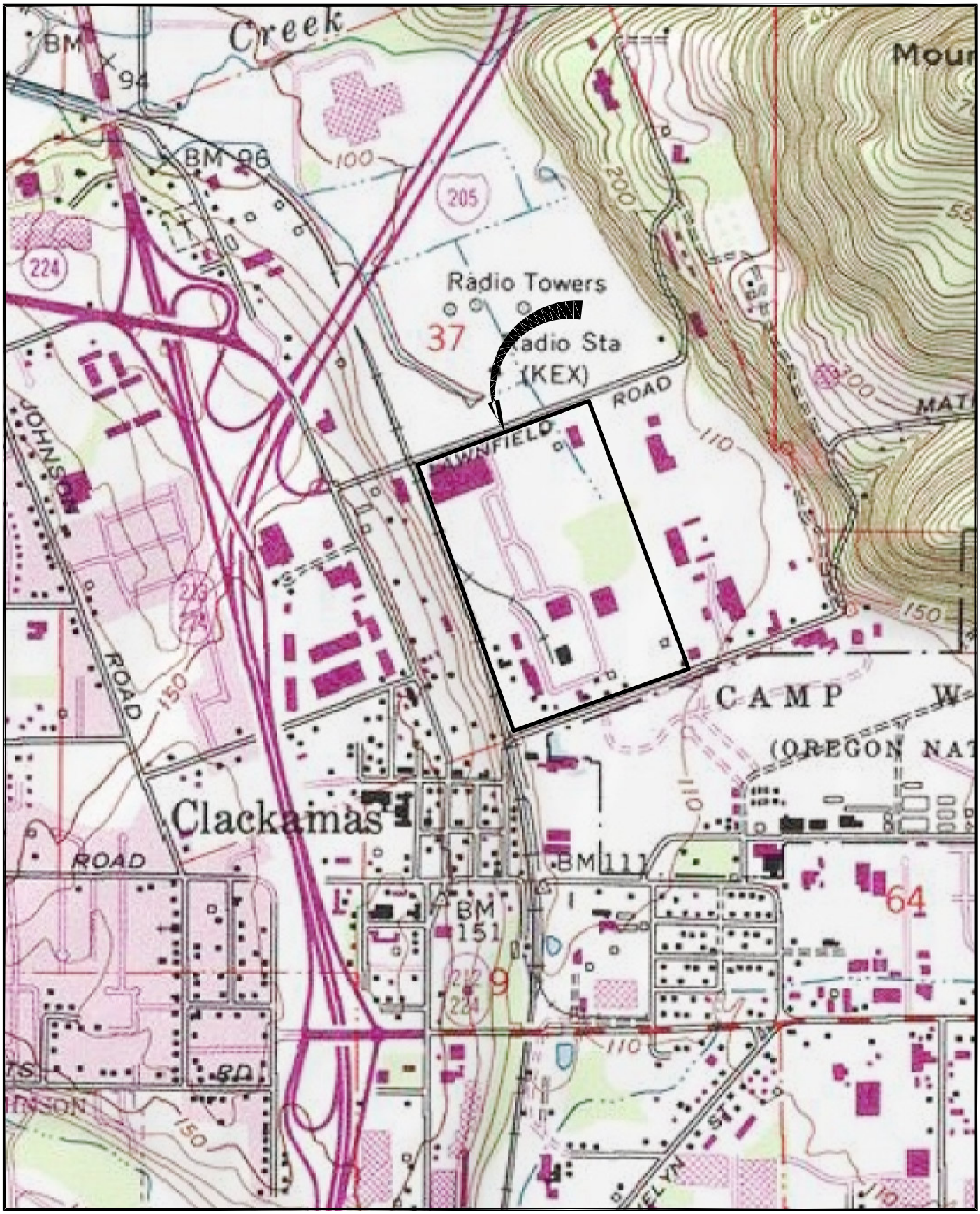
EPA Concurrences:

Name	Mary Stroh Queitzsch	Deb Yamamoto	Chris Field
	Office of Regional Counsel	Remedial Program Manager	Removal Program Manager
Signature	Mary Stroh	Deb Yamamoto	
Date	7-28/2009	7/28/09	7/28/09

Tables and Figures for
2009 Northwest Pipe and Casing Removal Action Memorandum

Figures:

Tables:



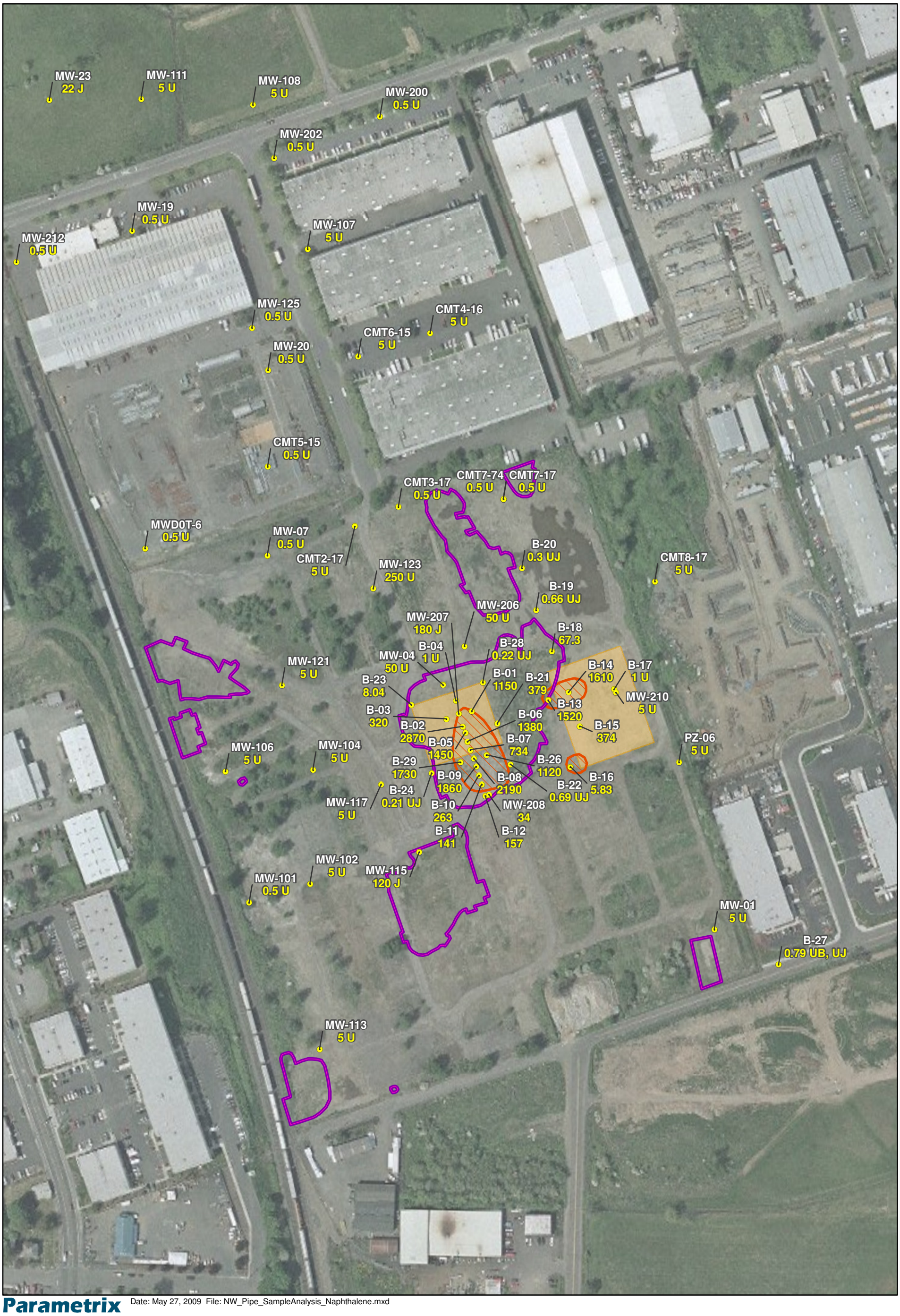
Parametrix DATE: May 18, 2006 FILE: PO2328007CF-06

N

0 1000'

SCALE IN FEET

Figure 1



Parametrix

Date: May 27, 2009 File: NW_Pipe_SampleAnalysis_Naphthalene.mxd

N

0 100 200

Feet

- Well Location ID and Naphthalene Sample Value
- Excavation Areas
- CoalBodies
- Plants 3 and 4 (Historic)

NW Pipe DRAFT

Portland, Oregon

Figure 2

NOTES:
Qualifier
J = Estimated Concentration
U = Not Detected At or Above the Method Reporting Limit
Units
µg/L = Microgram per Liter
Acronyms
PCE = Tetrachloroethene
WBZ = Water Bearing Zone

MW-23 0.5 U
MW-111 1.1 J
MW-108 0.9
SE Lawnfield Rd
MW-202 2.4
MW-200 0.67
MW-212 0.5 U
MW-19 46
MW-107 0.5 U
MW-125 75
SE Industrial Way
MW-20 8
CMT6-15 52
CMT4-16 0.4 J
CMT5-15 12
MWD0T-6 0.5 U
1.0
MW-07 0.5 U
CMT2-17 70
CMT3-17 36
CMT7-17 2.9
CMT8-17 6.3
10
MW-123 260
B-20 35.8
MW-121 40
B-19 1290
MW-206 880
1000
MW-207 900
MW-04 1600
1000
B-18 6250
B-23 483
B-28 3830
B-04 49.8
B-01 1100
MW-106 11
B-03 1880
B-13 550
B-14 620
B-14 645
MW-104 4.9
B-02 214
B-21 7090
B-17 57.2
B-05 272
B-06 72.8
B-07 61.6
B-15 135
MW-210 130
B-29 15.4
B-26 149
100
MW-117 98
B-24 12.8
B-29 17
B-09 62.9
10
B-22 41.4
B-10 6.25
B-08 147
B-16 6.11
MW-208 11
PZ-06 0.4 J
MW-101 17
MW-102 5.5
B-11 4.6
B-12 13.6
1.0
MW-115 0.7 J
10
MW-113 0.3 J
MW-01 84
B-27 0.35 UJ
1.0
SE Mather Rd

Parametrix Date: 02/23/09 File: NW_Pipe_Casing_ReportWorking.mxd

N

0 100 200

Scale in Feet

Figure 3

Legend

- Boring
- CMT Well
- Shallow Piezometer
- Shallow WBZ Well
- Isoconcentration Line µg/L

PCE Isoconcentration Map
Shallow WBZ

NW Pipe and Casing
Portland, Oregon

Table 1.

Summary of Analytical Results for the DNAPL and Aqueous Fractions from Well MW-207

Group	Analyte	DNAPL Fraction			Aqueous Fraction		
VOCs	1,1,2 TCA	mg/kg	N/A		µg/L	1.3	
	(1-Methyl ethyl)-benzene		N/A			4.0	
	1-Methy-4-(1-methyle thyl)-benzene		44	J		3.0	U
	1,2,4-Trimethylbenzene		1,031	J		135	
	1,3,5-Trimethylbenzene		200	J		24.9	
	1,1 DCE		N/A			3.0	
	cis-1,2 DCE		710	J		522	
	trans-1,2 DCE		N/A			3.3	
	Benzene		N/A			1.2	
	Carbon Tetrachloride		N/A			1.0	U
	Ethylbenzene		252	J		102	
	MP-Xylene		362	J		126	J
	sec-Butylbenzene		59	J		N/A	
	n-Butylbenzene		84	J		1	
	o-Xylene		254	J		98.4	J
	Naphthalene		21,000	J		377	
	Propylbenzene		121	J		14.5	
	Tetrachloroethene		1,100	J		2570	
	Toluene		N/A			25.5	
	Trans-1,3-Dichloropropene		N/A			3.0	J
	Trichloroethene		99	J		343	
	Trichloromethane		148	UJ		5.1	
	Vinyl Chloride		296	UJ		23.4	
PAHs	9H-Fluorene	mg/kg	38,000		µg/L	1,000	J
	Acenaphthene		86,000			2,400	J
	Acenaphthylene		180			50	UJ
	Anthracene		5,600			200	J
	Benzo(a)anthracene		6,100			61	J
	Benxo(a)pyrene		1,000			50	UJ
	Benzo(g,h,i)perylene		170			50	UJ
	Benzo[b]fluoranthene		1,100			50	UJ
	Benzo[k]fluoranthene		920			50	UJ
	Chrysene		4,100			65	J
	Dibenzo[a,h]anthracene		92			50	UJ
	Fluoranthene		83,000			1,200	J
	Indeno(1,2,3-cd)pyrene		200			50	UJ
	Naphthalene		20,000			2,200	J
	Naphthalene, 2-methyl-		12,000			480	J
	Phenanthrene		170,000			3,100	J
	Pyrene		53,000			890	J

Group	Analyte	DNAPL Fraction			Aqueous Fraction		
PCBs	PCB-1254	mg/kg	120		µg/L	9.5	
Metals	Arsenic	mg/kg	38	UJ	µg/L	2,000	U
	Barium		1.5			132	
	Cadmium		2.6	U		1,000	
	Chromium		8.5	U		10,000	U
	Copper		28.3			43,000	
	Manganese		4.0	J		3,520	
	Lead		21	U		17,000	
	Zinc		4.3	U		65	

U = not detected at or above its respective method reporting limit (MRL)

J = quantity is estimated

N/A = not analyzed

Table 2 Summary of PAHs in Subsurface Soil
Supplemental Field Investigation, Fall 2008
Units in micrograms per kilogram

Test Boring	Sample Name	Depth	Sample Rank	Ace-naphthene	Ace-naphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(g,h,i) perylene	Benzo(k) fluoranthene	Chrysene	Dibenz(a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
Cleanup Goals				--	--	--	2,500	250	2,500	--	2,500	250,000	250	--	--	2,500	--	--	--
B-02	B-02-SS-25.0	25	3	6820 J	32.7 J	1270 J	737 J	109 J	100 J	19.3 J	121 J	633 J	12 J	7770 J	4370 J	20.7 J	458 J	15800 J	6550 J
B-05	B-05-SS-14.0	14	4	25300 J	96 J	4750 J	3290 J	527 J	544 J	112 J	602 J	2840 J	75.3 J	27200 J	11500 J	115 J	551 J	58500 J	26400 J
B-06	B-06-SS-14.0	14	4	272000	6.67 U	31100	21000	4050	3640	865	3920	19200	443	200000	121000	937	75700	415000	170000
B-07	B-07-SS-15.0	15	4	432000 J	1730 J	66100 J	40100 J	6070 J	6200 J	1160 J	6730 J	35000 J	733 J	371000 J	251000 J	1290 J	81300	752000 J	300000 J
	B-07-SS-25.0	25	4	123000 J	316 J	16200 J	8730 J	1280 J	1450 J	245 J	1530 J	7830 J	162 J	118000 J	57500 J	260 J	89600	236000 J	65300 J
B-08	B-08-SS-14.0	14	4	9530 J	50.7 J	4130 J	947 J	125 J	147 J	20.7 J	119 J	853 J	12.7 J	10900 J	5870 J	22 J	30300	27700 J	7000 J
	B-08-SS-24.0	24	4	146000 J	374 J	21200 J	11600 J	1440 J	1610 J	253 J	1560 J	10300 J	173 J	141000 J	73000 J	293 J	66300	271000 J	88200 J
B-09	B-09-SS-18.0	18	3	51300 J	174 J	8170 J	4950 J	674 J	861 J	69.3 J	805 J	4250 J	52 J	52700 J	28700 J	82.7 J	4200	118000 J	40800 J
B-10	B-10-SS-20.0	20	3	10.7	6.67 U	6.7 UJ	3.3 UJ	0.67 UJ	6.67 U	2 UJ	1.3 UJ	3.3 UJ	2 UJ	39.3	7.33	2 UJ	5 UJ	46.7	23.3
B-11	B-11-SS-20.0	20	4	3590	17.3	594	423	48	68	7.33	62	361	5.3 UJ	3240	2180	8	778	8580	2890
B-13	B-13-SS-15.0	15	4	97700	158	10800	6130	1000	1110	159	1150	5690	96.7	81700	34500	166	27000	163000	60300
	B-13-SS-8.0	8	0	5680	6.67 U	969	457	162	157	58	163	471	29.3	4260	2600	58.7	665	9430	3240
B-14	B-14-SS-13.0	13	4	14400	40.7	1630	997	147	155	26.7	165	864	20	9430	6190	32	1280	22500	7900
	B-14-SS-25.0	25	0	764	2.7 UJ	109	44	9.33	8.67	4.7 UJ	8.67	42	2.7 UJ	461	292	3.3 UJ	513	1190	423
B-29	B-29-SS-19.0	19	4	152000	66.7 U	20100	12500	1830	2410	249	1970	10900	188	164000	76000	313	115000	317000	93000

Table 3 Summary of VOCs in Subsurface Soils
Supplemental Investigaiton, Fall 2008
Units in micrograms per kilogram

Test Boring	Sample Name	Depth	Sample Rank	CVOCs										Naphthalene	BTEX				
				1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	PCE	TCE	VC		Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene
Cleanup Goals				--	--	--	--	--	--	--	7	13	0.1	--	--	--	--	--	--
B-01	B-01-SS-15.0	12	0	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	1.6 UJ	10 UJ	10 UJ	10 UJ	20 UJ	10 UJ
B-02	B-02-SS-25.0	25	3	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	458 J	10 UJ	10 UJ	1.4 UJ	3.3 UJ	10 UJ
B-03	B-03-SS-65.0	63	0	10 U	10 U	10 U	10 U	10 U	10 U	1 UJ	10 U	10 U	10 U	2.7 UJ	10 U	10 U	10 U	20 U	10 U
B-05	B-05-SS-14.0	14	4	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	551 J	10 UJ	10 UJ	1.1 UJ	20 UJ	10 UJ
	B-05-SS-25.0	25	1	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	2.2 UJ	10 UJ	10 UJ	10 UJ	20 UJ	10 UJ
	B-05-SS-45.0	45	0	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	1.6 UJ	10 UJ	10 UJ	10 UJ	20 UJ	10 UJ
	B-05-SS-65.0	65	0	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	1.7 UJ	10 UJ	10 UJ	10 UJ	20 UJ	10 UJ
B-06	B-06-SS-14.0	14	4	10 U	10 U	10 U	2.4 UJ	10 U	1620	10 U	7280	574	4 UJ	75700	10	83	2930	2990	2330
B-07	B-07-SS-15.0	15	4	10 U	10 U	10 U	10 U	10 U	8.2 UJ	1 U	49.3	3.3 UJ	10 U	81300	10 U	5.8 UJ	39.6	64.6	31.5
	B-07-SS-25.0	25	4	10 U	10 U	10 U	10 U	10 U	10 U	1 U	81.7	10 U	10 U	89600	10 U	1.8 UJ	33.8	53.6	29.1
B-08	B-08-SS-14.0	14	4	10 U	10 U	10 U	10 U	10 U	23.9	1 U	53.6	43.2	10 U	30300	0.4 UJ	12.7	24.6	36.7	7.6 UJ
	B-08-SS-24.0	24	4	10 U	10 U	10 U	2.2 UJ	10 U	494	5 U	402	505	7.6 UJ	66300	4.4 UJ	25	367	477	52.6
B-09	B-09-SS-18.0	18	3	10 U	10 U	10 U	10 U	10 U	5.2 UJ	1 U	5.2 UJ	4.9 UJ	0.91 UJ	4200	0.52 UJ	10 U	8.7 UJ	24.3	7.6 UJ
B-10	B-10-SS-20.0	20	3	10 U	10 U	10 U	10 U	10 U	8.7 UJ	1 U	10 U	10 U	10 U	5 UJ	10 U	10 U	10 U	20 U	10 U
B-11	B-11-SS-20.0	20	4	10 U	10 U	10 U	10 U	10 U	10 U	1 U	1.5 UJ	10 U	10 U	778	10 U	10 U	0.85 UJ	3.3 UJ	2.1 UJ
B-13	B-13-SS-15.0	15	4	10 U	10 U	10 U	10 U	10 U	40.2	1 U	554	20.8	0.78 UJ	27000	10 U	8.4 UJ	1.9 UJ	7.1 UJ	2 UJ
	B-13-SS-25.0	25	0	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	1.5 UJ	10 UJ	10 UJ	10 UJ	20 UJ	10 UJ
	B-13-SS-45.0	45	0	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	1.4 UJ	10 UJ	10 UJ	10 UJ	20 UJ	10 UJ
	B-13-SS-8.0	8	0	10 U	10 U	10 U	10 U	10 U	14.7	5 U	1.3 UJ	10 U	6.3 UJ	665	10 U	10 U	10 U	20 U	10 U
B-14	B-14-SS-13.0	13	4	10 U	10 U	10 U	10 U	10 U	66.7	1 U	310	12.9	3.4 UJ	1280	10 U	4.1 UJ	3.8 UJ	9.3 UJ	3.9 UJ
	B-14-SS-25.0	25	0	10 U	10 U	10 U	10 U	10 U	10.4	1 U	8.5 UJ	10 U	10 U	513	10 U	10 U	10 U	20 U	10 U
	B-14-SS-45.0	45	0	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	104 J	10 UJ	10 UJ	10 UJ	20 UJ	10 UJ
	B-14-SS-64.0	64	0	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	1 UJ	10 UJ	10 UJ	10 UJ	1.5 UJ	10 UJ	10 UJ	10 UJ	20 UJ	10 UJ
B-17	B-17-SS-65.0	65	0	10 U	10 U	10 U	10 U	10 U	10 U	1 U	10 U	10 U	10 U	4.7 UJ	10 U	10 U	10 U	20 U	10 U
B-29	B-29-SS-19.0	19	4	10 U	0.98 UJ	10 U	10 U	10 U	40.8	2500 U	42.6	5.3 UJ	0.91 UJ	115000	0.94 UJ	3.7 UJ	28.9	57.4	29.8

Table 4 2008 Groundwater Contamination Concentrations

Test Boring	Sample Name	Depth (in feet)	PCE (µg/L)	TCE (µg/L)	VC (µg/L)	cis-1,2-Dichloroethene (µg/L)	Naphthalene (µg/L)	Ethylbenzene (µg/L)
Remedial Goals[1]			1.0	1.6	1.0	--	--	--
Restoration Goals[1]			5.0	5.0	2.0	--	--	--
Regional Screening Levels[2]			0.11	1.7	0.016	370	0.14	1.5
B-01	B-01-GW-27.0	27	1100	165	13.4	574	1150	7.76
	B-01-GW-47.0	47	142	32	4.34	315	1280	8.68
	B-01-GW-65.0	65	125	19.2	6.08	114	470	4.38
B-02	B-02-GW-27.0	27	214	122	103	1100	2870	115
	B-02-GW-46.0	46	119	53.1	5.67	140	2580	43.7
	B-02-GW-65.0	65	69.3	21.3	4.24	49.4	1760	18.5
B-03	B-03-GW-27.0	27	1880	769	16.4	1220	320	2.13
	B-03-GW-47.0	47	105	74.5	5.33	122	590	2.31
	B-03-GW-65.0	65	13	16.9	1 U	49.3	50.1	0.46 UJ
B-04	B-04-GW-27.0	27	49.8	9.57	4.48	148	1 U	1 U
	B-04-GW-47.0	47	64	87.1	12	960	1.05	1 U
	B-04-GW-65.0	65	26.6	15	1 U	7.67	0.766	1 U
B-05	B-05-GW-27.0	27	272	168	63.3	714	1450	36.5
	B-05-GW-47.0	47	231	83.8	3.18	91.7	1150	17
	B-05-GW-65.0	65	83.2	28.5	0.95 UJ	29.4	728	10.6
B-06	B-06-GW-27.0	27	72.8	159	35	467	1380	22.2
	B-06-GW-47.0	47	110	144	4.2 UJ	82.2	667	11.7
	B-06-GW-65.0	65	22	23.8	0.61 UJ	18.9	451	3.83
B-07	B-07-GW-27.0	27	61.6	71.2	35.4	129	734	17.4
	B-07-GW-47.0	47	81.6	107	2.7 UJ	56.3	1340	7.75
	B-07-GW-65.0	65	28.7	17.6	5 U	6.8	1320	4.6 UJ
B-08	B-08-GW-27.0	27	147	230	16.6	296	2190	25.4
B-09	B-09-GW-27.0	27	62.9	76.8	8.15	92.1	1860	18.2

B-10	B-10-GW-27.0	27	6.25	33.5	9.2	98.2	263	2.2 UJ
B-11	B-11-GW-27.0	27	4.6	38.2	5.74	109	141	0.7 UJ
B-12	B-12-GW-27.0	27	13.6	39	1.43	34.2	157	0.64 UJ
	B-12-GW-47.0	47	6.26	23.9	1 U	2.98	9.49	0.1 UJ
	B-12-GW-65.0	65	1 U	3.77	1 U	0.54 UJ	0.49 UJ	0.21 UJ
B-13	B-13-GW-27.0	27	550	157	54.2	873	14600	5.73
	B-13-GW-47.0	47	127	12	1 U	21.1	621	1.4
	B-13-GW-65.0	65	14.3	1.23	1 U	1.24	164	0.3 UJ
B-14	B-14-GW-27.0	27	620	38.8	25 U	76	1610	7 UJ
	B-14-GW-27.0-FD	27	645	48	25 U	80.5	1470	7 UJ
	B-14-GW-47.0	47	2860	95.5	25 U	46.8	1570	14 UJ
	B-14-GW-64.0	64	1140	22.4	1 U	5.01	762	7.21
B-15	B-15-GW-27.0	27	135	70.8	2.55	81.1	374	0.32 UJ
	B-15-GW-47.0	47	12.2	8.12	1 U	13.4	127	0.25 UJ
	B-15-GW-65.0	65	2.69	1.71	1 U	3.28	67.3	1 U
B-16	B-16-GW-27.0	27	6.11	1 U	1 U	1 U	5.83	0.24 UJ
	B-16-GW-45.0	45	1 U	2.9	1 U	0.6 UJ	0.92 UJ	0.1 UJ
B-17	B-17-GW-27.0	27	57.2	19.3	1.22	8.08	1 U	0.1 UJ
	B-17-GW-47.0	47	3.02	0.62 UJ	1 U	1 U	0.24 UJ	0.11 UJ
B-18	B-18-GW-27.0	27	6250	1220	129	7650	67.3	0.7 UJ
	B-18-GW-47.0	47	100	14.3	1.59	130	21.8	0.13 UJ
	B-18-GW-65.0	65	57.7	51.6	3.78	112	96.6	0.12 UJ
B-19	B-19-GW-27.0	27	1290	988	6.23	3280	0.66 UJ	0.12 UJ
	B-19-GW-47.0	47	1140	174	10.2	231	0.49 UJ	0.1 UJ
	B-19-GW-65.0	65	41.6	7.17	1 U	10.9	0.31 UJ	0.1 UJ
B-20	B-20-GW-27.0	27	35.8	45.9	2.33	230	0.3 UJ	1 U
	B-20-GW-47.0	47	523	227	21	448	1 U	0.1 UJ
	B-20-GW-65.0	65	424	69.2	4.72	463	1 U	1 U

	B-20-GW-65.0-FD	65	165	86.9	6.52	164	0.23 UJ	1 U
B-21	B-21-GW-27.0	27	7090	184	35.4	136	379	12.2
	B-21-GW-47.0	47	240	10.1	1 U	6.08	1140	24.7
B-22	B-22-GW-27.0	27	41.4	7.98	1 U	6.65	0.69 UJ	1 U
	B-22-GW-47.0	47	8.91	13.1	1 U	6.65	46.9	0.71 UJ
	B-22-GW-64.0	64	12	2.23	1 U	1 U	820	2.69
B-23	B-23-GW-27.0	27	483	121	1.68	158	8.04	1 U
	B-23-GW-47.0	47	36.4	6.07	1 U	5.38	1.59	1 U
	B-23-GW-65.0	65	6.54	1.74	1 U	1 U	1.03	1 U
B-24	B-24-GW-27.0	27	12.8	69.4	20.7	192	0.21 UJ	0.11 UJ
	B-24-GW-47.0	47	45	80.9	2.71	41.4	0.41 UJ	0.14 UJ
	B-24-GW-65.0	65	1.04	3.29	1 U	2.01	0.5 UJ	0.19 UJ
B-26	B-26-GW-27.0	27	149	318	30.8	1050	1120	4.69
B-27	B-27-GW-27.0	27	0.35 UJ	1.46	1 U	1.78	0.79 UB, UJ	1 U
	B-27-GW-47.0	47	1 U	0.56 UJ	1 U	1 U	0.9 UB, UJ	0.12 UJ
	B-27-GW-65.0	65	1 U	1 U	1 U	1 U	0.75 UB, UJ	0.12 UJ
B-28	B-28-GW-27.0	27	3830	342	7.91	123	0.22 UJ	0.23 UJ
	B-28-GW-47.0	47	378	96.9	1.37	13.1	0.73 UJ	0.32 UJ
B-29	B-29-GW-27.0	27	17	13.2	3.28	13.6	1730	23.1
	B-29-GW-27.0-FD	27	15.4	14.7	4.06	15.2	1820	25.4

Notes:

µg/l = micrograms per liter

U = not detected at or above the method reporting limit

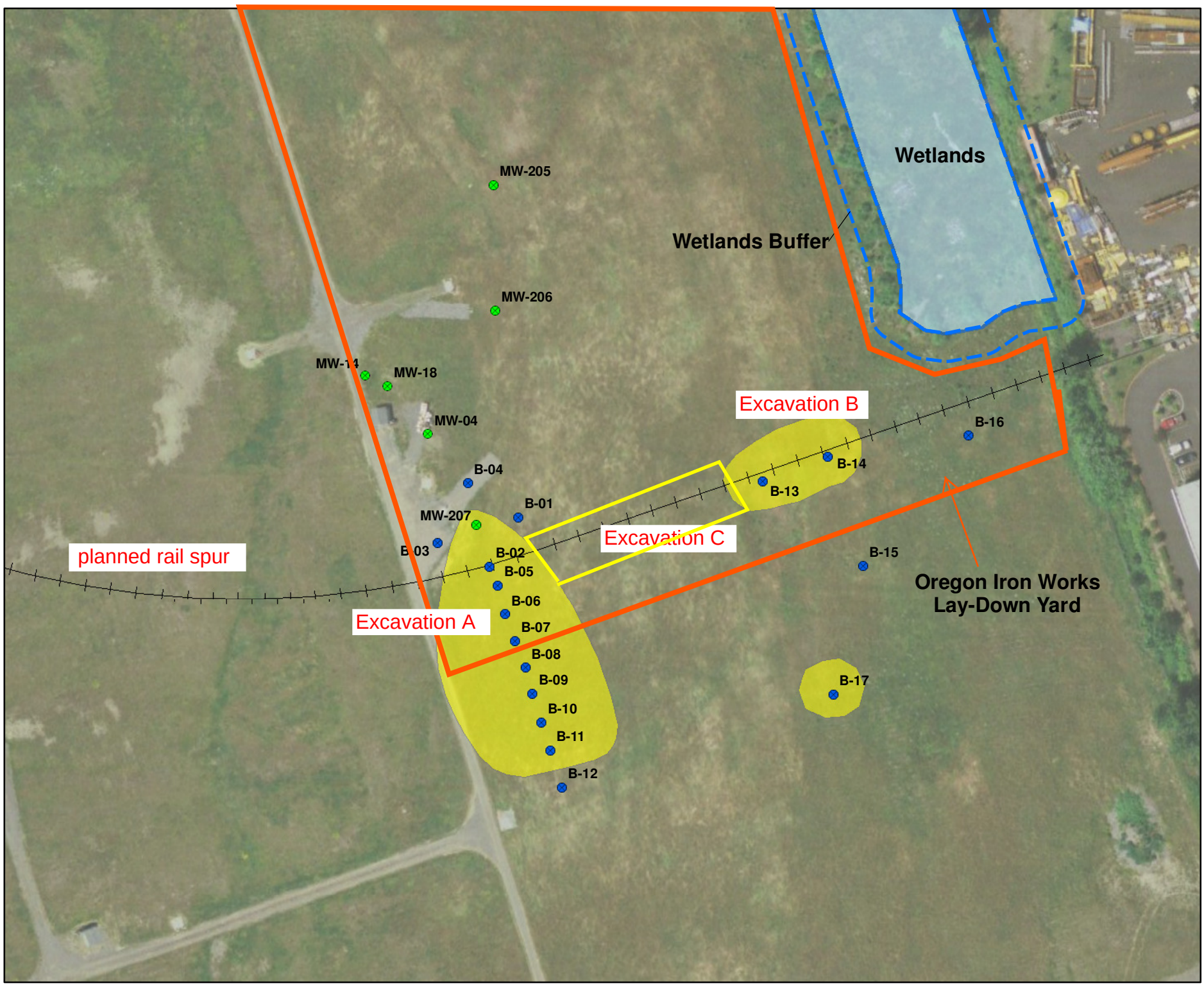
UJ = The analyte was not detected at or above the reported estimated result

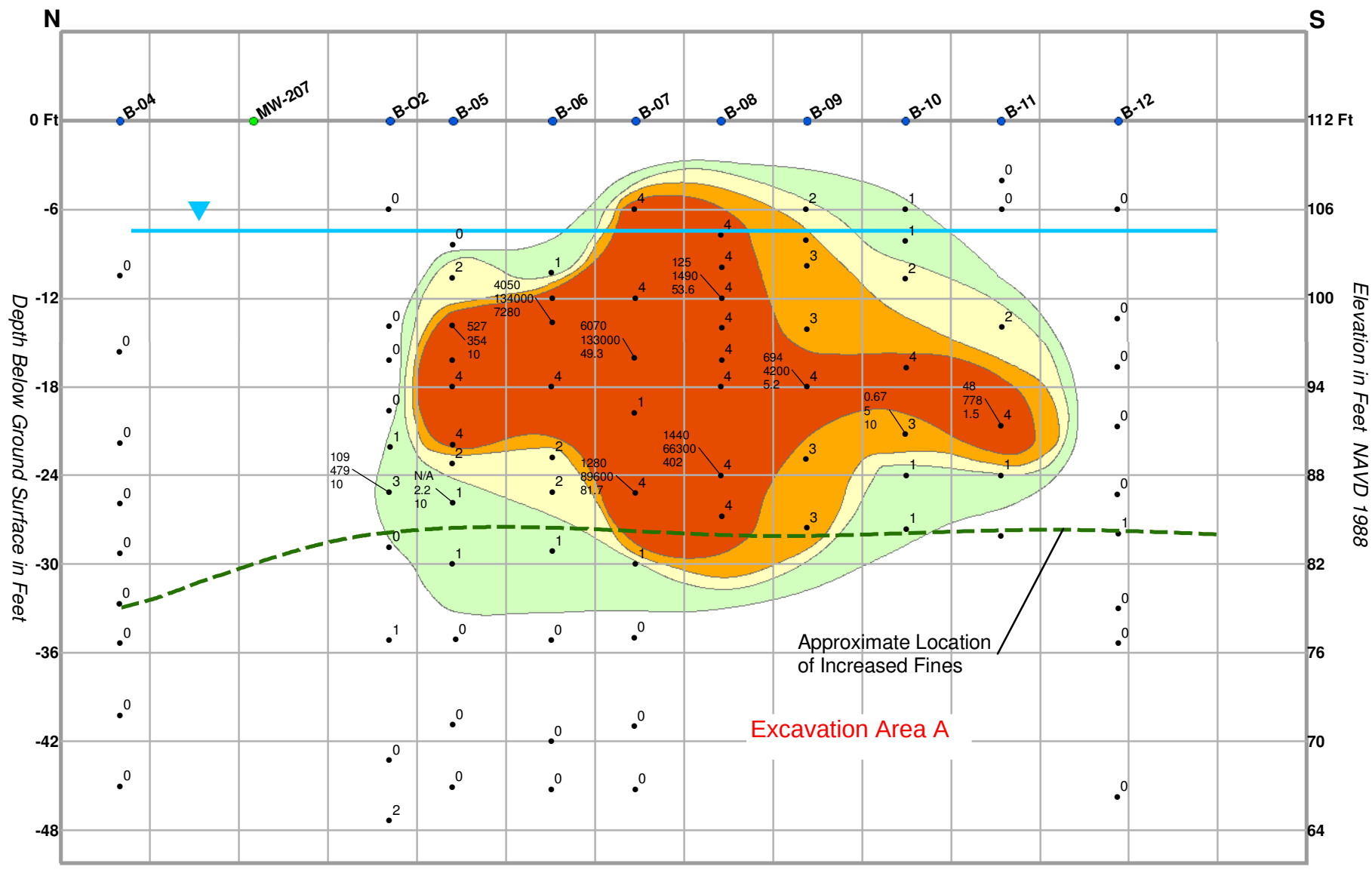
UB = Analyte was detected in a QC blank. The sample result is less than five times the blank concentration and is possibly due to cross-contamination. The analyte is considered not detected.

-- = not applicable

1 = Remedial Goals and Restoration Goals from *Northwest Pipe and Casing Company - OU2 Record of Decision, September 2001*

2 = Regional Screening Levels from *EPA Regional Screening Level Table (RSL) Master, April 2009*





Parametrix

N

0 50 100 150

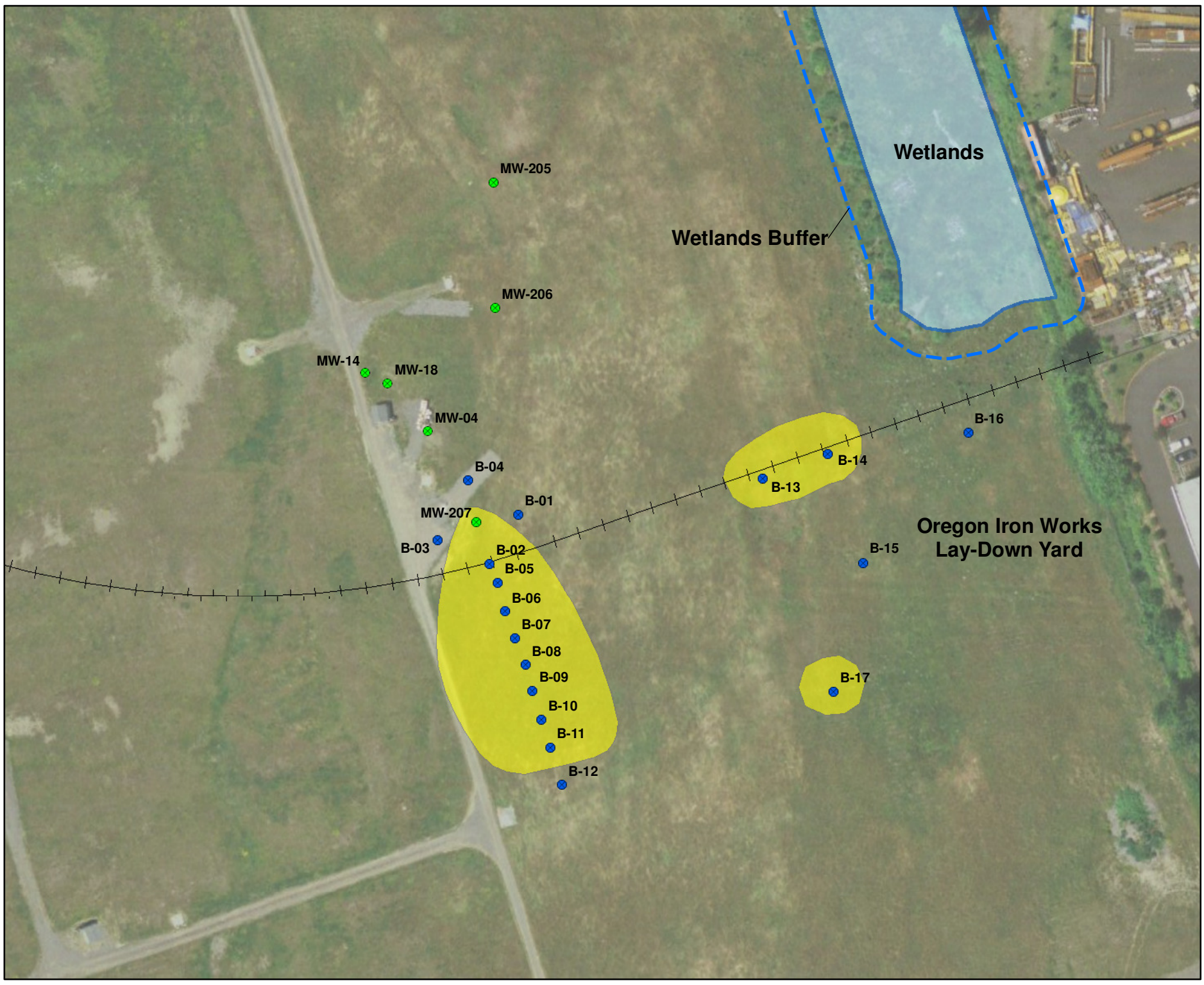
Feet

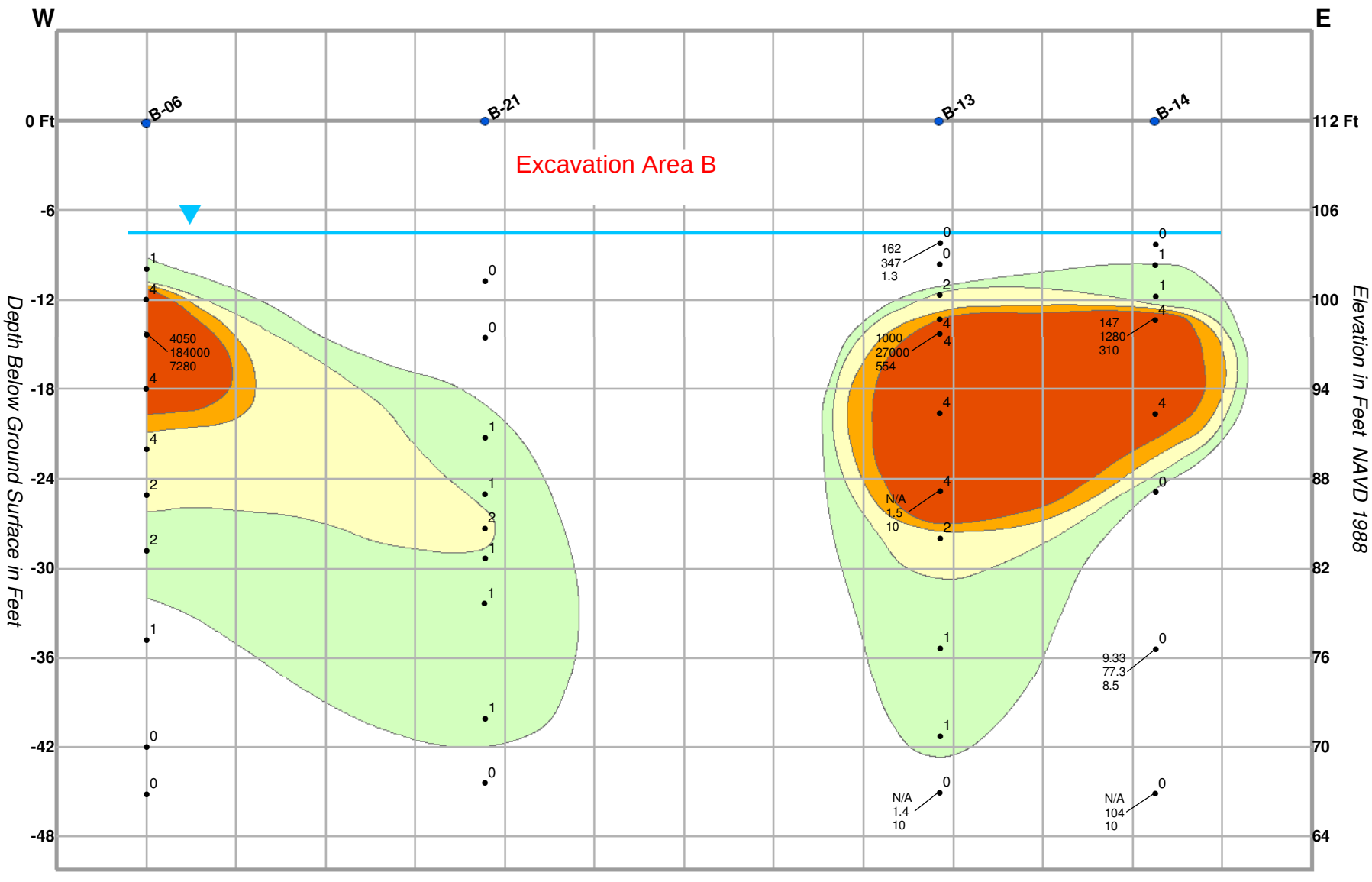
- Sonic Boring
- Existing Monitoring Well
- Coal Tar Body

0 No Impact
1 Naphthalene Odor
2 Sheen
3 Coal Tar Globuals
4 DNAPL

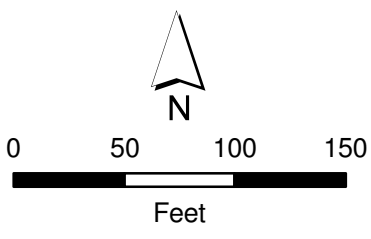
NW Pipe Casing
Portland, Oregon
June 17, 2009

Figure 4





Parametrix



- Sonic Boring
- Existing Monitoring Well
- Coal Tar Body

0 No Impact
1 Naphthalene Odor
2 Sheen
3 Coal Tar Globuals
4 DNAPL

NW Pipe Casing
Portland, Oregon
June 17, 2009

Figure 5