VOLUME I

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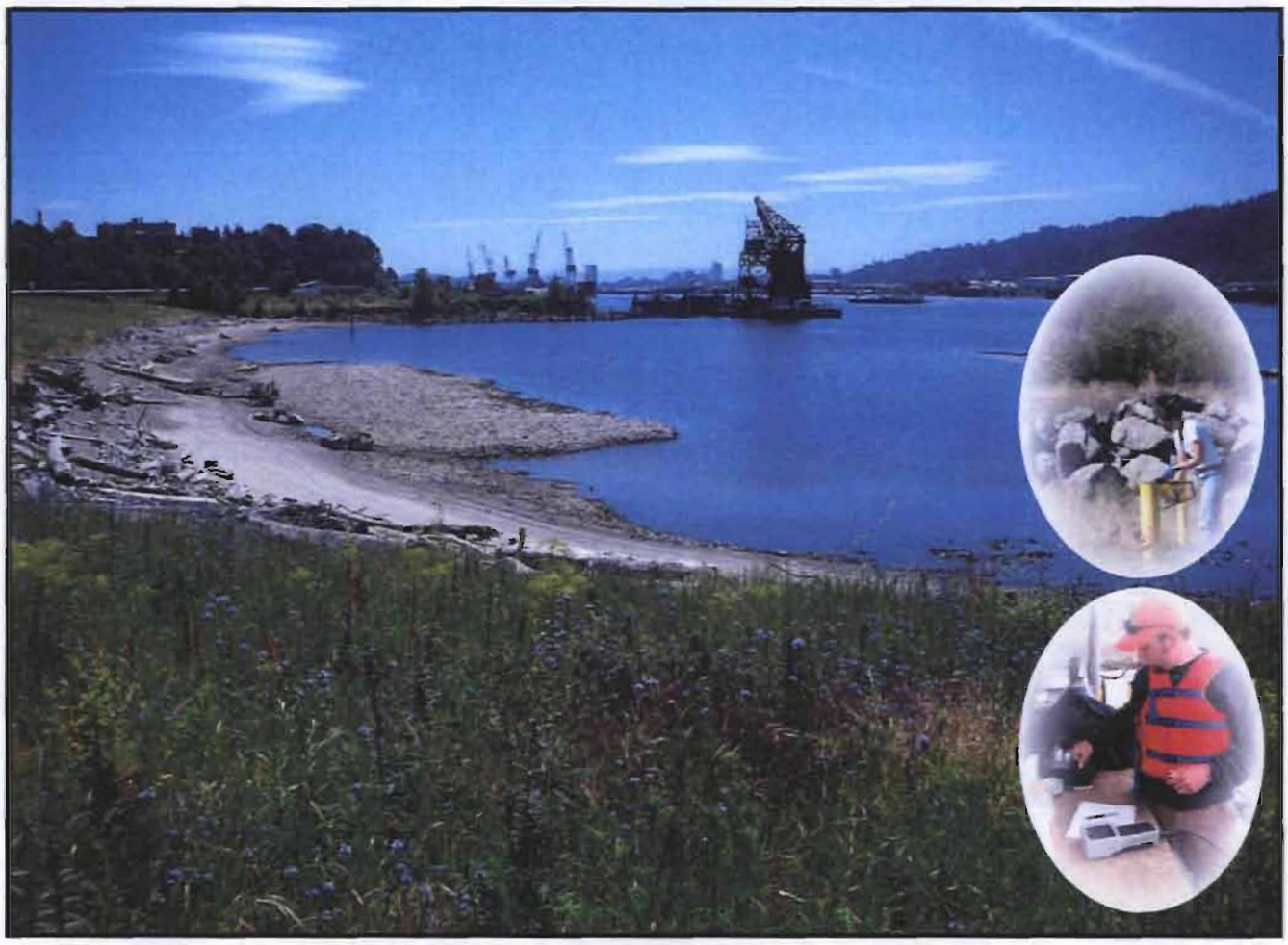
OPERATION AND MAINTENANCE REPORT

(JANUARY 2007 THROUGH DECEMBER 2007)

MCCORMICK & BAXTER CREOSOTING COMPANY
SUPERFUND SITE

PORTLAND, OREGON



May 2008

Task Order No. 71-03-28

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Department of
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Operation and Maintenance Report

(January 2007 through December 2007)

McCormick & Baxter Creosoting Company Site Portland, Oregon

Task Order No. 71-03-28

May 2008

Prepared for:

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
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List of Abbreviations and Acronyms

AAC	Advanced American Construction
ACB	Articulated Concrete Block
ACLs	Alternate Concentration Limits
ACZA	Ammoniacal Copper Zinc Arsenate
AWQC	Ambient Water Quality Criteria
bgs	Below Ground Surface
BNRB	Burlington Northern Railroad Bridge
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	Cubic Feet per Second
Clearwater	Clearwater Environmental Services, Inc
COC	Contaminant of Concern
CPA	Central Processing Area
cPAHs	Carcinogenic Polynuclear Aromatic Hydrocarbons
DEA	David Evans and Associates, Inc.
DEQ	Oregon Department of Environmental Quality
DNAPL	dense nonaqueous phase liquid
E & E	Ecology and Environment, Inc.
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FWDA	Former Waste Disposal Area
HI	Hazard Index
LNAPL	light nonaqueous phase liquid
McCormick & Baxter	McCormick & Baxter Creosoting Company
MCL	Primary Drinking Water Standard Maximum Contaminant Level
MDL	method detection limit

List of Abbreviations and Acronyms (cont.)

NAPL	nonaqueous phase liquid
NAVD	North American Vertical Datum
NPL	National Priorities List
OHW	Ordinary High Water
O&M	Operation and Maintenance
PAHs	polynuclear aromatic hydrocarbons
PCP	pentachlorophenol
PSU	Portland State University
RAOs	Remedial Action Objectives
ROD	Record of Decision
Site	McCormick & Baxter Creosoting Company Site
SSC	Superfund State Contract
TCDD TEQ	2,3,7,8-Tetrachlorodibenzo-p-dioxin toxic equivalency quotient
TFA	Tank Farm Area
USACE	United States Army Corps of Engineers
UT	University of Texas

1 Introduction and Purpose

This Operation and Maintenance (O&M) Report has been prepared for the Oregon Department of Environmental Quality (DEQ) to document the O&M activities implemented at the McCormick and Baxter Creosoting Company Superfund Site (Site), located in Portland, Multnomah County, Oregon, between January 1, 2007 and December 31, 2007. The location of the Site is shown in Figure 1-1. Figure 1-2 presents the Site layout and features and Figure 1-3 presents the Site layout with surface elevations. This report has been prepared by DEQ's contractor, Ecology and Environment, Inc. (E & E).

The DEQ is conducting O&M activities according to the October 2007 Draft O&M Plan prepared by DEQ (DEQ, 2007). The October 2007 Draft O&M Plan defines the administrative, financial, and technical details and requirements for inspecting, operating, and maintaining the remedial actions at the Site. The O&M Manual (GSI/Hart Crowser, 2008) specifies the sampling and monitoring procedures, quality assurance and quality control, technical information, and data necessary for implementing O&M activities.

The October 2007 O&M Plan (DEQ, 2007) provides the Site background including: Site description, Site history, regulatory history, removal actions, remedy selection, redevelopment potential, and remedy description. Additional information regarding the hydrogeology and nonaqueous phase liquid (NAPL) distribution and mobility is presented in the Post-Remedial Action Conceptual Site Model for NAPL Mobility (CSM) (GSI, 2007). A few select figures from these documents have been included in this report as requested by the project team. Figure 1-4 presents monitoring well locations, Figure 1-5 presents development restrictions, and Figure 1-6 presents the historic sources. Figure 1-7 presents a Site cross section (A2-A2' from the CSM) showing the hydrogeologic units in addition to nonaqueous phase contamination distribution based on borings. The cross section location is presented in Figure 1-3.

This O&M Report documents the operation, monitoring, and maintenance activities that occurred in 2007. The O&M performance standards and activities are provided in Section 2; the non-sampling O&M activities are summarized in Section 3; and the sampling activities are summarized in Section 4. Section 5 discusses planned activities for 2008.

Detailed presentations of these O&M activities are provided in the following Attachments:

- Attachment A is the *Barrier Wall Performance Monitoring Assessment*;

- Attachment B is the *Site Observation and Activity Summary*;
- Attachment C is the *Sheen Observation and Investigation Summary;*
- Attachment D is the *Organoclay Cap Performance Evaluation – Laboratory Study;*
- Attachment E is the *Armoring Assessment and Repair;*
- Attachment F is the *Vegetation Survival Assessment*;
- Attachment G is the *Surface Water, Inter-armoring Water, and Sub-armoring Water Assessment*;
- Attachment H is the *Infiltration Pond MW-59s Groundwater Quality Assessment*; and
- Attachment I contains Updated Site-Wide Record Drawings.

The O&M Report has been provided to DEQ in hard copy and in electronic format on compact disc (CD) and digital video disc (DVD). It should be noted that the CD and DVD contain material not provided in the hard copy report including, full laboratory analytical reports, statistical analysis, and diver video images from sampling efforts.

O&M activities were implemented primarily by DEQ's contractor, E & E. E & E used subcontractors for support of these activities including Clearwater Environmental Services, Inc (Clearwater) for routine operation, monitoring, and maintenance activities including NAPL gauging and extraction and Site inspections; David Evans and Associates, Inc. (DEA) for Site surveying and bathymetry; Global Diving, Inc. for surface water/inter-armoring/sub-armoring sampling support; S.S. Papadopulos and Associates, Inc. (SSPA) for groundwater modeling efforts related to the CSM; and Advanced American Construction, Inc. (AAC) for diver inspections and placement of additional rock armoring. DEQ maintained contracts with Test America for laboratory analytical support and GSI Water Solutions, Inc. (GSI) for additional hydrogeological support. DEQ also maintained intergovernmental agreements with the City of Portland for vegetation planting and maintenance and Oregon State University for biodegradation studies, as well as an interstate agreement with the University of Texas for performance studies on organoclay.

Key personnel for implementation of O&M activities included:

- Kevin Parrett: Oregon DEQ Project Officer;
- Steve Campbell: Oregon DEQ Contract Specialist;
- John Montgomery: E & E Program Manager;
- Eric White: E & E Project Manager;
- George Lukert: E & E Task Manager;
- Lenna Cope: E & E Project Engineer;

- Chad Nancarrow: E & E Project Engineer (Record Drawings); and
- Heidi Blischke: Hydrogeologist, GSI Water Solutions, Inc.

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2 Operation and Maintenance Performance Standards and Activities

As discussed in Section 1, the DEQ is conducting O&M activities according to a Draft O&M Plan prepared by DEQ. Performance standards and activities of the October 2007 Draft O&M Plan (DEQ, 2007) are described below.

2.1 Soil Remedy

Soils beneath the soil cap remain contaminated with arsenic, pentachlorophenol (PCP), polyaromatic hydrocarbons (PAHs), dioxins, and NAPL, thereby requiring the need for long-term monitoring and maintenance. The performance standards for the soil cap are as follows.

- Maintain contaminant concentrations in surface soil below the following risk-based cleanup goals, as specified in the Record of Decision (ROD):
  - Arsenic – 8 milligrams per kilogram (mg/kg)
  - Pentachlorophenol – 50 mg/kg
  - Total Carcinogenic PAHs – 1 mg/kg
  - Dioxins/furans – 0.00004 mg/kg
- Maintain the topsoil layer to within 50 percent of its design specification:
  - Area over impermeable geomembrane cap – maintain thickness of at least 6 inches
  - All areas except over impermeable geomembrane cap - maintain thickness of at least 12 inches
- Minimize infiltration of rainwater within the subsurface barrier wall by maintaining a subsurface stormwater conveyance system.
- Minimize stormwater erosion and surface water ponding by maintaining Site grading, surface stormwater conveyance, and native vegetation.
- Maintain native vegetation within the 6-acre riparian zone for compliance with the National Marine Fisheries Service Biological Opinion (NOAA, 2004).

Monitoring activities for the soil cap (including the riparian zone) include visual inspections of the cap surface, stormwater conveyance system, security fencing, and warning signs. The soil cap is designed to be generally maintenance free, except for maintaining the native vegetation. Routine maintenance includes irrigation of native vegetation through Summer 2008, mowing of open grass areas, manual removal of invasive plants, and targeted application of herbicides. Non-

routine maintenance may include repairs of the fence, replacement of warning signs, repairs of the gravel roads, filling of potential animal burrows, removal of sediment from manholes and replanting of unsuccessful trees and shrubs. The frequency of these O&M activities over the first five years of O&M is provided in Table 2-1.

2.2 Sediment Remedy

Sediments beneath the sediment cap remain contaminated with arsenic, PCPs, PAHs, dioxins, and NAPL, thereby requiring the need for long-term monitoring and maintenance. The performance standards for the sediment cap are as follows:

- Maintain contaminant concentrations in surface sediments below the following risk-based cleanup goals, as specified in the ROD (EPA 1996):
  - Arsenic – 12 mg/kg, dry weight
  - Pentachlorophenol – 100 mg/kg, dry weight
  - Total Carcinogenic PAHs – 2 mg/kg, dry weight
  - Dioxins/furans – $8x10^{-5}$ mg/kg, dry weight
  - Protection of benthic organisms based on sediment bioassay tests, resulting in impaired survival and growth (i.e., weight).
- Prevent visible discharge of creosote to the Willamette River.
- Minimize releases of contaminants from sediment that might result in contamination of the Willamette River in excess of the following Federal and State ambient water quality criteria (AWQC)[1]:
  - Arsenic (III) – 190 micrograms per liter (µg/l).
  - Chromium (III) – 210 µg/l.
  - Copper – 12 µg/l.
  - Zinc – 110 µg/l.
  - Pentachlorophenol – 13 µg/l.
  - Acenaphthene – 520 µg/l.
  - Fluoranthene – 54 µg/l.
  - Naphthalene – 620 µg/l.
  - Total Carcinogenic PAHs – 0.031 µg/l.
  - Dioxins/furans – $1.4x10^{-5}$ nanograms per liter (ng/l).
- Maintain the armoring layer to within 50 percent of the design specification:
  - 6" rock armoring – maintain thickness of at least 6 inches.
  - 12" rock armoring – maintain thickness of at least 7.5 inches.
  - 24" rock armoring – maintain thickness of at least 12 inches.
- Maintain uniformity and continuity of articulated concrete block armoring.
- Maintain at least 20 percent excess sorption capacity of the organoclay cap.

[1] The ROD specifies no exceedance of surface water background levels for the groundwater remedy. Issues associated with this cleanup goal (i.e., relating to Alternate Concentration Limits) are further discussed in Section VIII and IX of the Second Five-Year Review Report.

The AWQC values listed above are those values in effect at the time of the ROD (EPA 1996); however, since completion of the ROD, the AWQC values have been updated. During meetings in August 2007 between stakeholders (DEQ, EPA, NOAA, Warm Springs Tribe, and Yakama Tribe) it was agreed that for comparison purposes, five benchmarks would be included in analytical results summary tables in this 2007 O&M Report:(i) two AWQCs in effect at the time the ROD was issued (1996 criteria for chronic effects to aquatic life and for human health based on fish consumption); (ii) two current 2007 National Recommended Water Quality Criteria (NRWQCs) [one for chronic effects to aquatic life and one for human health (consumption of organisms)]; and (iii) current Maximum Contaminant Levels (MCLs). Although these benchmarks have been included in this 2007 O&M Report for comparison purposes, the ROD cleanup levels have not been formally changed.

Monitoring activities for the sediment cap include visual inspections of near shore areas and may include aerial photography of the shoreline during extreme low river stages (late September or early October), multi-beam bathymetric surveys and side-scan sonar surveys of deeper areas, and diver inspections of areas of concern identified from the bathymetry and sonar surveys. Monitoring activities also include collection of samples from surface water, inter-armoring water, sub-armoring water, organoclay cores, and crayfish. Although the sediment cap is designed to be generally maintenance free, unplanned or non-routine maintenance may include: the replacement of warning buoys, placement of additional armoring due to erosion, and placement of additional organoclay if new releases of creosote are discovered or if the existing organoclay becomes saturated with creosote. Any new organoclay would require armoring. (Monitoring and maintenance of the riparian zone is addressed as part of the soil cap.) The frequency of these O&M activities over the first five years of O&M is provided in Table 2-2.

2.3 Groundwater Remedy

Groundwater both within and outside of the subsurface barrier wall remains contaminated with metals, PCP, PAHs, dioxins, and NAPL, thereby requiring the need for long-term monitoring and maintenance. The performance standards for the subsurface barrier wall and NAPL recovery are as follows.

- Continue to recover NAPL from outside the subsurface barrier wall until recovery rates become minimal, alternative pumping strategies have been examined and/or field tested with poor results, and remaining NAPL does not pose a threat to the Willamette River and its sediments.
- Maintain contaminant concentrations in shallow, downgradient compliance wells (or sediment pore water) below Site cleanup standards. The cleanup standards that were initially identified for the Site, Alternate Con-

centration Limits (ACLs) set forth in the ROD[2], are no longer being used, pending identification of final standards. For reference purposes, groundwater data is compared with current Primary Drinking Water Maximum Contaminant Levels (MCLs):

- Arsenic – 0.01 mg/l.
- Chromium – 0.1 mg/l.
- Pentachlorophenol – 1 µg/l.
- Benzo (a) pyrene – 0.2 µg/l.

- Minimize the transport of NAPL and communication of groundwater zones across the subsurface barrier wall.
- Minimize further vertical migration of creosote.
- Minimize visible discharge of creosote to the Willamette River.
- Maintain contaminant concentrations in the Willamette River below background concentrations or less than the Sediment Cap performance standards for surface water.[3]

Monitoring activities for the groundwater remedy include groundwater elevation monitoring and groundwater sampling. Routine maintenance of equipment and providing for Site utility service are also included as elements of groundwater O&M. The frequency of these O&M activities over the first five years of O&M is provided in Table 2-3.

[2] The ROD initially specified site-specific ACLs for the Site. EPA has determined that ACLs are not valid as substitutes for Primary Drinking Water Standard Maximum Contaminant Levels (MCLs) in groundwater. Invalidation of ACLs also invalidates the CERCLA provision for implementation of ACLs which prohibits exceedance of background concentrations in surface water for the Site. As a result of this determination, the DEQ and EPA anticipate that: 1) groundwater standards for the Site will be established following a rigorous analysis of Site conditions and all relevant data; and 2) (assuming MCLs cannot be met) the application of a waiver pursuant to Section 122(d)(4) of CERCLA for MCLs to comply with the threshold criterion (meeting ARARs) for all remedies implemented pursuant to all CERCLA final ROD. Issues associated with use of ACLs at this Site are further discussed in Section VIII and IX of the Second Five-Year Review Report.

[3] See previous footnote.

3 Non-Sampling Operation and Maintenance Activities Summary

This section provides a brief overview of key O&M activities that do not include sample collection and analysis. Tables 2-1, 2-2, and 2-3 in Section 2 listed the activities typically performed at the Site. O&M activities conducted in 2007 included inspections, routine and non-routine maintenance, NAPL recovery, and provision of Site utility services. A summary of sampling activities is provided in Section 4.

More detailed presentations of the non-sampling O&M activities are provided in the following Attachments:

- Attachment A – *Groundwater and NAPL Monitoring Assessment.*
- Attachment B – *Site Observation and Activity Summary* for the period of January 1, 2007 through September 30, 2007.
- Attachment E – *Armoring Assessment and Repair* performed in 2007.
- Attachment F – *Vegetation Survival Assessment* completed in November 2007.
- Attachment I – *Updated Site-Wide Record Drawings.*

3.1 Groundwater and NAPL Monitoring Assessment

To assess the performance of the barrier wall and soil cap, E & E performed periodic well gauging, NAPL measurement and extraction. During the reporting period, January 1, 2007 through December 31, 2007, NAPL was monitored weekly in eight Site wells and quarterly in the remaining wells onsite. Monitoring was not performed for the weeks ending 1/27/2007, 8/18/2007, 8/25/2007, 9/1/2007, 9/22/2007, 10/20/2007, and 11/3/2007 because of constructions activities at the Site or due to the monitoring equipment being repaired. Extraction was performed only in wells located outside the barrier wall that contained sufficient NAPL to warrant extraction. Light nonaqueous phase liquids (LNAPL) was measured in six wells during the reporting period (EW-2s, EW-9s, EW-10s, EW-18s, EW-23s, and MW-56s). Four of the five wells are located within the barrier wall; therefore, no LNAPL was extracted from these wells. The fifth well (EW-10s) is located outside the barrier wall and contained sufficiently thick LNAPL (i.e., > 0.4 feet) to warrant extraction twice during the reporting period. However,

when a bailer was inserted for extraction, the LNAPL dissipated, and no LNAPL was able to be collected during the monitoring period.

Dense nonaqueous phase liquids (DNAPL) was measured in six wells during the reporting period (MW-20i, MW-Ds, MW-Gs, EW-1s, EW-8s, and EW-9s). Two of the wells are located within the barrier wall (EW-1s and EW-8s); therefore, no DNAPL was extracted from these wells. The remaining four wells are located outside the barrier wall. Of the four wells located outside the barrier wall, three contained sufficiently thick DNAPL (i.e., > 1.5 feet) to warrant extraction at least once during the reporting period. Approximately 35 gallons of DNAPL was extracted from the Site bringing the total NAPL extracted to date to approximately 6,190 gallons.

Manual measurements of static groundwater levels were conducted on February 13, 2007; June 18, 2007; September 26, 2007; and December 17, 2007 during low tide. Groundwater contour maps indicate that groundwater flow direction and gradient is consistent with previous reporting periods. Seasonal changes in gradients are apparent and consistent with previous reporting periods. During the last four quarters, the groundwater elevation outside the barrier wall peaked in the first quarter of 2007 with a level of approximately 20 feet North American Vertical Datum (NAVD), and was at its lowest level during the fourth quarter of 2007, with a level of approximately 16 feet NAVD. Within the barrier wall, peak groundwater levels were 15 feet NAVD during the first and second quarters of 2007 and 13 to 14 feet NAVD during the third and fourth quarters of 2007. Prior to installation of the impermeable cap, the elevation difference outside versus inside at the bluff side of the barrier wall averaged 1-foot. After installation, elevation differences are approximately 3.5 to 4 feet.

Groundwater level data was collected using pressure transducers that monitored groundwater level fluctuations on a half-hour basis at select monitoring wells surrounding the barrier wall. Transducer plots were prepared for selected monitoring wells (MW-36s, MW-37s, MW-44s MW-45s, MW-52s, and MW-53s) inside and outside the barrier wall. Data for the fourth quarter is not available because the transducers were improperly programmed and recorded the necessary groundwater levels for only the initial few days of the quarter.

Based on the observations made to date in 2007, it appears that the barrier wall and cap are functioning, as intended, to divert groundwater flow and rainwater infiltration around the remaining contamination in former source areas located within the barrier wall. NAPL does not appear to be increasing significantly in any of the observation wells, and the overall rate of extraction of NAPL appears to be reaching a plateau.

3.2 Site Observation and Activity Summary

Tables 2-1 and 2-2 outline the planned inspections for the soil and sediment caps, respectively, during the reporting period. E & E subcontracted with Clearwater to

perform routine O&M activities, including Site inspections. During the months of July, August, and September 2007, sediment cap inspections were performed on a weekly basis. During the remainder of the reporting period, sediment cap inspections were performed on a monthly basis. Soil cap inspections were performed on a monthly basis during the reporting period. Additional Site inspections were performed during monthly Site meetings, sampling events, and other miscellaneous Site visits.

During the reporting period, sheen was regularly observed from approximately late June to September, but not observed during the remainder of the period. The sheen was observed most frequently in the vicinity of organoclay mat OC-2 located south east of the granular organoclay off of the TFA area. Sheen in this area was observed in thin bands along the shoreline, and in small quarter- to fist-sized spots. Sheen observed at the remainder of the Site was generally quarter- to fist-sized. In general, the sheen was blocky and milky in appearance. Two sampling events were performed in an effort to identify the source or release mechanism for the sheen observed near the organoclay mat OC-2; these sampling events are summarized in Section 3.1. Although the source of the sheen near the organoclay mat appears to be from the Site, the mechanism producing the sheen is not clear. Should the sheen occur again next summer, E & E recommends additional evaluation into the mechanism and potential actions to mitigate the sheen.

In general, the sediment and soil caps appear to be stable, with no significant changes observed during the reporting period. For the sediment cap, sand cover remains over a majority of the shoreline. Some portions of articulated concrete block (ACB) are exposed and visible: the largest area of exposed ACB is towards the southern end of the Site where a steep shoreline slope exists. For subsurface conditions, bathymetric difference images indicate a stable surface with no extreme cases of deepening or shoaling of the sediment cap. For the soil cap; previous erosion near the retention pond has ceased and vegetation is maturing. Animal burrows observed in the soil cap were excavated to determine if they posed a threat to the soil cap integrity; however, none of the burrows extended into contaminated soil (maximum depth observed was 1.5 feet) and currently no actions are planned to address burrows. Wildlife commonly seen at the Site includes Canada goose, common crow, blue heron, osprey, bald eagle, squirrel, and rabbit; a sea lion, coyotes, and potentially nutria have also been observed.

Site inspections and observation resulted in several non-routine maintenance activities in addition to routine activities. Non-routine activities include: fence repairs, organoclay mat installation, treated timber removal, grouting gaps in the ACB, cutting stainless steel ACB cable loops which became exposed as sand or woody debris shifted, repairing the overhead security light, placing additional rock armoring, and replacing monitoring well locks. Routine activities include operating the irrigation system and maintenance of extraction pumps and hoses, air compressor, regulators, the Site vehicle, and the oil-water interface meter used for gauging.

3.3 Armoring Assessment and Repair

As a result of inspections and observations performed in 2006 and 2007, additional rock armoring was placed at six locations within the sediment cap footprint. Construction activities took place from June 26, 2007 through July 11, 2007 and were performed by AAC, with direction provided by E & E and DEQ. Approximately 139 tons of 6-inch minus rock was placed at five locations, covering a total area of approximately 200 square yards, where rock armoring was found to be deficient. Approximately 752 tons of 10-inch minus rock was placed in the embayment (Area 6), covering a total area of approximately 800 square yards, where rock armoring was found to be deficient. Six-inch minus rock was placed using a clam shell bucket operated from a crane barge. The 10-inch minus rock was placed using an excavator from the edge of a small barge guided into position by two skiffs and a tug boat.

To evaluate changes in the topography of the river bottom over the sediment cap, a series of bathymetric surveys were completed by DEA and reviewed by E & E and DEQ. Difference analysis of these images over various timeframes show how the river bottom contours have changed during and after cap construction activities. In general, the cap appears to have been stable since completion of the cap construction, with no general trends of deepening or shoaling that would indicate the cap itself is being affected by erosional forces. This review did indicate, however, small locations where deepening appeared to be taking place. Three potential anomalies were selected for further evaluation via diver inspections, which were performed on July 10, 2007, in conjunction with the rock armor placement activities. The additional diver inspections indicated that rock armoring was present in two of the three locations, that there did not appear to be scouring taking place at these locations, and that rock armoring was likely to be present at the third location, although it is covered by a thick layer of deposited sand. The areas of concern will continue to be monitored in the future.

Prior to placement of additional armoring, E & E prepared an Environmental Monitoring and Reporting Plan (Appendix B of Attachment E of this O&M Report) which outlined the monitoring, documentation, and reporting procedures to be followed by oversight personnel. This monitoring was intended to evaluate impacts to water quality and make certain that the protective measures presented in the NMFS biological opinion were implemented. No dead or injured endangered species and no sheen in the work area were observed during environmental monitoring. Turbidity monitoring showed no adverse effects resulting from construction activities.

3.4 Vegetation Survival Assessment

The City of Portland, Bureau of Environmental Services (BES) provides DEQ with vegetation planning and maintenance services under an Intergovernmental Agreement. Since the re-vegetation project started in 2005, it has performed above expectations. BES has divided the site into five areas: (i) upper riparian

(18.7 to 30.0 NGVD), (ii) lower riparian (16.6 to 18.7 NGVD), (iii) natural tree and shrub planting area, (iv) swale and pond planting, and (v) impermeable soil cap. In the upper riparian area the alder trees have grown faster than the other plantings, although the survival rates are equal. The survival rate for the woody species planted in this area is approximately 68%; the mortality was mostly among the live stake plants rather then the bare root plantings. Groundcover in the upper riparian area has shifted from predominantly lupine to clovers and grasses, which should help the woody species survival rates. The lower riparian area is experiencing lower survival rates than the upper riparian area because the irrigation system does not extend into this area; the survival rate is approximately 62%. BES recommends considering extension of the irrigation system pending monitoring results in 2008. In the natural tree and shrub planting areas, the madrone, oak, and hawthorn varieties have a 100% survival rate. The survival rate in the swale and pond areas is approximately 63%; the live stakes have not been as successful as as bare root, but will achieve shrub cover. Alder seedlings are naturally regenerating in the swale and pond area. After an initial successful first growing season (Fall 2005), there has been a rapid decline in vigor for the grasses and wildflowers in the impermeable soil cap area. BES has reseeded the area and will continue to monitor survival and vigor. A common recommendation among all the areas is to continue monitoring for noxious weeds and continue their management through herbicide application and/or manual pulling. The vegetation survival assessment also discusses repairs to the irrigation system over the last year.

3.5 Updated Site-Wide Record Drawings

As a result of the additional rock placement at the Site, the record drawing depicting sediment cap features (Sheet 2) was updated, and is provided as Attachment I to this report. Updates to the drawing include: revised topography in the embayment to reflect contours surveyed by DEA following the additional rock placement, delineation of five additional rock armor placement areas that have not been surveyed, the addition of a new 20-foot by 15-foot section of organoclay mat near the tank farm area, and corrections to organoclay mats to better reflect actual Site conditions.

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4 Sampling Activities Summary

This section provides a brief summary of the O&M activities listed in Tables 2-2 and 2-3 pertaining to sampling requirements at the Site. These sampling events included sampling: surface water, inter-armoring water, and sub-armoring water; and the infiltration pond monitoring well MW-59s. Additional surface water and sub-armoring water sampling, not outlined in Table 2-2, was performed in response to sheen occurrences at the Site, and laboratory analysis of previously collected organoclay cores was completed.

More detailed presentations of these O&M activities related to sampling are provided in the following Attachments:

- Attachment C – *Sheen Observation and Investigation Summary.*
- Attachment D – *Organoclay Cap Performance Evaluation – Laboratory Study.*
- Attachment G – *Surface Water, Inter-armoring Water, Sub-armoring Water Assessment.*
- Attachment H – *Infiltration Pond MW-59s Groundwater Quality Assessment.*

Supplemental information for these activities is provided in electronic format on the O&M Report CD.

4.1 Sheen Observation and Investigation Summary

Two sampling events have been conducted in response to sheen observed at the Site during Summer 2007. The sheen was milky and blocky in appearance, suggesting a fair degree of weathering. During the first event, on June 26, 2007, surface water samples were collected at low tide from eight locations; sheen was visible at four of the eight sample locations, while the other four locations were selected riverward of the locations where sheen was observed. During the second event, on September 27, 2007, surface water and sub-armoring water was collected at multiple time intervals from one location during the course of one tidal cycle; sheen was not visible during most of the sampling event.

In the June 26, 2007 event, detectable total PAH concentrations were reported in all four of the shoreward sample locations and in two of the four riverward samples. Total PAH concentrations in the shoreward samples ranged from 0.177

µg/L to 4.93 µg/L. Total PAH concentrations in the riverward samples ranged from below the method detection limits to a maximum concentration of 0.358 µg/L. The maximum total PAH concentration was detected at Location A, which is a shoreward location. One sample exceeded the corresponding comparison criterion of 0.031 µg/L for total cPAHs, Location C, which is a shoreward location. These concentrations are consistent with previous sub-armoring water samples from the area and may represent groundwater discharging from the bank during low tide. PCP was detected at one location (Location G), but it was below the comparison criteria of 1.0 µg/L. Location G is a shoreward location.

In the September 27, 2007 sampling event, total PAHs were detected in three of eight surface water samples and all eight sub-armoring water samples. In surface water samples, total PAH concentrations ranged from below method detection limits to a maximum concentration of 0.27 µg/L. In sub-armoring water samples, total PAH concentrations ranges from 7.51 µg/L to 25.8 µg/L. No sample from the event exceeded the corresponding comparison criteria of 0.031 µg/L for total cPAHs, or any individual cPAH. PCP was not detected above the method detection limits in any of the samples collected. The method reporting limit for PCP was 0.24 µg/L.

4.2 Organoclay Cap Performance Evaluation – Laboratory Study

The University of Texas at Austin, under contract to DEQ, performed a series of tests on organoclay core samples collected from the Site in 2006. The organoclay core field sampling effort is described in Attachment E of the 2006 O&M Report (E & E 2007). The laboratory results are provided as Attachment D to this 2007 O&M Report. The following tests were conducted to evaluate the performance of organoclay placed in bulk layers and mats, from the time of placement through October 2006: available sorption capacity for NAPL, percent hexane extractable material (%HEM), permeability, and water content.

Analyses indicate that NAPL has not compromised the ability of organoclay to continue to protect against NAPL migration and release. Results from sorption capacity and % HEM tests were essentially equivalent to that expected of water saturated fresh organoclay. The lowest available sorption capacity and the highest fraction of HEM occurred at the sediment organoclay interface, where there was visible evidence of NAPL in some samples. In addition, the permeability of the core samples was essentially equivalent to fresh organoclay, suggesting that NAPL can continue to penetrate and be sorbed by the organoclay if mobile NAPL exists. These results indicate that the placed organoclay continues to perform as designed and that its ability to contain NAPL has not been compromised by reduction in either capacity or permeability. Similar results were noted from the organoclay placed as mats.

4.3 Surface Water, Inter-Armoring Water, Sub-Armoring Water Quality Assessment

Post cap construction surface water/inter-armoring water/sub-armoring water sampling took place during the Fall of 2005, Spring of 2006, Fall of 2006, Spring of 2007, and Fall of 2007. Pre-cap construction surface water/pore water sampling took place in 2002 and 2003. Attachment G contains the *Surface Water, Inter-Armoring Water, and Sub-Armoring Water Assessment,* which describes sampling methodology, sampling results, summaries, and references for the 2007 events, as well as a summary of results from previous sampling events conducted in 2002, 2003, 2005, and 2006. Beginning in 2005, sampling activities were conducted in the fall and spring of each year to evaluate post sediment cap construction water quality conditions under both low-river and high–river conditions.

Samples taken in 2005, 2006, and 2007 included the collection of water contained in the sand layer of the sediment cap (above the original sediments but beneath the overlying armoring layer); hence the term sub-armoring water samples. Samples taken in 2002 and 2003 were collected from the existing sediments and therefore are referred to as pore water samples. Beginning in 2006 a third sampling zone (the armor layer itself) was included and is referred to as inter-armoring water.

For each sampling event, analytical results obtained from the laboratory were tabulated by location and media. A series of statistical parameters were used to summarize the data and were provided for each media (i.e., surface water, inter-armoring water, and sub-armoring water) and each sampling event (i.e., Fall 2002, Fall 2003, Fall 2005, Spring 2006, Fall 2006, Spring 2007, and Fall 2007). The parameters include the following:

- Number of Samples;
- Detection Frequency;
- Maximum Detected Concentration;
- Location of Maximum;
- Mean Concentration;
- Data Distribution; and
- 95% Upper Confidence Limit (UCL) on the Mean (95% UCL).

The summary statistics for each sampling event are provided in Attachment G.

During the 2007 sampling events samples were analyzed for site COCs, including both total and dissolved metals (arsenic, chromium, copper, and zinc), PAHs, and PCP, and total dissolved solids (TDS). Analytical results were compared against a group of water quality guidelines including AWQCs referenced in the 1996 ROD, as well as current NRWQCs and NPDWRs established by the EPA. These guidelines are collectively referred to as comparison criteria.

4.3.1 2007 Surface Water

During 2007 there were no detections of cPAHs in surface water. The maximum concentration of total PAHs detected in Spring 2007 was 0.0553 ug/L and in Fall 2007 was 1.99 ug/L. Total metals and dissolved metals were detected in most of the samples collected during 2007, which is to be expected since they are naturally occurring in soil and sediment. For total metals all arsenic concentrations exceeded the corresponding comparison criteria of 0.00014 mg/L. Chromium, copper, and zinc did not have any exceedences for total metals. Dissolved metals were not evaluated in relation to any comparison criteria. However, dissolved metals concentrations appear to increase with increasing TDS concentrations. PCP was not detected above the method detection limits in any of the surface water samples collected during Spring or Fall 2007.

4.3.2 2007 Inter-Armoring Water Sampling Results

During 2007 there were no detections of cPAHs in inter-armoring water. The maximum concentration of total PAHs detected in Spring 2007 was 0.1495 ug/L and in Fall 2007 was 0.0812 ug/L. Total metals and dissolved metals were detected in most of the samples collected during 2007, which is to be expected since they are naturally occurring in soil and sediment. For total metals all arsenic concentrations exceeded the corresponding comparison criteria of 0.00014 mg/L. Copper exceeded the corresponding comparison criteria of 0.009 mg/L in four samples. Chromium and zinc did not exceed their corresponding comparison criteria for total metals. Dissolved metals were not evaluated in relation to any comparison criteria. However, dissolved metals concentrations appear to increase with increasing TDS concentrations. PCP was not detected above the method detection limits in any of the inter-armoring water samples collected during Spring or Fall 2007.

4.3.3 2007 Sub-Armoring Water Sampling Results

During 2007 five samples exceeded their corresponding comparison criteria of 0.013 ug/L for cPAHs in sub-armoring water. The maximum concentration of total PAHs detected in Spring 2007 was 929.17 ug/L and in Fall 2007 was 445.89 ug/L. Total metals and dissolved metals were detected in most of the samples collected during 2007, which is to be expected since they are naturally occurring in soil and sediment. For total metals all arsenic concentrations exceeded the corresponding comparison criteria of 0.00014 mg/L. Copper exceeded the corresponding comparison criteria of 0.009 mg/L in two samples. Chromium and zinc did not exceed their corresponding comparison criteria for total metals. Dissolved metals were not evaluated in relation to any comparison criteria. However, dissolved metals concentrations appear to increase with increasing TDS concentrations. PCP was detected above the corresponding comparison criteria of 1.0 ug/L in one sample during 2007.

4.4 Infiltration Pond MW-59s Groundwater Quality Assessment

In 2005, a soil cap was installed at the Site as part of the remedial action. One component of the soil cap was an infiltration pond constructed at the southwestern corner of the Site to collect all surface water runoff from the Site. A groundwater monitoring well, MW-59s, was installed downgradient from the infiltration pond in 2005 to monitor changes in contaminant levels in groundwater. As specified in the draft O&M Plan (DEQ 2007), four quarters of groundwater samples were to be collected from MW-59s to evaluate the potential for subsurface contaminants to be mobilized by the upland cap infiltration pond. A total of four samples have been collected from MW-59s to date; however, two samples were collected in the fall and no samples were collected during the summer quarter.

During the four sampling events, arsenic concentrations in three of the four events have exceeded the MCL of 0.01 mg/L. All other detections for metals and PAHs were below the corresponding MCLs (where such MCLs exist). No PCP was detected during the four sampling events.

The Draft O&M Plan dictates that MW-59s be monitored a total of four quarters. This last quarterly sampling was planned for August 2007, but did not occur until October 3, 2007. No clear pattern has developed to either support or deny the potential for subsurface contaminants to be mobilized by the upland cap infiltration pond, and because PAHs were only detected in the most recent samples collected from MW-59s, a definitive determination cannot be made. Thus, additional sampling is recommended to verify that subsurface contamination is not being mobilized by the upland cap infiltration pond. Annual sampling, in August, is recommended until 2010 (i.e., 3 additional events).

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5 Summary and Planned Activities for 2008

Table 5-1 summarizes the planned O&M activities for 2008. Tasks correspond to O&M activities outlined in Tables 2-1, 2-2, and 2-3. Since 2006, inspection of habitat enhancement features has been added to the inspection task for the sediment cap.

No sediment cap multi-beam bathymetric and side-scan sonar surveys or diver inspections of deep water, are scheduled for 2008. However, should severe river conditions or indication of significant alteration or damage to the cap be observed, these tasks may need to be performed during the reporting period, at the direction of DEQ.

Sampling of MW-59s has been completed. However, because no clear pattern has developed to either support or deny the potential for subsurface contaminants to be mobilized by the upland cap infiltration pond, and because PAHs were detected in the most recent samples collected from MW-59s after no previous detections, a definitive determination cannot be made. Annual monitoring through 2010 is recommended.

There are currently no non-routine corrective measures planned for the next reporting period.

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Operation and Maintenance Report Figures

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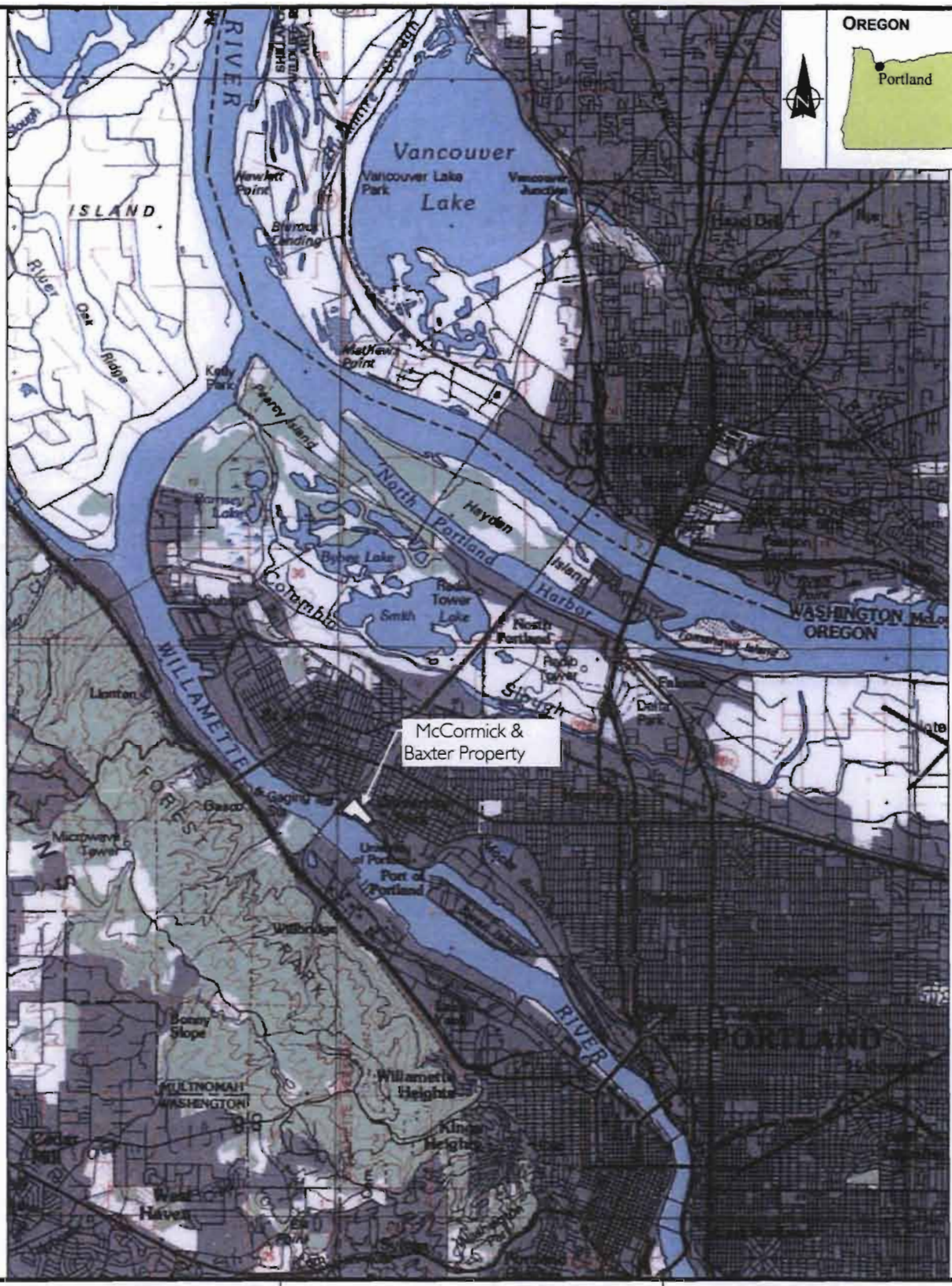

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International Specialists in the Environment
Portland, Oregon

McCORMICK & BAXTER
CREOSOTING CO.
Portland, Oregon

Figure 1-1

SITE LOCATION MAP

Date:
1-21-08

10:002688.OY28.09\fig 1-1

N W E S

0 75 150 300 450 600 750
Feet
Approximate Scale

Map Reference: Orthorectified Photo Image, October 2, 2006 @ 11:45am. River Stage at Time of Photo is 5.21' ft. NAVD88 at Morrison Street Bridge.

McCormick & Baxter Creosoting Company

Portland, Oregon

Figure 1-2
CURRENT SITE LAYOUT and FEATURES

Date:	GIS:	Job Number:
1/2/2008	avh	002688.OY28.06

\\edms projects\mcbax\2007 october report figures\figure 1-2 site layout and features.mxd

CAD ON SEANAS\Engineering Documents\McCORMICK & BAXTER\BASEMAP

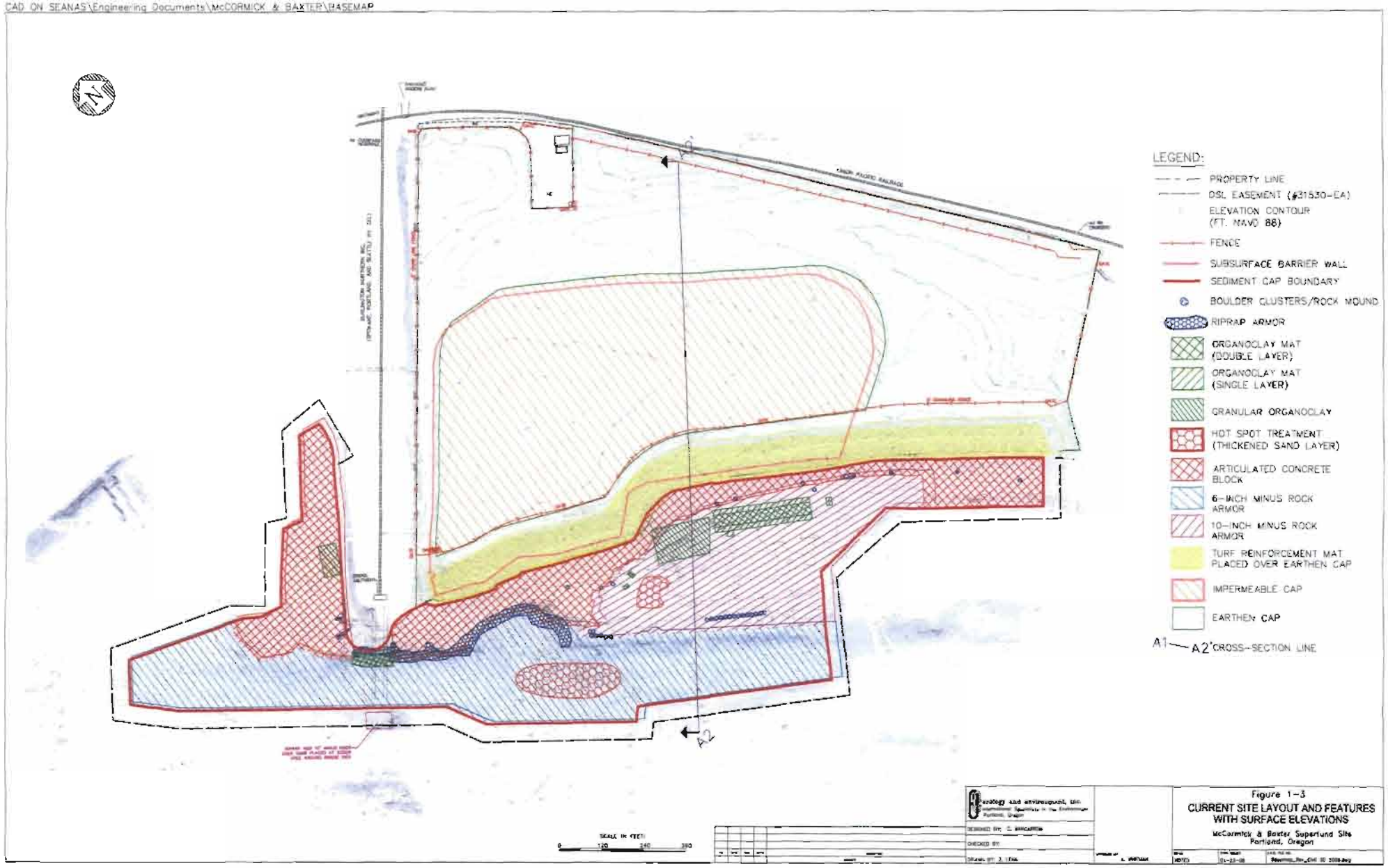
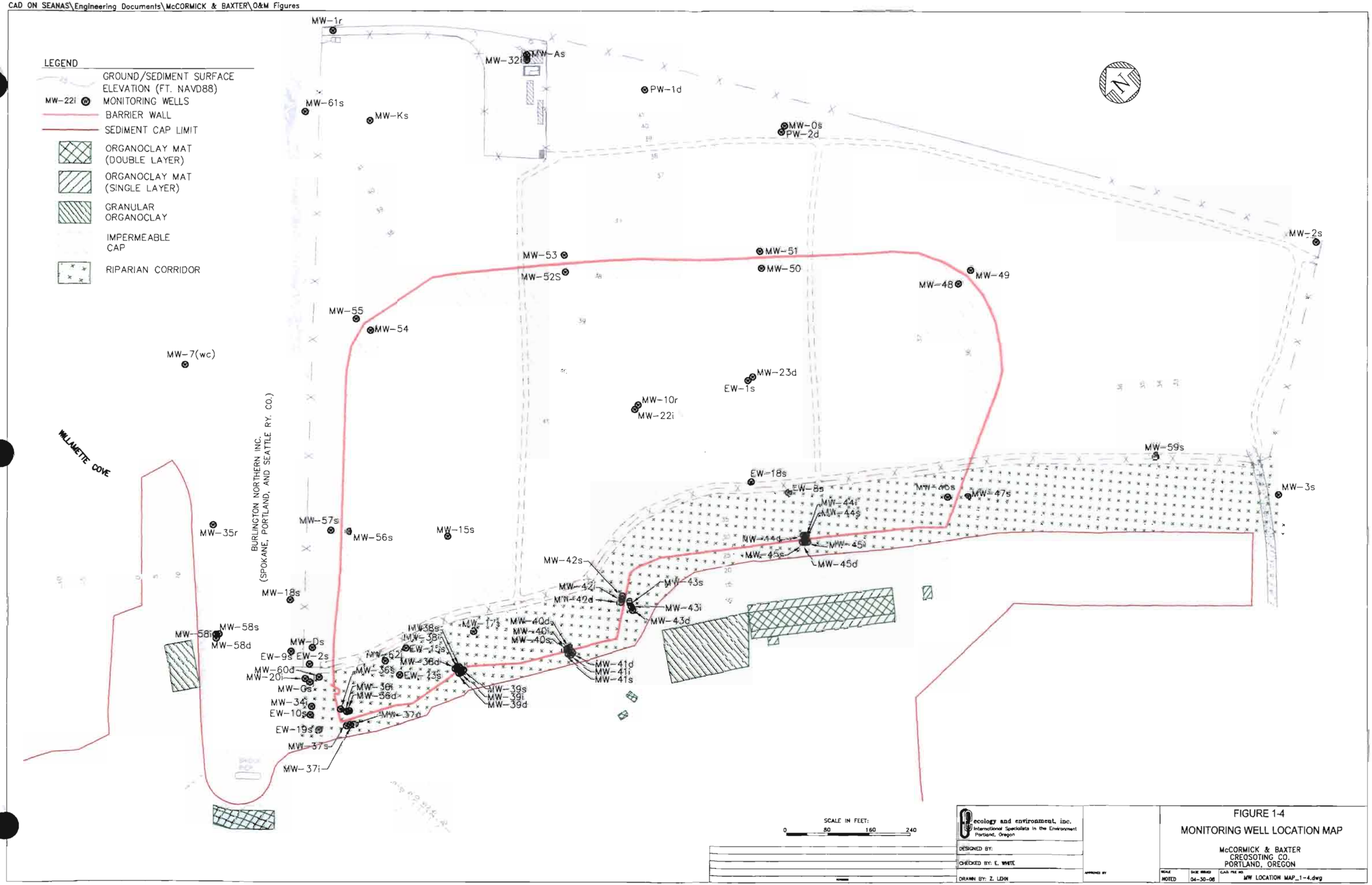


Figure 1-3
CURRENT SITE LAYOUT AND FEATURES WITH SURFACE ELEVATIONS
McCormick & Baxter Superfund Site
Portland, Oregon

CAD ON SEANAS\Engineering Documents\McCORMICK & BAXTER\O&M Figures



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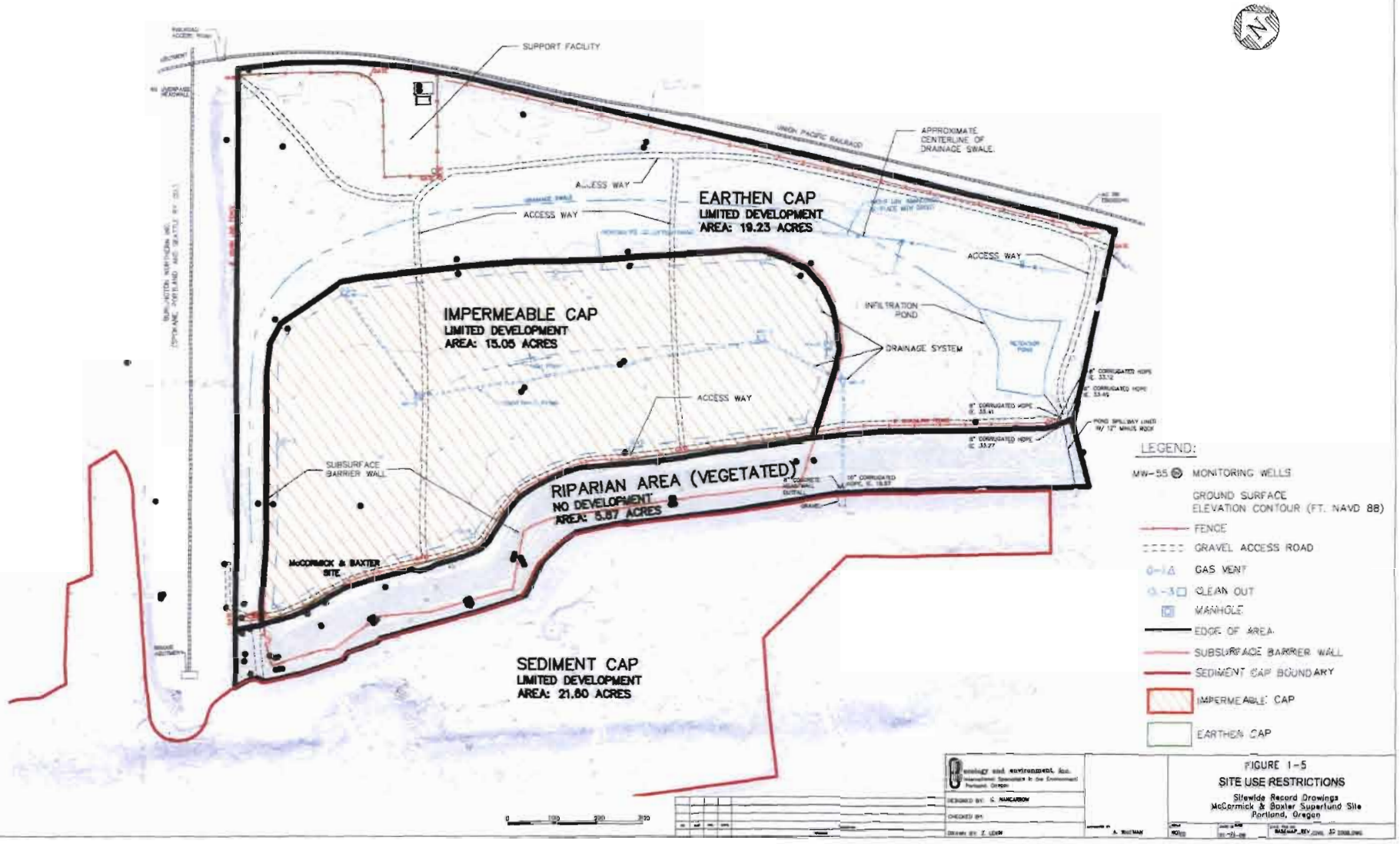

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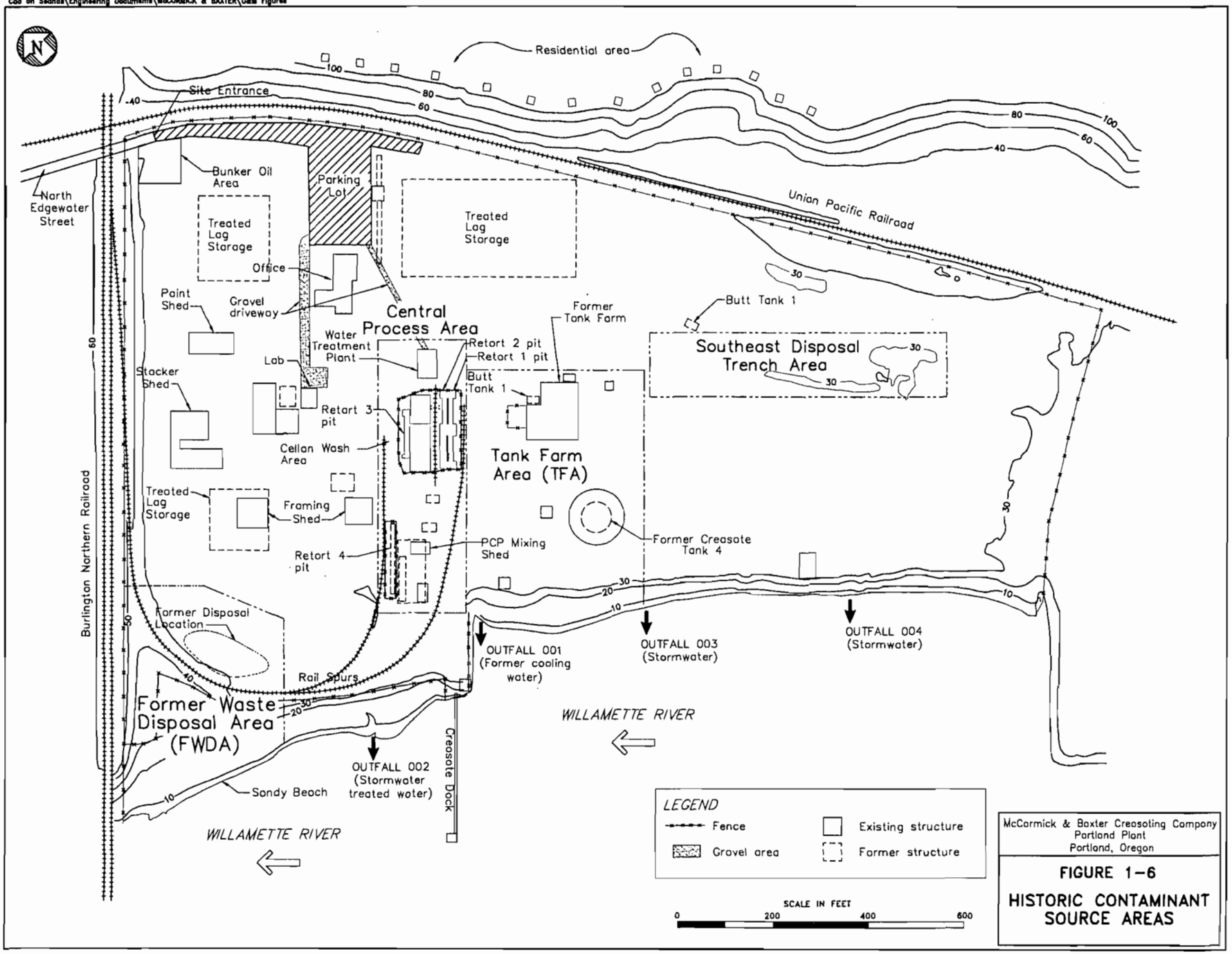
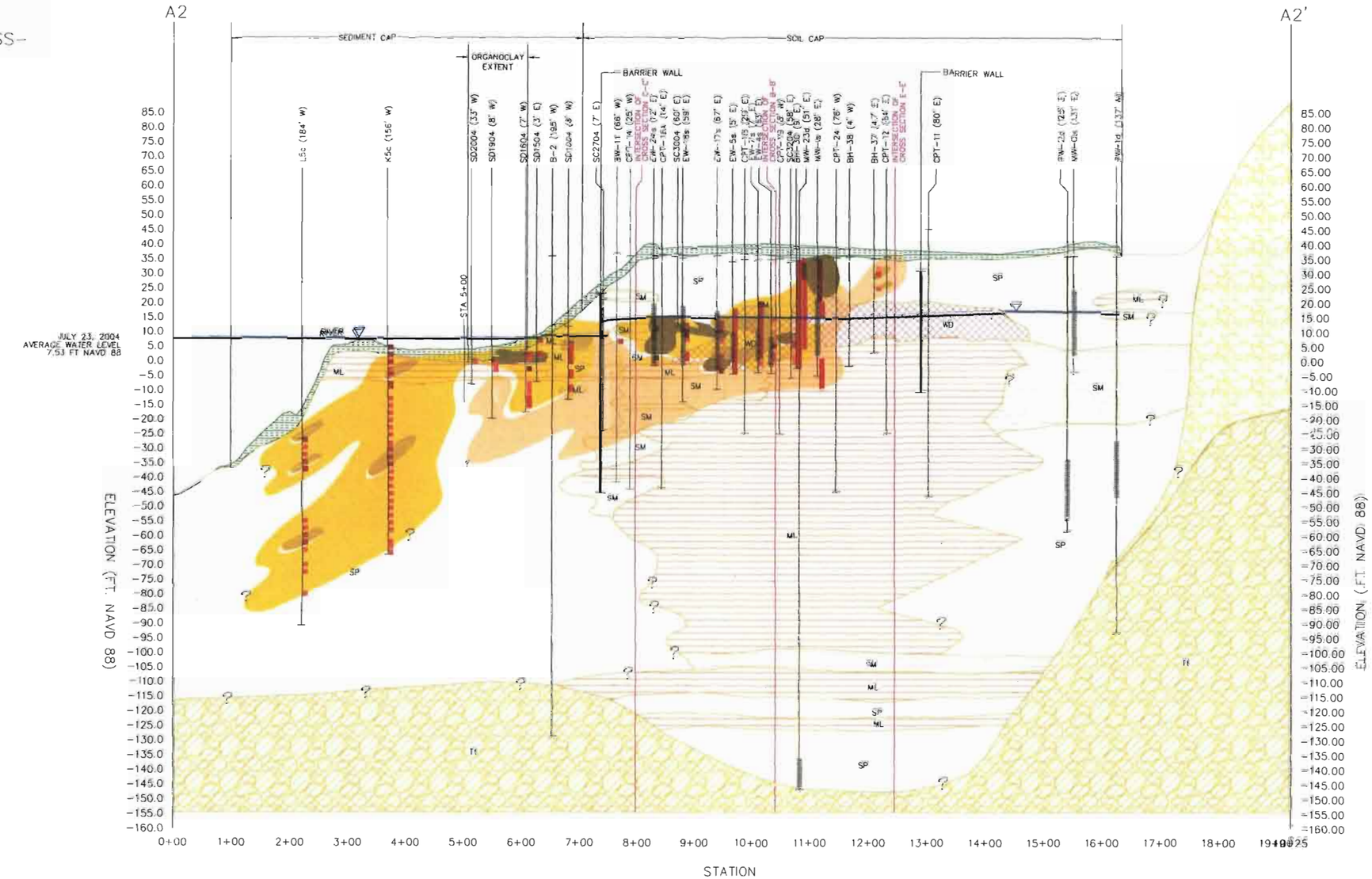


McCormick & Baxter Creosoting Company
Portland Plant
Portland, Oregon

FIGURE 1-6

HISTORIC CONTAMINANT SOURCE AREAS

NOTE: SEE FIGURE 1-3 FOR PLAN VIE2 OF CROSS-SECTION LOCATIONS.



LEGEND

- SP – SAND, FINE TO MEDIUM, POORLY GRADED
- ML – CLAYEY SILT OR SILTY CLAY
- WD – WOOD DEBRIS, CHIPS OR SAWDUST OCCASIONALLY
- GS – GRAVEL WITH SAND, POORLY DRAINED
- SM – SILT SAND, OR THIN INTERBEDS OF SILT AND SAND
- TL – TROUTDALE FORMATION
- Qf – CATASTROPHIC FLOOD DEPOSITS CONSISTING OF GRAVELS AND SANDS

- SEDIMENT/SOIL CAP
- APPROXIMATE SHALLOW GROUNDWATER LEVEL JULY 23, 2004 – TAKEN FROM CONTOUR DATA
- MW-25 (36' NW) BOREHOLE OR WELL ID (WITH SCREENED INTERVAL), DISTANCE AND DIRECTION OFF SECTION
- FAINT CREOSOTE ODOR
- CREOSOTE ODOR
- STRONG CREOSOTE ODOR
- SLIGHT SHEEN
- MODERATE SHEEN (INCLUDES STAINING NOT SPECIFIED)
- HEAVY SHEEN
- SATURATED
- ODOR
- SHEEN
- HEAVY SHEEN
- SATURATED

HORIZONTAL SCALE IN FEET
0 100 200 300

VERTICAL SCALE IN FEET (5X VERTICAL EXAGGERATION)
0 20 40 60

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International Specialists in the Environment
Portland, Oregon

DESIGNED BY:
CHECKED BY: E. WINK
DRAWN BY: Z. LEHN

FIGURE 1-7
HISTORIC NAPL DISTRIBUTION
CROSS SECTION A2-A2'
McCormick & Baxter Superfund Site
Portland, Oregon

SCALE: NOTED
DATE ISSUED: 01-23-08
CAD FILE: GeoSections_with NAPL_Aug07.dwg

Operation and Maintenance Report Tables

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Table 2-1: Description and Frequency of Soil Cap O&M Activities through September 30, 2011	
O&M Activity	**Frequency**
Inspections: • Cap surface • Stormwater conveyance system • Security fencing • Warning signs	 • Monthly • Monthly • Monthly • Monthly
Routine Maintenance: • Irrigation of Native Vegetation • Mowing open grass areas • Manual removal of invasive plant • Targeted application of herbicides	 • Summer 2007 and 2008 (if needed irrigation will continue beyond 2008) • Annually, if necessary • Annually, if necessary • Biannually (April and September), if necessary
Non-Routine Maintenance – such as: • Repairs of fence • Replacement of warning signs • Repairs of gravel roads • Filling of potential animal burrow into the earthen cap • Remove sediment from manholes • Replanting unsuccessful trees and shrubs	 • As needed • As needed • As needed • As needed • As needed • As needed

Table 2-2: Description and Frequency of Sediment Cap O&M Activities through September 30, 2011	
O&M Activity	**Frequency**
Inspections	
• Warning buoys	• Monthly
• Near shore areas	• Weekly (August - October) otherwise monthly
• Habitat Enhancement Features	• Yearly
• Multibeam bathymetric surveys	• Spring 2010 or as needed
• Side-scan sonar surveys	• Spring 2010 or as needed
• Diver inspections of deep water	• Spring 2010 or as needed
Sampling	
• Surface water, inter-armoring water, and sub-armoring water	• Semiannually (March and September each year through 2010)
• Crayfish	• Biannually (October 2006, 2008 and 2010)
• Organoclay cores	• October 2006 and 2010
Non-Routine Maintenance – such as:	
• Replacement of buoys	• As needed
• Additional armoring placement	• As needed
• Additional organoclay capping	• As needed

Table 2-3: Description and Frequency of Groundwater O&M Activities through September 30, 2011	
O&M Activity	**Frequency**
NAPL Recovery • Gauging and Extraction of Exterior Wells • Gauging of Interior Wells	• Weekly, until otherwise determined • Quarterly
Groundwater Monitoring • Downloading continuous water level data loggers • Manual water level measurements	• Quarterly • Quarterly
Groundwater Sampling • Site-wide • Infiltration pond (MW-59s)	• Spring 2010 • May 2006, November 2006, February 2007, August 2007
Routine Maintenance of Equipment • Interface probes, pumps, vehicle, data loggers/transducers, etc.	• As needed
Utility Services • Water, electric, phone, alarm, solid waste, toilet	• Continuous

Table 4-1: Schedule of Upcoming Activities for October 2007 through December 2008	
Task	**Schedule**
Soil and Sediment Cap inspections (contractor)	Monthly from September 2007 through July 2008, weekly August 2008 through October 2008, monthly November 2008 through December 2008.
Habitat Enhancement Features Inspection	September 2008.
Sediment Cap multibeam bathymetric and side-scan sonar surveys; diver inspections of deep water	Currently none scheduled from October 2007 through December 2008. Next scheduled is Spring 2010, unless otherwise needed.
Irrigation of native vegetation	Summer 2008.
Mowing of open grass area; manual removal of invasive plants	September 2008, if necessary to suppress invasive plant growth.
Targeted application of herbicides	April 2008 and September 2008, if necessary to suppress invasive plant growth.
Maintenance of equipment	Ongoing as needed.
Non-routine maintenance	As needed.
Surface Water/ Inter-Armoring/ Sub-Armoring Sampling	March 2008 and September 2008.
MW-59s Sampling	This task is complete, unless otherwise needed.
NAPL recovery exterior wells	Gauged weekly, recovery as criterion is met.
NAPL recovery interior wells	Gauged quarterly, no recovery.
Groundwater Elevation Monitoring	December 2007, March 2008, June 2008, September 2008, and December 2008.
Utility Services	Continuous.

Attachment A

002688.OY28

Groundwater and NAPL Monitoring

(Formerly the Barrier Wall Performance Monitoring Assessment)

McCormick & Baxter Creosoting Company Site Portland, Oregon

Task Order No. 71-03-28

May 2008

Prepared for:

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
Northwest Region
2020 SW Fourth Avenue
Portland, Oregon 97201-4987

Prepared by:

ECOLOGY AND ENVIRONMENT, INC.

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List of Abbreviations and Acronyms

ACL	Alternate Concentration Limits
Clearwater	Clearwater Environmental Services
DEQ	Oregon Department of Environmental Quality
DNAPL	dense nonaqueous phase liquid
E & E	Ecology and Environment, Inc.
FWDA	Former Waste Disposal Area
LNAPL	light nonaqueous phase liquid
The Site	McCormick & Baxter Creosoting Company
MCL	Maximum Concentration Limits
MW	Monitoring Well
NAPL	nonaqueous phase liquid
NAVD 88	North American Vertical Datum 1988
O&M	Operation and Maintenance
TFA	Tank Farm Area
USGS	United States Geological Survey

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1 Introduction

Ecology and Environment, Inc. (E & E), under contract with the Oregon Department of Environmental Quality (DEQ), prepared this barrier wall monitoring report for the McCormick & Baxter Creosoting Company (McCormick & Baxter), Portland Plant, site located in Portland, Oregon. The site, a former wood-treating facility, is located along the Willamette River at 6900 North Edgewater Street. This report was prepared under Task Order 71-03-28 to evaluate the performance of the barrier wall installed at the site. Measurement of water levels and nonaqueous phase liquids (NAPL) presence and thickness show how effective the barrier wall and impermeable soil cap are at limiting groundwater and NAPL migration from contaminated capped areas of the site to the river.

This attachment to the O&M report presents the NAPL measurement and extraction results and groundwater elevation and gradient information collected at the site for the period from January 1, 2007 through December 31, 2007. The most recent groundwater analytical sampling results, from August 2006, are presented as well. These results were reported in the 2006 O&M annual report, but they are included herein with changes in the presentation based on recommendations from the project team during the August 2007 project team meeting. This attachment also contains historic groundwater contour maps from 2001 to November 2006, a technical memorandum presenting the percentage water content for extracted NAPL, and a summary of an alternative NAPL pumping strategy as Appendices A through C to this attachment, respectively.

Prior to October 1, 2006, NAPL measurement and extraction was conducted on a weekly basis for 17 wells inside and outside the barrier wall that had recently produced measurable NAPL thicknesses. Results for NAPL measurement and extraction, and groundwater elevation and gradients were provided to DEQ on a monthly basis in *Barrier Wall Performance Monitoring Summary Reports*. These historic monthly monitoring reports for October 2005 through September 2006 were provided on a CD accompanying the 2006 Operation and Maintenance (O&M) Report (E & E 2007).

From October 1, 2006 to the present, NAPL measurements and extraction for wells located outside the barrier wall have continued on a weekly basis. How-

ever, for the wells located inside the wall or that had shown no recent history of NAPL presence in the well, gauging for the presence of light non-aqueous phase liquid (LNAPL) and dense non-aqueous phase liquid (DNAPL) is conducted on a quarterly basis. NAPL is not extracted from wells inside the barrier wall. Groundwater elevations and gradients are measured and compiled on a quarterly basis and reported in the annual O&M report. This O&M report covers four calendar quarters; the first quarter is January 1, 2007 through March 31, 2007; the second quarter is April 1, 2007 through June 30, 2007; the third quarter is July 1, 2007 through September 30, 2007; and the fourth quarter is October 1, 2007 through December 31, 2007.

Since October 2005, Clearwater Environmental Services, under contract to E & E, has conducted the NAPL gauging and extraction at the site, as well as general site maintenance.

2 NAPL Measurements and Extraction

The NAPL monitoring program at the McCormick and Baxter site is used to evaluate the functional performance of the containment system (the barrier wall and soil cap) and to document NAPL removal relative to the groundwater remedial action objective: *to contain the NAPL plumes, prevent ongoing discharges of NAPL to the Willamette River, and minimize further contamination of the intermediate and deep aquifers.*

NAPL thickness measurements and removal volumes for the monitoring period of January 1, 2007 through December 31, 2007 are presented in this section. The quarterly NAPL gauging events were conducted on February 13, 2007, June 18, 2007, and September 26, and December 17, 2007. Weekly monitoring activities included NAPL gauging of 8 monitoring wells located outside the barrier wall which have recently shown the potential to contain NAPL. If warranted, extraction of NAPL from wells located outside the wall is also performed on a weekly basis. Quarterly monitoring activities included NAPL gauging of the remaining 71 monitoring wells located onsite and on the adjacent Burlington Northern and Metro (Willamette Cove area) properties. Wells that contain NAPL but are located within the barrier wall are not extracted. Monitoring well locations are shown on Figure 2-1.

2.1 NAPL Thickness and Extraction

LNAPL and DNAPL measurements are recorded at 8 site wells on a weekly basis[1] including EW-10s, EW-2s, MW-Gs, EW-19s, MW-20i, MW-34i, MW-Ds, and EW-9s. Remaining wells are monitored quarterly for NAPL. NAPL was detected in six (EW-2s, EW-9s, EW-10s, MW-20i, MW-Ds and MW-Gs) of the eight wells gauged weekly, and seven (EW-1s, EW-8s, EW-15s, EW-18s, EW-23s, MW-22i, and MW-56s) of the remaining wells gauged quarterly during this reporting period. Figures 2-2, 2-3, 2-4, and 2-5 show the location of wells that contained LNAPL and/or DNAPL for the first through fourth quarters, respec-

[1] Measurements were not made during the weeks of 1/27/2007, 8/18/2007, 8/25/2007, 9/1/2007, 9/22/2007, 10/20/2007, and 11/3/2007.

tively. Tables 2-1, 2-2, 2-3, and 2-4 provide the first through fourth quarter NAPL gauging measurements, respectively.

If individual wells meet the NAPL thickness criteria (0.4 feet for LNAPL, 1.5 feet for DNAPL, and located outside the barrier wall) then NAPL extraction is conducted. LNAPL is extracted using a bailer and DNAPL is extracted using a submersible pump.

Beginning January 2007, extracted liquid (NAPL and water) from each well was consolidated into a single 55-gallon drum that was gauged quarterly. To determine the amount of pure NAPL extracted, E & E and Clearwater calculated the percent of water in the collected liquids. The percentage of water was determined by using the different freezing temperatures of water and NAPL to separate the two liquids from each other. The volume of each liquid was then determined, and the percentage water content was calculated. Appendix B to this attachment contains a technical memorandum describing the procedure used to determine the water content. E & E calculated that 38 percent of the extracted liquid was water; therefore, it was decided that the water correction factor (38 percent) would be applied to the total measured liquid, and that volume would be reported as total NAPL recovered. Tables 2-5, 2-6, 2-7, and 2-8 tabulate, for each quarter, the weekly NAPL thickness measurements, visually estimated extraction volumes each week for wells meeting the extraction criteria, and total NAPL extracted based on quarterly drum gauging and the water correction factor of 38 percent.

2.1.1 LNAPL

During each of the four quarters, measurable LNAPL thickness (equal to or greater than 0.01 feet) was detected in four FWDA wells (EW-10s, EW-15s, EW-23s, and MW-56s) with thicknesses ranging from a minimum of 0.01 feet in EW-10s, to 4.47 feet in EW-23s, both during the third quarter. Monitoring well EW-10s is the only well located outside the barrier wall that contained measurable LNAPL; no LNAPL has been present in EW-19s located between EW-10s and the Willamette River. Although LNAPL was measured at thicknesses greater than 0.4 feet in EW-10s twice in 2007, the LNAPL dissipated when a bailer was inserted for extraction; therefore, no LNAPL was extracted during the year. LNAPL was also measured each of the four quarters in EW-18s; located inside the barrier wall in the TFA; at a thickness of 0.04 feet during the first, 0.25 feet during the second, 0.68 during the third, and 0.12 during the fourth quarterly monitoring event.

2.1.2 DNAPL

During each of the four quarters, measurable DNAPL thickness (equal to or greater than 0.01 feet) was regularly detected in three FWDA wells (MW-20i, MW-Ds, and MW-Gs) with thicknesses ranging from a minimum of 0.14 in MW-Gs, during the first quarter, to 9.29 in MW-Gs, during the fourth quarter. Extraction was warranted 98 percent of the time for MW-20i, 52 percent for MW-Ds, and 37 percent for MW-Gs. DNAPL was also detected in the FWDA in EW-9s three of the four quarters and in EW-2s during the fourth quarter, but never warranted extraction. Located within the barrier wall in the TFA, DNAPL was detected each quarter in EW-1s, MW-22i, and EW-8s. Thicknesses ranged from a minimum of 1.75 feet in EW-8s, during the second quarter, to 3.57 feet in MW-22i, during the second quarter.

DNAPL was measured in MW-22i at 2.27 feet, 3.57 feet, 3.17 feet, and 3.42 feet during the 1st, 2nd, 3rd and 4th quarters, respectively. Within the last two years, the only other time DNAPL was detected in MW-22i was in July 2006. Prior to that DNAPL was reported in MW-22i from 1997 to 2000, as shown in Figures 5-22A through 5-22G of the CSM. In July 2006, Clearwater used a bailer to extract from the bottom of the well. The extracted liquid appeared to be water with globules of DNAPL interspersed throughout. The DNAPL appeared to have a low viscosity, was translucent in appearance, and had a gasoline-like odor. However, recently the DNAPL observed on the probe at this well has been more typical of other DNAPL observed at the site; a moderate to high viscosity and an opaque black color. Since the DNAPL appears to be in globules, rather than a distinct layer at the bottom of the well, the DNAPL thicknesses measured during the monitoring period may not accurately reflect the amount of DNAPL in the well. Since MW-22i is within the barrier wall, no further extractions have taken place.

2.1.3 NAPL Summary

Based on drum gauging and a 38 percent water content correction factor, a total of approximately 50 gallons of NAPL was extracted from January 1, 2007 through December 31, 2007. Historical cumulative NAPL extraction is presented in Table 2-9, and shown graphically in Figure 2-6. As of December 31, 2007, a total of approximately 6,207 gallons of NAPL have been extracted from site wells since February 1993.

2.1.4 Alternative Pumping Pilot Test

In April of 2006, an alternative pumping method was pilot tested to evaluate the potential effectiveness of utilizing an automated LNAPL extraction system. The description of this pilot test was inadvertently left out of the 2006 O&M Annual

Report and is, therefore, being reported at this time. The pilot test consisted of a skimmer pump, which operated on a float system to allow for fluctuations in LNAPL thickness. A membrane sensor distinguished between LNAPL and groundwater, allowing only LNAPL to enter the pumping chamber. However, at the end of the pilot test nearly all liquid extracted was water, indicating the LNAPL at the site is not compatible with the selected pump. The pilot test and results are presented in Appendix C.

3 Water Level Monitoring (Manual and Continuous Water Level Data Collection)

E & E conducted manual water level gauging on a quarterly basis for all site wells and collected continuous automated data from a subset of the wells using transducers. Quarterly monitoring activities included collection of groundwater elevation data in the 79 monitoring wells located onsite and on the adjacent Burlington Northern and Metro (Willamette Cove area) properties. This section of the report presents a summary of the data collected during the monitoring period from January 1, 2007 through December 31, 2007.

- Quarterly manual water-level measurements (low tide event) and
- Continuous hydraulic-head measurements (transducers).

This section also includes a discussion of vertical and horizontal gradients observed at the Site. Resulting groundwater contour maps constructed for the shallow unconfined aquifer for each quarter (Figures 2-2, 2-3, 2-4, and 2-5) and transducer plots of groundwater elevation (Figures 3-1 through 3-7) are also presented and discussed. Groundwater monitoring data provide information on the impact of the upland soil cap and impermeable cap on groundwater flow at the site.

Manual measurements of static groundwater-levels were conducted on February 13, 2007, June 18, 2007, September 26, and December 17, 2007; during low tide. Measurements were collected at all site wells with the exception of MW-7(wc) in the third quarter which was inaccessible due to a rusted lock.

Based on the manually-measured groundwater levels, shallow groundwater elevation contour maps were developed for each of the three quarters (Figures 2-2, 2-3, 2-4 and 2-5). The groundwater elevation data for each quarterly monitoring event are included in Tables 2-1, 2-2, 2-3, and 2-4.

Groundwater level data were collected using pressure transducers that monitored groundwater level fluctuations on a half-hour basis at select monitoring wells surrounding the barrier wall for the entire monitoring period. The majority of these

wells (14 of 16 wells) are located along the riverfront portion of the barrier wall. This includes well clusters MW-36, MW-37, MW-44, and MW-45, and the shallow wells in clusters MW-40 and MW-41. Transducers were also installed in two upland well locations, MW-52s and MW-53s. Data downloaded from the transducer for the first quarter cover the period from November 9, 2006 through February 13, 2007; the second quarter covers the period from February 13, 2007 through June 18, 2007; and the third quarter covers the period from June 18, 2007 through September 26, 2007. After downloading the third quarter data the transducers were programmed to take readings for the fourth quarter. However, when data was downloaded from the transducers during the fourth quarter gauging event, it was discovered that they had been improperly programmed and had only collected data for approximately two days. The two days of data was downloaded and reviewed to ensure the transducers were working properly; the transducers were then re-programmed to take readings for the first quarter of 2008. Since the two days of data is a small time frame compared to the reporting periods, it has not been included in this report.

Transducer plots were prepared for selected monitoring wells (MW-36s, MW-37s, MW-44s MW-45s, MW-52s, and MW-53s) inside and outside the barrier wall as shown in Figures 3-1 through 3-7. The transducer plots compare water-level elevations inside the barrier wall versus water-level elevations outside the barrier wall, river elevation, and precipitation data. Figure 3-1 shows a comprehensive plot of transducer data from October 2003, when transducers were initially installed, to September 26, 2007, for the shallow wells in the FWDA. To show more detailed water level fluctuations, Figures 3-2 and 3-3 show transducer data during the November 2006 through September 2007 monitoring period, and over a selected three-day period in February 2007, respectively. Similarly, Figures 3-4, 3-5, and 3-6 show transducer data for the TFA for the same time periods as Figures 3-1 through 3-3. Figure 3-7 shows data for upland wells from March 23, 2006 to September 26, 2007.

River stage data were recorded on a half hour basis from USGS station number 14211720, located on the upstream side of the Morrison Bridge, and corrected to river stage adjacent to the McCormick and Baxter site [(Morrison Bridge data)-(0.1 ft)]. River stage elevation data were collected relative to the Portland River Datum and are corrected to NAVD88 (+5.001 feet).

3.1 Shallow Groundwater Flow Direction and Horizontal Gradients

As shown in Figures 2-2, 2-3, 2-4 and 2-5, the shallow horizontal groundwater gradient within the barrier wall is independent of that outside the barrier wall. Shallow groundwater elevations at the bluff side of the barrier wall are lower inside the barrier wall while shallow groundwater elevations towards the river are lower outside the wall than inside the barrier wall. The shallow groundwater horizontal gradient inside the barrier wall is flat (ranging from 0.00013 ft/ft to 0.00025 ft/ft) compared to the shallow horizontal gradient (ranging from 0.005 ft/ft to 0.03 ft/ft) outside the barrier wall. Inside the wall the gradient is towards the former waste disposal area (FWDA) (west). Outside the barrier wall, shallow groundwater flow is diverted around the barrier wall towards Willamette Cove and the Willamette River. This is consistent with previous reporting periods.

Since the installation of the impermeable cap in 2005, elevation differences inside versus outside the wall have increased, indicating a significant reduction in rainwater entering the barrier wall area through the riparian area and a small amount of precipitation infiltrating between the edge of the impermeable cap liner and the top of the barrier wall. Prior to installation of the impermeable cap, the elevation difference outside versus inside at the bluff side of the wall averaged 1-foot. After installation, elevation differences are approximately 3.5 to 4 feet.

3.2 Vertical Gradients

Vertical groundwater gradients were calculated using manual data from each of the three quarterly low-tide gauging events for well clusters MW-36, MW-37, MW-40, and MW-41 (located in the FWDA), and well clusters MW-44 and MW-45 (located in the Tank Farm Area [TFA]). Because the measurements are taken during low-tide conditions, these vertical gradients represent low-tide conditions. Vertical gradients calculated from manual measurements for each of the four quarters are summarized in Tables 3-1, 3-2, 3-3, and 3-4. Vertical gradients inside and outside the barrier wall along the river are best observed on Figures 3-2 and 3-3 for the FWDA and Figures 3-5 and 3-6 for the TFA. Figures 3-2 and 3-5 illustrate overall trends during the previous year, while Figures 3-3 and 3-6 provide a more detailed view of vertical gradients between the shallow, intermediate, and deep wells in relationship to river levels and tide cycles over a three-day period.

In general the gradient between the shallow zone inside the barrier wall and the intermediate and deep zone is strongly downward. From the transducer hydrographs, it is clear that the hydraulic connection between the shallow zone within the barrier wall and deeper zones is minimal and, where present, retarded. Thus,

the relatively strong downward gradient is not indicative of significant groundwater flow to the deeper zones. The vertical hydraulic conductivity is apparently very low within most of the barrier wall increasing slightly in the FWDA. The shallow zone within the barrier wall at MW-44 well (within the TFA) cluster appears to be solely influenced by precipitation as can be seen by the lack in response to the sharp decline in the River levels between 1/7/2007 and 2/11/2007 depicted in Figure 3-5. The shallow zone in the TFA shows an approximately 1.5 foot increase during the rainy season and decline into the third quarter as precipitation decreased. While the shallow zone within the FWDA appears to be influenced both by precipitation and the Willamette River stage (or the intermediate and deeper zones) as can be seen in Figure 3-2 where the shallow zone, although showing a dampened response, mimics the intermediate and deep zones and the Willamette River level.

The shallow zone outside the barrier wall follows the river stage closely, both in the FWDA and TFA, with a smaller amplitude (where the River stage may vary by 2.5 to 3 feet during tidal cycles, the shallow zone varies by 0.5 to 1 foot). The intermediate and deep zones both inside and outside of the barrier wall closely mimic the river stage both in elevation and timing with a small vertical gradient that varies between upward and downward with the tidal changes. Heavy rains in mid-December and early January illustrate the degree to which the intermediate and deep wells both inside and outside the wall in the FWDA and TFA mimic river levels. When river levels change quickly, vertical gradients during low and high tide remain stable inside the wall, and during high tide outside the wall, both in the FWDA and TFA. However, vertical gradients outside the wall during low river stages when the tidal amplitude is greater switch between an upward and downward gradient between the shallow, intermediate and deep zones in both the FWDA and TFA.

Hydrographs for the shallow zone inside and outside the barrier wall for upland wells (MW-52s and MW-53s) are presented in Figure 3-7. The shallow zone, inside and outside of the barrier wall, appears to react subtly to precipitation and is not affected directly by river levels. Because the shallow water zone is not believed to be hydraulically connected across the barrier wall divide (i.e., the barrier is embedded into the underlying silt), this observation can best be explained by the infiltration of rain water from the edge of the impermeable cap to the inside of the barrier wall. This supposition is based on the design of the impermeable cap that terminates directly over the barrier wall and does not provide for overlap (see Site-Wide Record Drawing 9) (E & E 2007). Given that wells located inside the barrier wall are also located within the footprint of the impermeable cap and a 2- to 4-foot amplitude difference in shallow water levels is observed, we believe the volume of rainwater leakage along the upland edges of the impermeable cap is

small. The amplitude difference is largest during periods of heavy precipitation and becomes smaller as precipitation decreases seasonally. This would be expected as outside the barrier wall, the shallow zone is receiving infiltrating precipitation over a large area, while the infiltration from precipitation into the barrier wall is minimal.

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4 2006 Groundwater Assessment Summary

The most recent comprehensive groundwater sampling event at the Site took place from April 24, 2006 to May 22, 2006. A detailed description of the sampling event including sampling methodology, handling, analysis, and sampling results is presented in Attachment H of the 2006 O&M Report (E & E 2007). A summary of the sampling results is re-presented here to compare to MCLs to reflect comments from the EPA regarding the use of Alternate Concentration Limits (ACLs) as comparison criteria. The next groundwater sampling event is scheduled for May 2010.

A total of 79 wells were sampled in Spring 2006. The samples were analyzed for total metals, Pentachlorophenol (PCP), and Polyaromatic Hydrocarbons (PAHs). During the Second Five-Year Review (DEQ 2006) the EPA determined that ACLs were not valid as substitutes for Maximum Concentration Limits (MCLs) in groundwater at any site. However, to provide additional comparison criteria, sample results were compared to both ACLs and MCLs in attachment H of the 2006 O&M Report (E & E 2007). In this and all subsequent reports, ACLs will not be included for comparison purposes in sampling result summary tables or sample result discussions, only MCLs will be used. Refer to Table 4-1 for the updated groundwater sampling results table.

Figures presented in the 2006 O&M Report (E & E 2007) summarized the sample results for arsenic and chromium, copper and zinc, and PCP and PAHs. Results were displayed based on ranges of concentrations, not necessarily associated with a corresponding MCL, because MCLs are not available for all analytes tested. In this and all subsequent report figures, sample results will be graphically presented based on comparison with the analytes' corresponding MCL reference criteria; MCL criteria are available for total metals, PCP, and benzo (a) pyrene. Refer to Figures 4-1 through 4-12 for the updated groundwater sampling result figures.

The MCL for arsenic (0.01 mg/L) was exceeded in water from more than half of the wells that were sampled. The samples that exceeded the MCL for arsenic were from all water-bearing zones (shallow, intermediate, and deep). In addition,

water from sixteen of the sampled wells exceeded the MCL for PCP of 1.0 μg/L. Water from 11 of 78 wells exceeded the MCL for benzo(a)pyrene of 0.2 μg/L. The majority of the exceedances of the MCL for benzo(a)pyrene were in water from wells located in the shallow aquifer in the FWDA or TFA primarily in areas where measurable creosote is present in wells or residual creosote is thought to remain.

In general, the lateral distribution of dissolved phase contaminants in groundwater was as anticipated, with the highest PAH concentrations detected in known source areas (i.e., FWDA, TFA and central processing area). The lateral distribution of total metals was less distinctive, but higher concentrations were generally found in the source areas or wells downward gradient as compared to wells upward gradient from known source areas. With respect to barrier wall well clusters, no discernable vertical trend was observed of contaminants either increasing or decreasing with depth. In barrier wall well clusters MW-38, MW-39, and MW-43, PAH concentrations increased with depth, while in well clusters MW-37 and MW-45 PAH concentrations decreased with depth. Still other well clusters contained the highest contaminant concentration in the intermediate well such as well clusters MW-36 and MW-44.

5 Summary

During the monitoring period, there was not sufficient accumulation of LNAPL to warrant extraction from wells outside the barrier wall. DNAPL was extracted from three wells located outside the barrier wall in the FWDA. A total of approximately 80 gallons of liquid (NAPL / water mixture) were extracted during the monitoring period, corresponding to an estimated 50 gallons of NAPL.

Shallow groundwater elevation and gradient during this reporting period at the McCormick and Baxter site are generally consistent with conditions observed during previous reporting periods. Horizontal gradients are the greatest during periods of high precipitation and decrease during low precipitation. Groundwater flow inside the barrier wall remains flat, while outside the wall, shallow groundwater flow is diverted around the barrier wall to the northwest, and south.

Under stable river conditions, vertical groundwater gradient figures indicate that gradients are generally downward during low and high tide inside the wall in the FWDA and TFA, with the exception of an upward gradient during high tide in the TFA. Outside the wall, during low tide, vertical gradients are downward between shallow to intermediate, shallow to deep, and intermediate to deep zones. During high tide, outside the wall, vertical gradients tend upward between shallow to intermediate and shallow to deep and downward between intermediate to deep. The gradient between the intermediate and deep zones inside and outside the wall are very low (on the order of 0.001 ft/ft).

Groundwater at the site is contaminated at levels that exceed MCLs, as anticipated. The next groundwater sampling event is scheduled for May 2010. Sampling summary results tables and figures from the 2006 sampling event are included in this report. The 2006 event was previously discussed in the 2006 O&M Report (E & E 2007).

Based on the observations made through the 2007 reporting period, it appears that the barrier wall and cap are functioning as intended to divert groundwater flow and rainwater infiltration around source areas contained within the barrier wall.. NAPL does not appear to be increasing significantly in any of the observation

wells and the overall rate of extraction of NAPL appears to be reaching a plateau. It should be noted that NAPL collection approaches have changed over time, in terms of pumping approaches and the number of wells from which NAPL was extracted. However, as NAPL extraction rates stabilize, the overall strategy for collecting NAPL from the site may warrant re-evaluation, taking into consideration the total volume of NAPL anticipated to remain at the site and the potential for future migration of residual NAPL.

At this time, it is anticipated that future O&M activities will be conducted in accordance with the O&M Plan, including groundwater gauging and NAPL extraction activities.

6 References

Ecology and Environment, Inc. (E & E). March 2007. *Operation and Maintenance Report (October 2005 through December 2006), McCormick & Baxter Creosoting Company, Portland, Oregon.* Prepared for the Oregon Department of Environmental Quality, Portland, Oregon.

Oregon Department of Environmental Quality. March 2007. Draft Final Operation and Maintenance Plan for McCormick and Baxter Creosoting Company Superfund Site Portland, Multnomah County, Oregon, ORD00020603.

_____. September 2006. Second Five-Year Review for McCormick and Baxter Creosoting Company Superfund Site Portland, Multnomah County, Oregon, ORD009020603

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Figures

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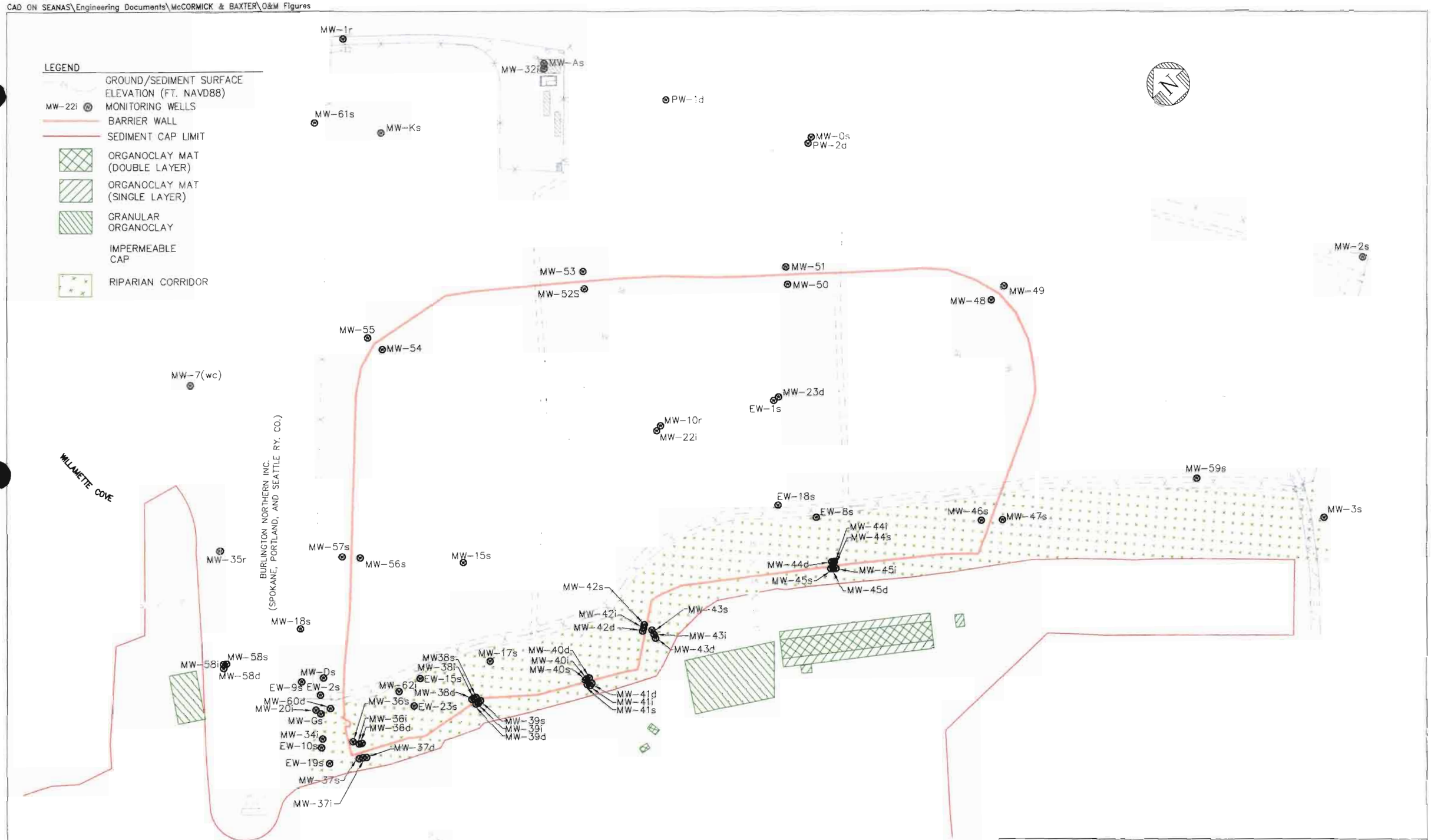

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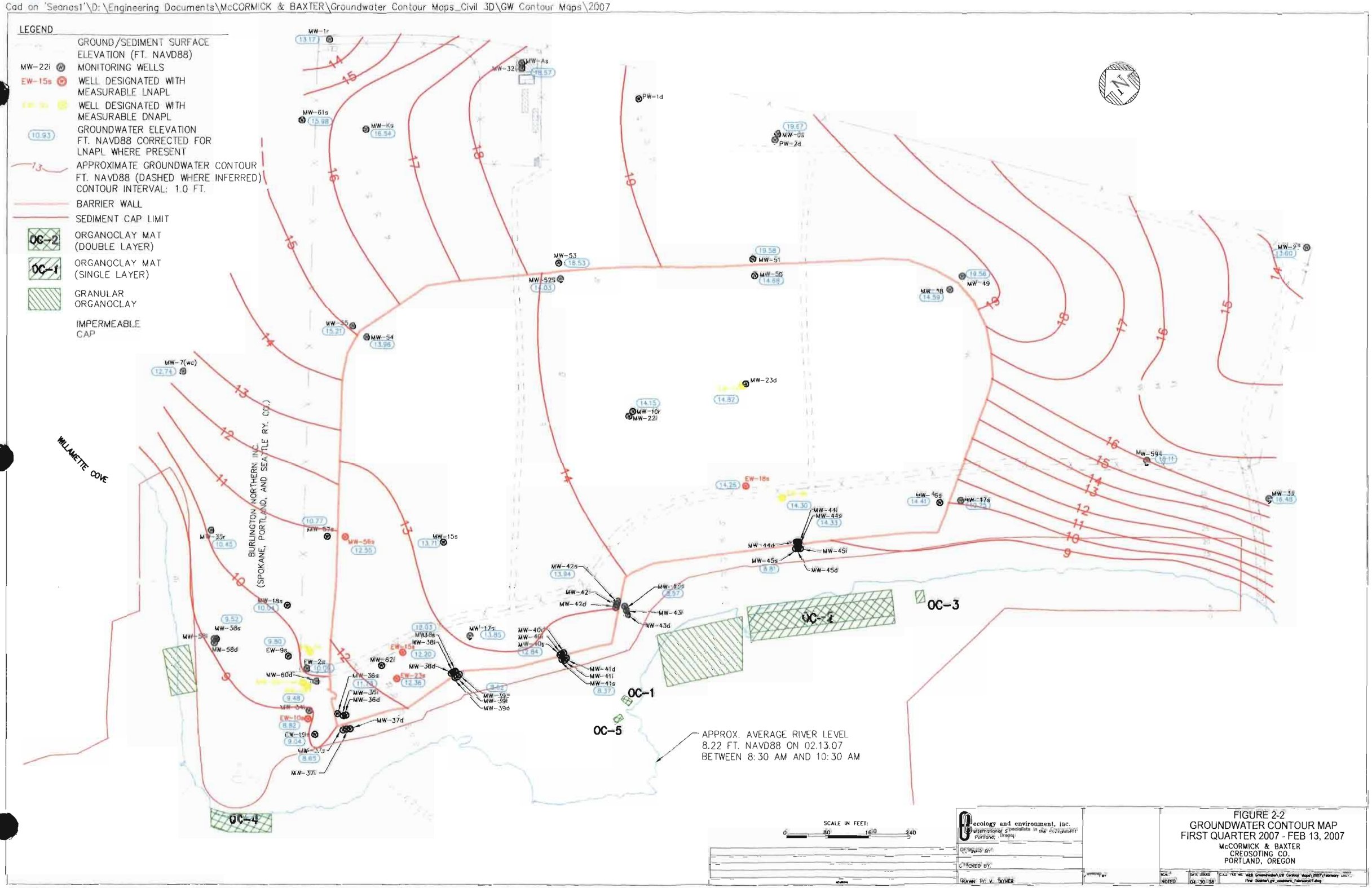

FIGURE 2-2
GROUNDWATER CONTOUR MAP
FIRST QUARTER 2007 - FEB 13, 2007
McCORMICK & BAXTER
CREOSOTING CO.
PORTLAND, OREGON

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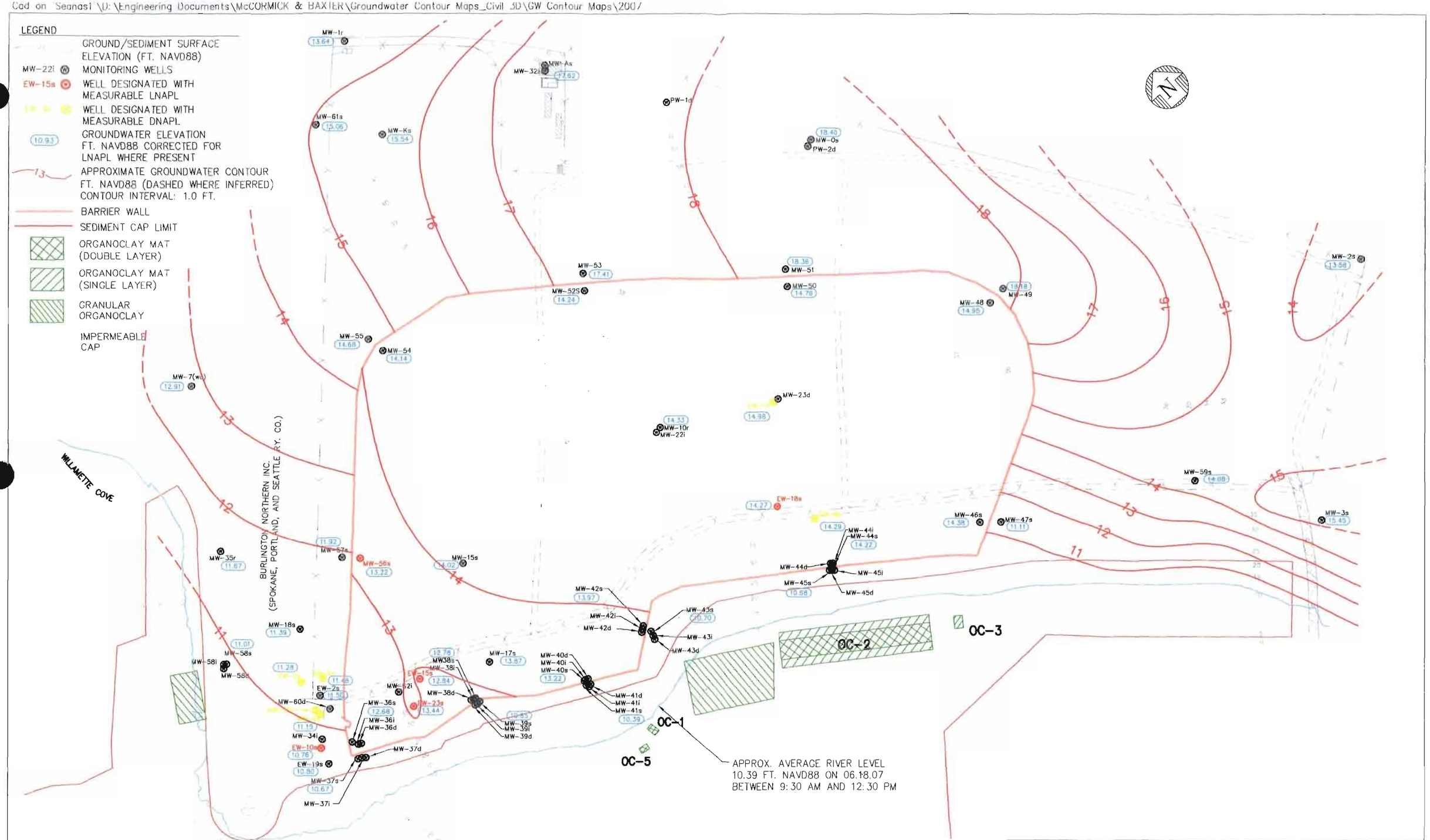

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International Specialists in the Environment
Portland, Oregon

DESIGNED BY:
CHECKED BY:
DRAWN BY: Z. LEHN

FIGURE 2-3
GROUNDWATER CONTOUR MAP
SECOND QUARTER 2007 - JUNE 18, 2007
McCORMICK & BAXTER
CREOSOTING CO.
PORTLAND, OREGON

SCALE: NOTED
DATE ISSUED: 04-29-08
C.A.D. FILE NO.: gw_contours_June07_071607.dwg

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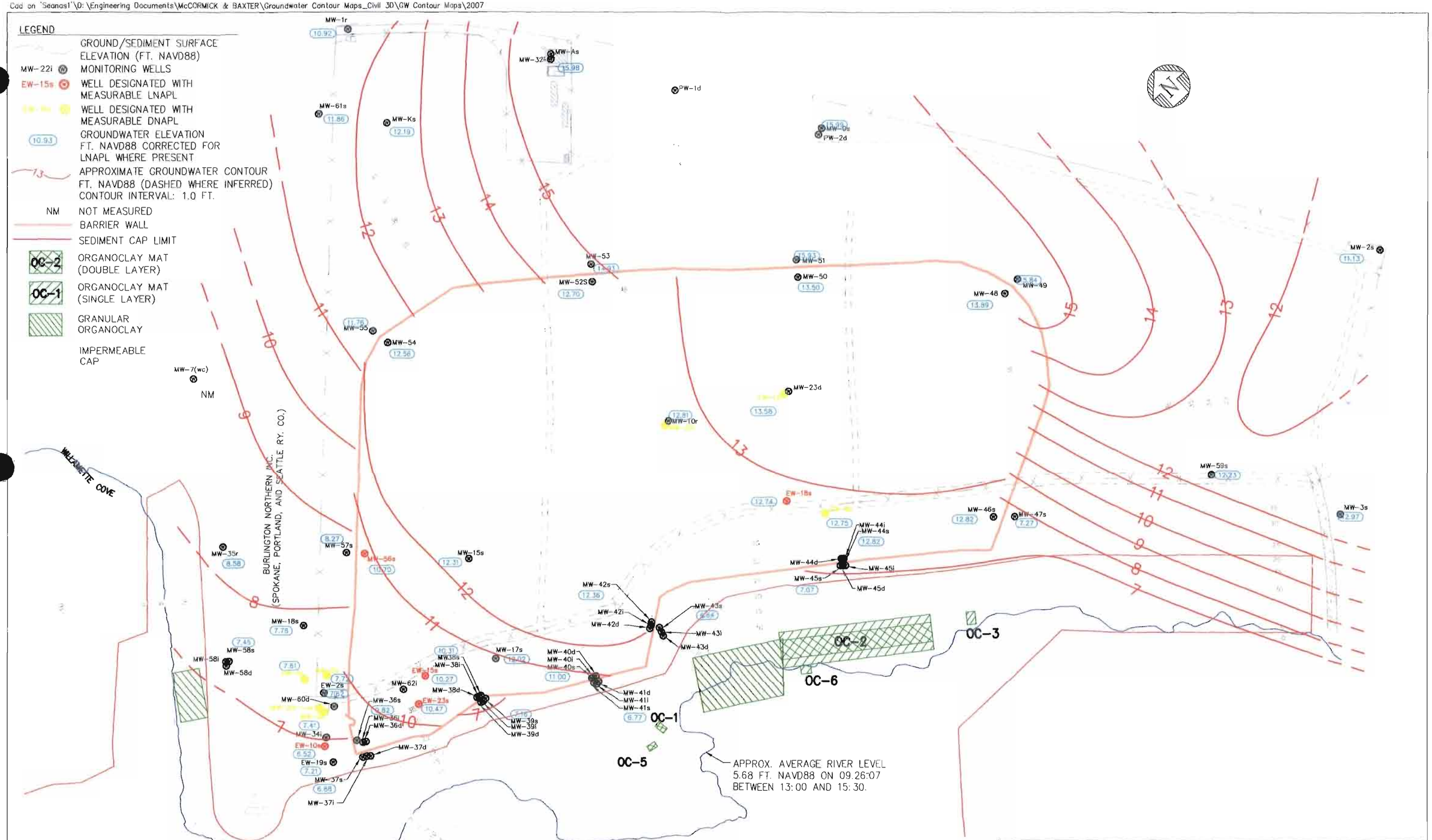

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DESIGNED BY:
CHECKED BY: L. COPE
DRAWN BY: Z. LEHN
APPROVED BY

FIGURE 2-4
GROUNDWATER CONTOUR MAP
THIRD QUARTER 2007 - SEP 26, 2007
McCORMICK & BAXTER
CREOSOTING CO.
PORTLAND, OREGON

SCALE: NOTED
DATE ISSUED: 02-29-08
C.A.D. FILE NO.: gw_contours_Sept07_Fig 2-4.dwg

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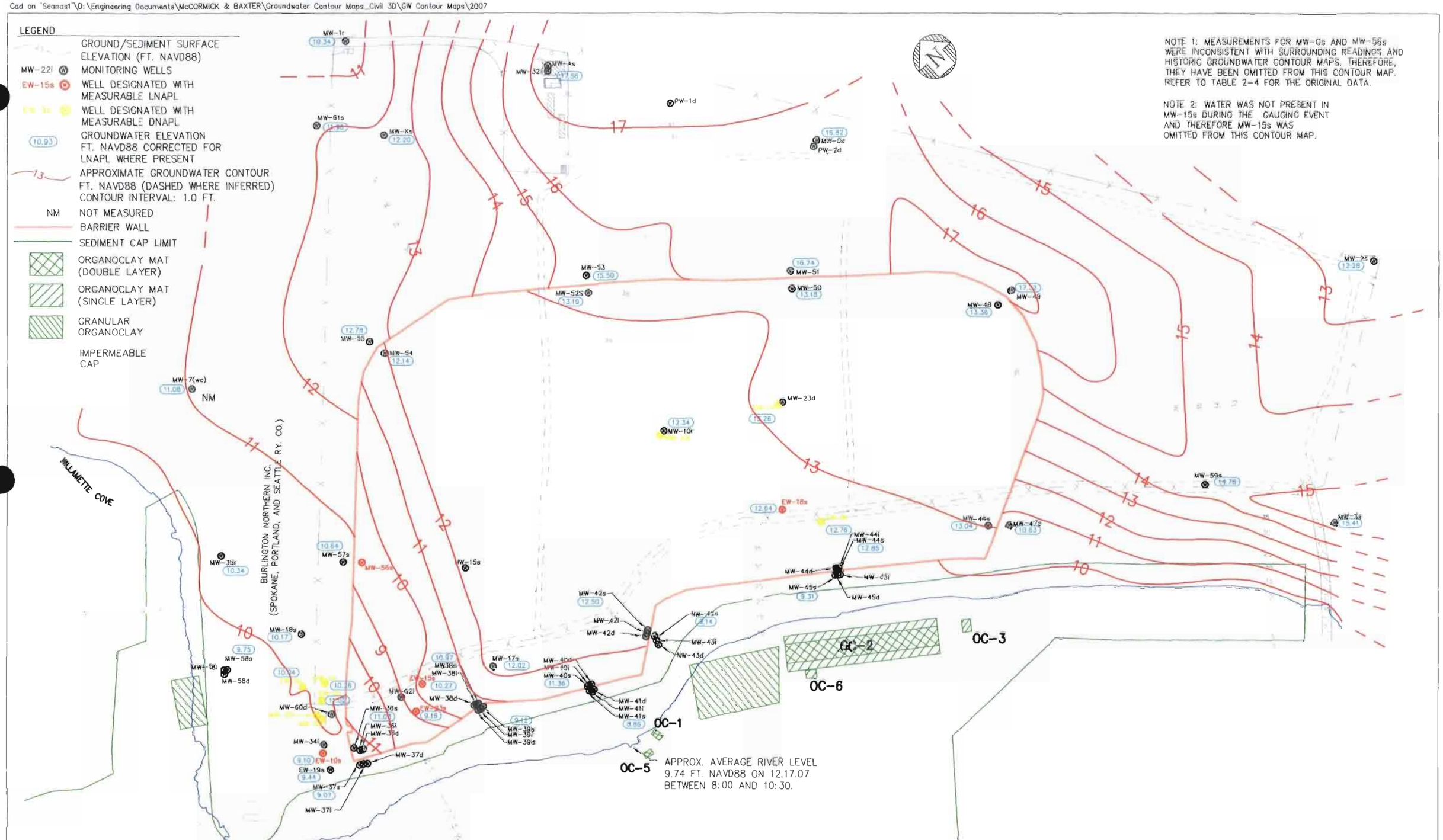

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Portland, Oregon

DESIGNED BY:
CHECKED BY: L. KORE
DRAWN BY: Z. SOHN

FIGURE 2-5
GROUNDWATER CONTOUR MAP
FOURTH QUARTER 2007 - DEC 17, 2007
McCORMICK & BAXTER
CREOSOTING CO.
PORTLAND, OREGON

NOTED 04-30-08 gw_contours_Dec07.dwg

FIGURE 2-6
Cumulative NAPL Recovery as of December 31, 2007
McCormick and Baxter Creosoting Company
Portland, Oregon

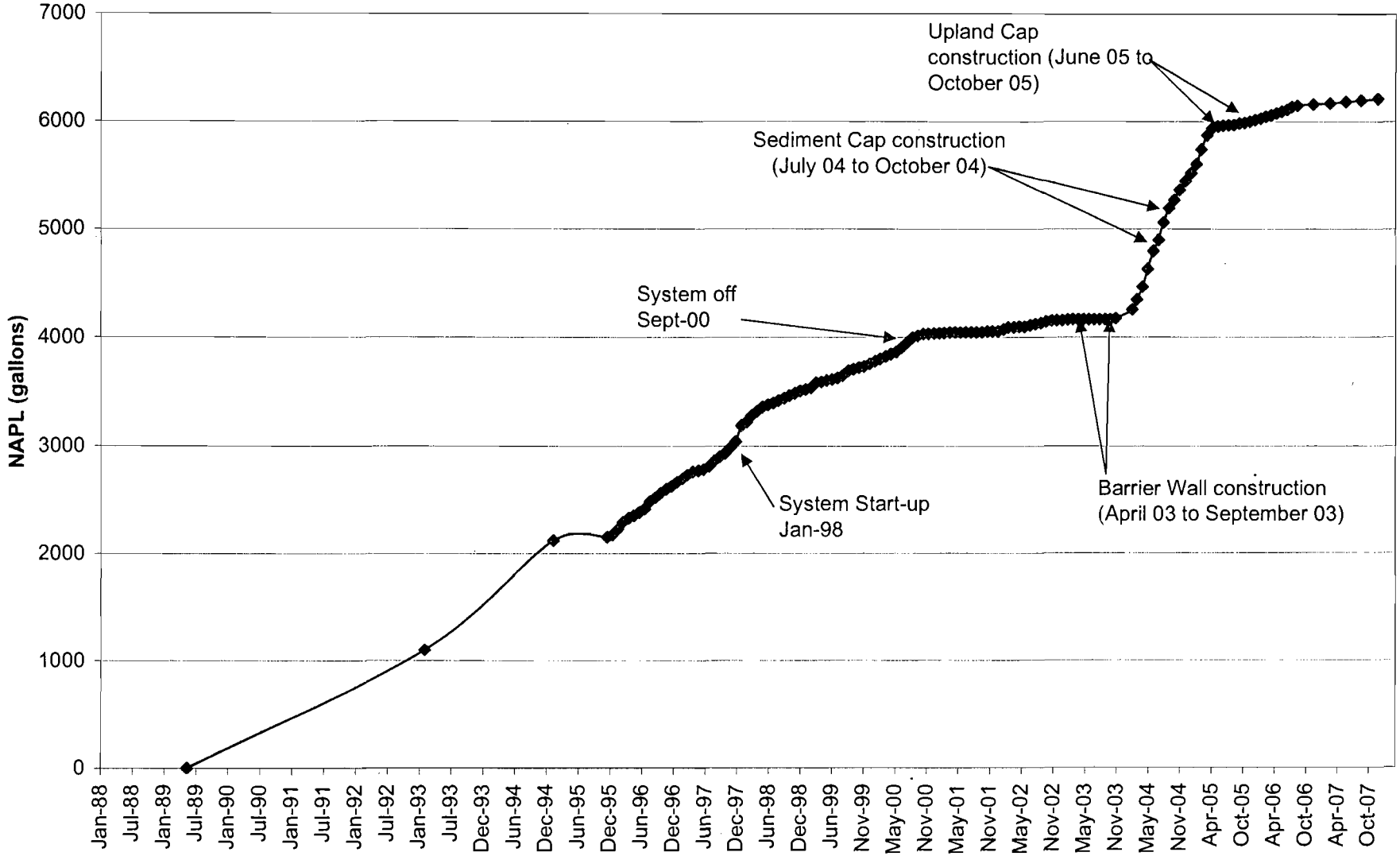

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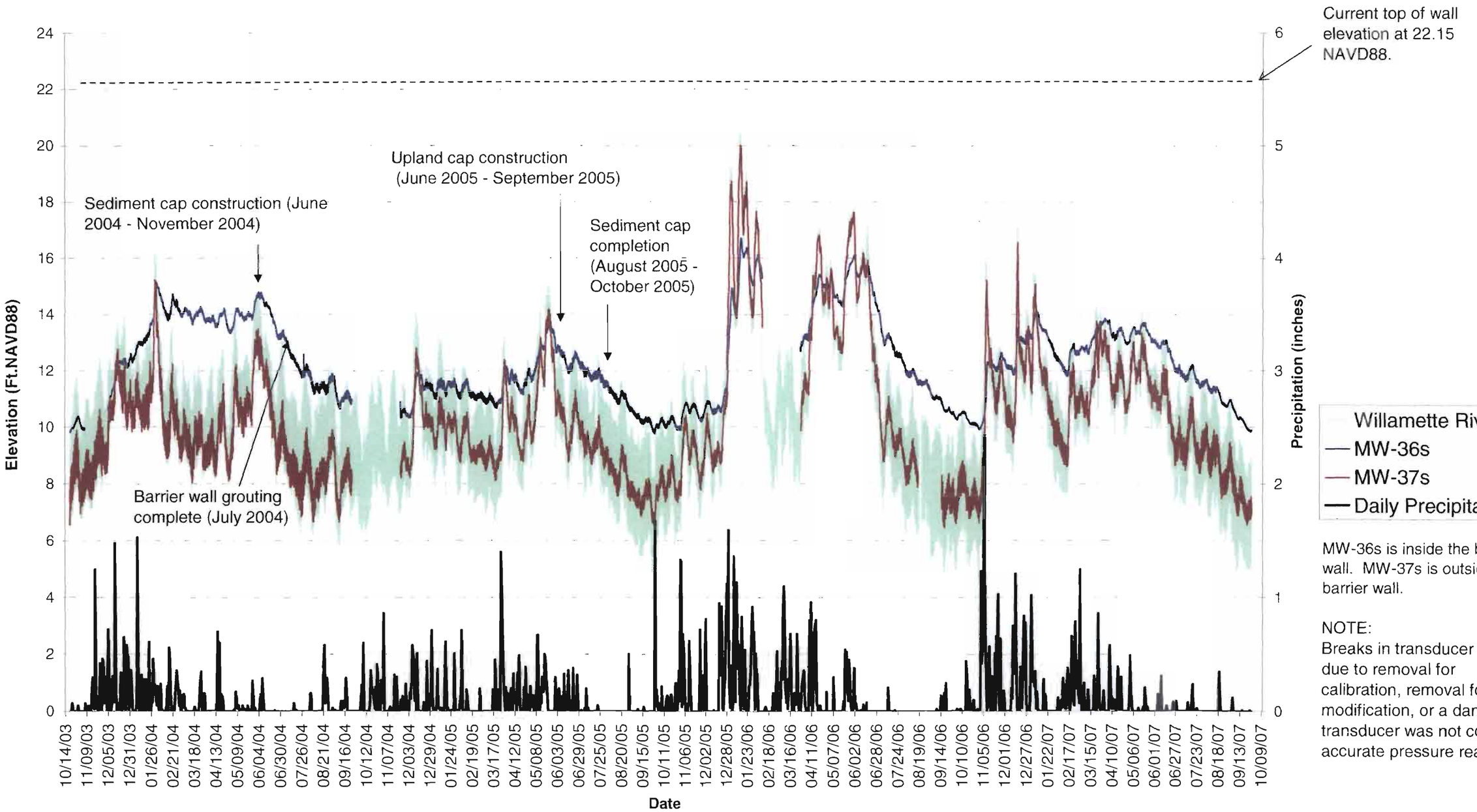
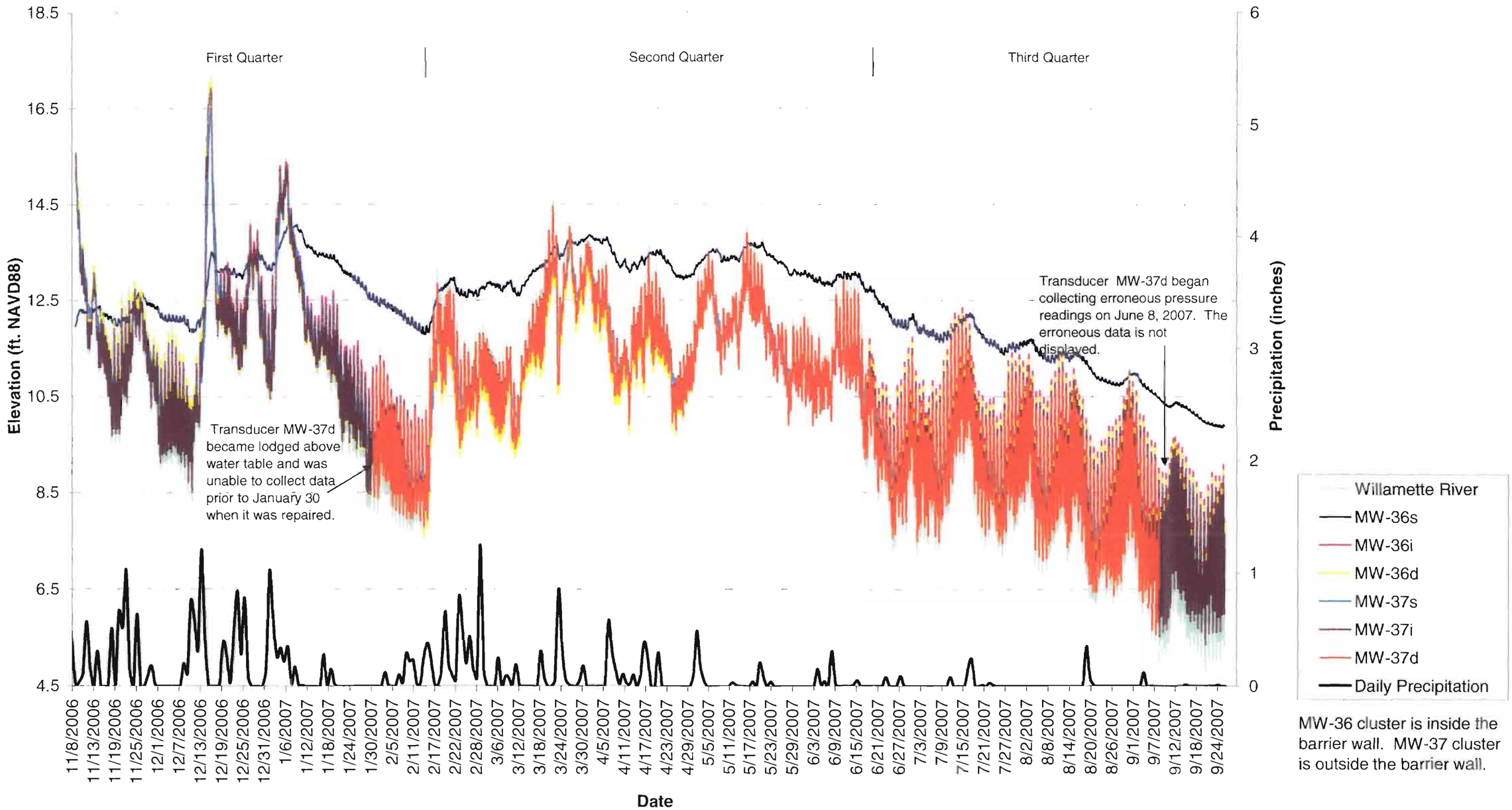
Figure 3-1
FWDA SHALLOW GROUNDWATER INSIDE THE BARRIER WALL vs OUTSIDE THE BARRIER WALL
October 20, 2003 through September 26, 2007
McCORMICK and BAXTER CREOSOTING COMPANY
PORTLAND, OREGON



MW-36s is inside the barrier wall. MW-37s is outside the barrier wall.

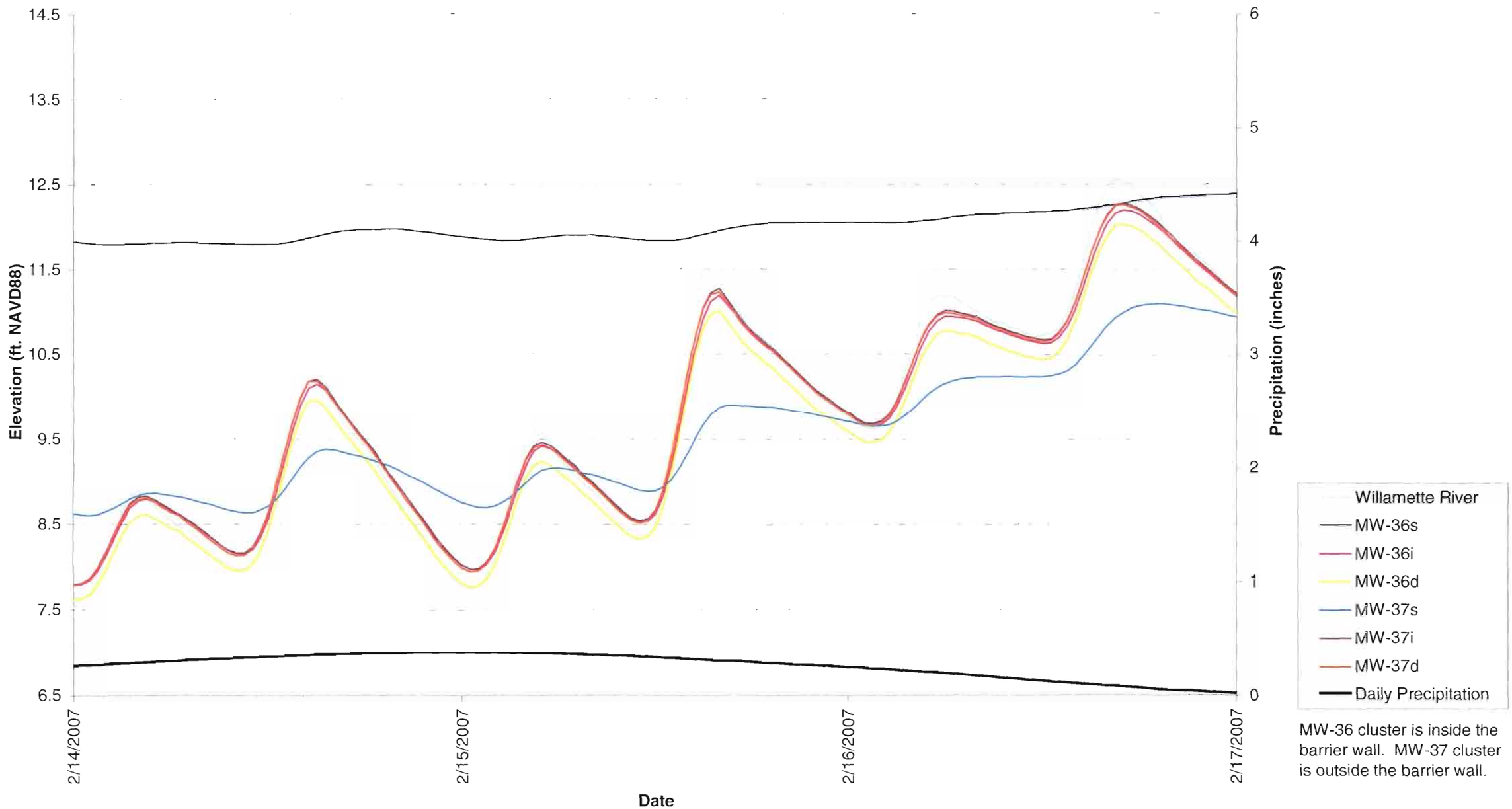
NOTE:
Breaks in transducer data due to removal for calibration, removal for well modification, or a damaged transducer was not collecting accurate pressure readings.

Figure 3-2
FWDA GROUNDWATER ELEVATIONS INSIDE THE BARRIER WALL vs OUTSIDE THE BARRIER WALL
November 9, 2006 through September 26, 2007
McCORMICK and BAXTER CREOSOTING COMPANY
PORTLAND, OREGON



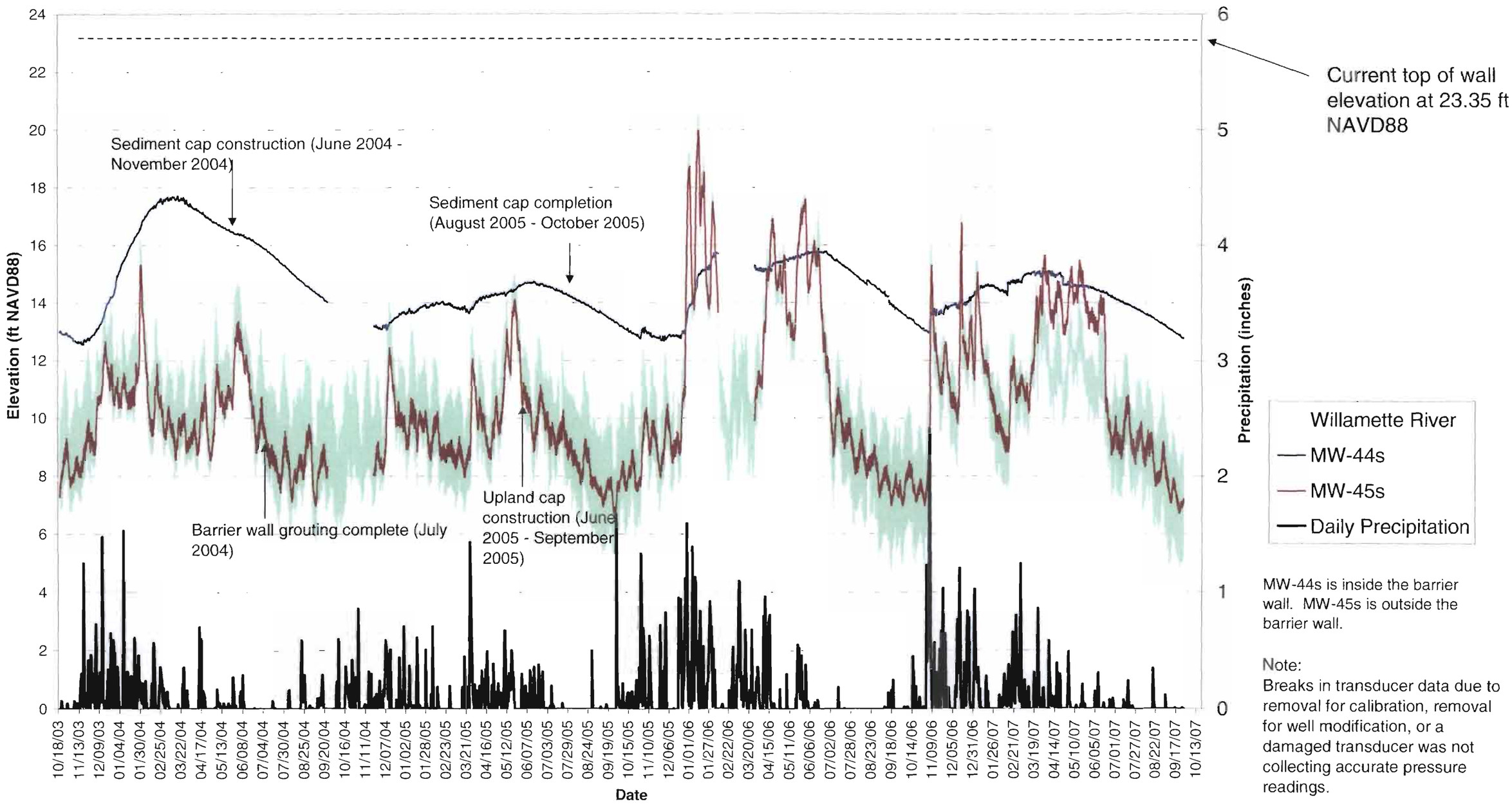
MW-36 cluster is inside the barrier wall. MW-37 cluster is outside the barrier wall.

Figure 3-3
FWDA GROUNDWATER ELEVATIONS INSIDE THE BARRIER WALL vs OUTSIDE THE BARRIER WALL
February 14, 2007 through February 17, 2007
McCORMICK and BAXTER CREOSOTING COMPANY
PORTLAND, OREGON



MW-36 cluster is inside the barrier wall. MW-37 cluster is outside the barrier wall.

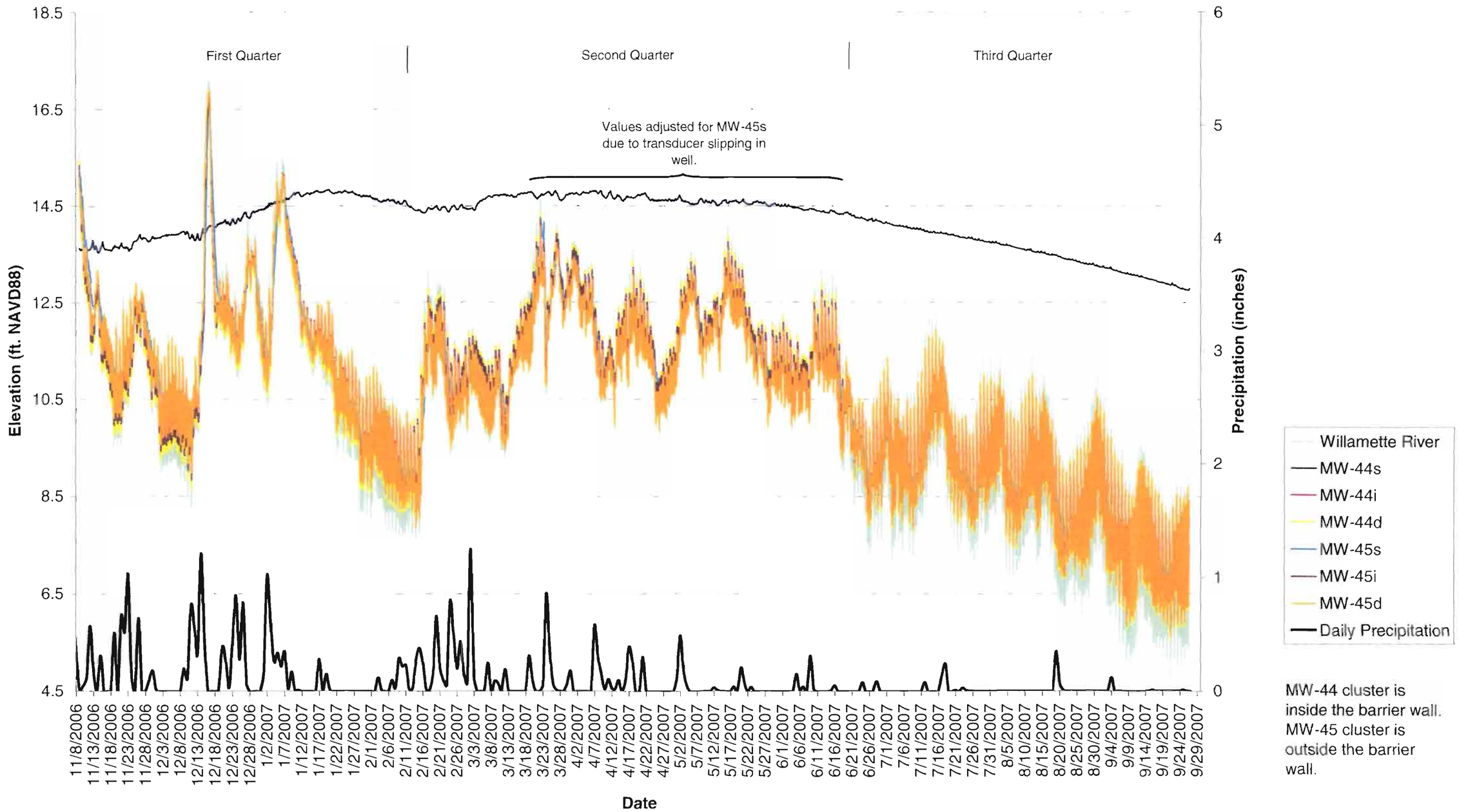
Figure 3-4
TFA SHALLOW GROUNDWATER INSIDE THE BARRIER WALL vs OUTSIDE THE BARRIER WALL
October 20, 2003 through September 26, 2007
McCORMICK and BAXTER CREOSOTING COMPANY
PORTLAND, OREGON



MW-44s is inside the barrier wall. MW-45s is outside the barrier wall.

Note:
Breaks in transducer data due to removal for calibration, removal for well modification, or a damaged transducer was not collecting accurate pressure readings.

Figure 3-5
TFA GROUNDWATER ELEVATION INSIDE THE BARRIER WALL vs OUTSIDE THE BARRIER WALL
November 9, 2006 through September 26, 2007
McCORMICK and BAXTER CREOSOTING COMPANY
PORTLAND, OREGON



MW-44 cluster is inside the barrier wall. MW-45 cluster is outside the barrier wall.

Figure 3-6
TFA GROUNDWATER ELEVATION INSIDE THE BARRIER WALL vs OUTSIDE THE BARRIER WALL
February 14, 2007 through February 17, 2007
McCORMICK and BAXTER CREOSOTING COMPANY
PORTLAND, OREGON

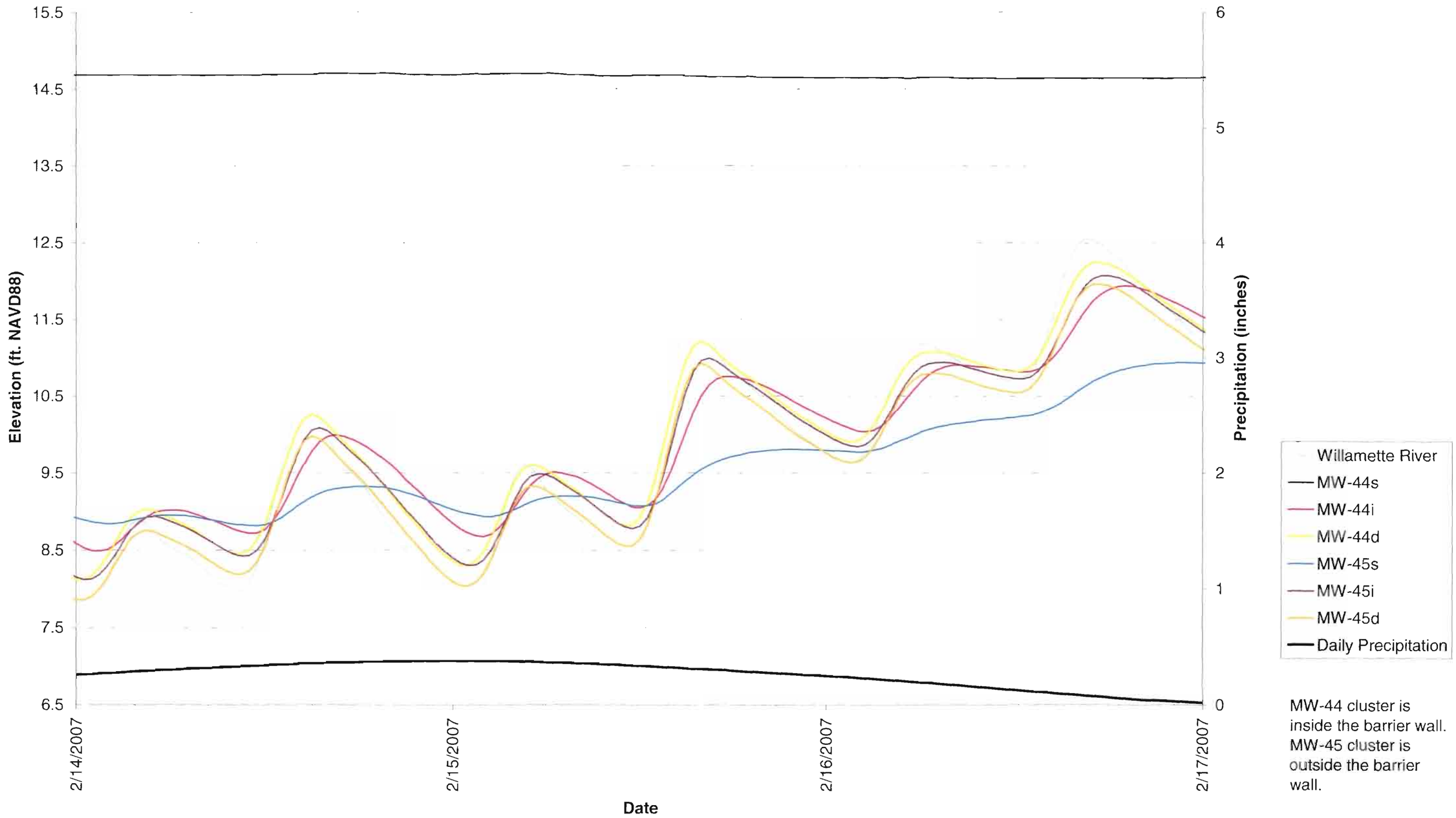
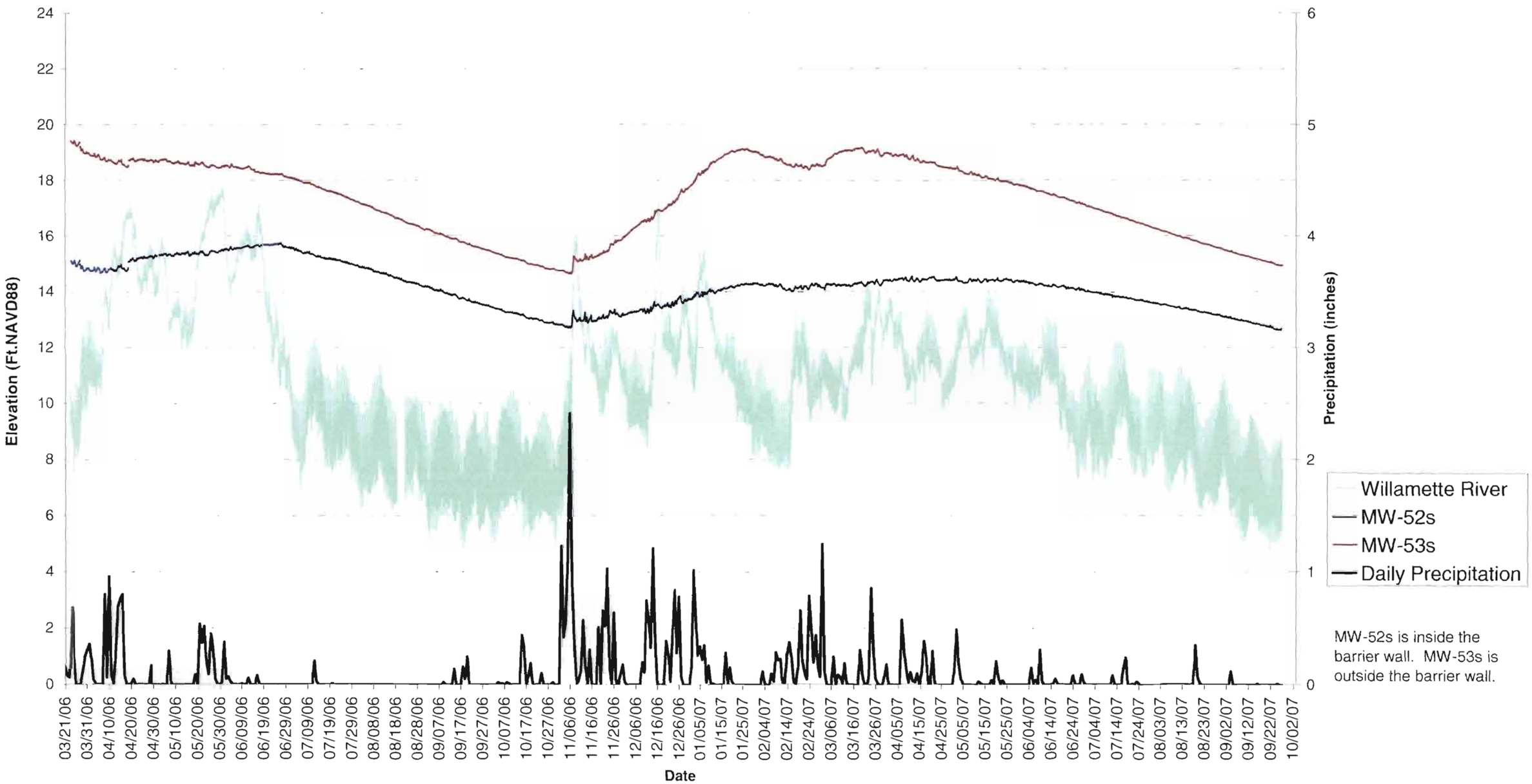
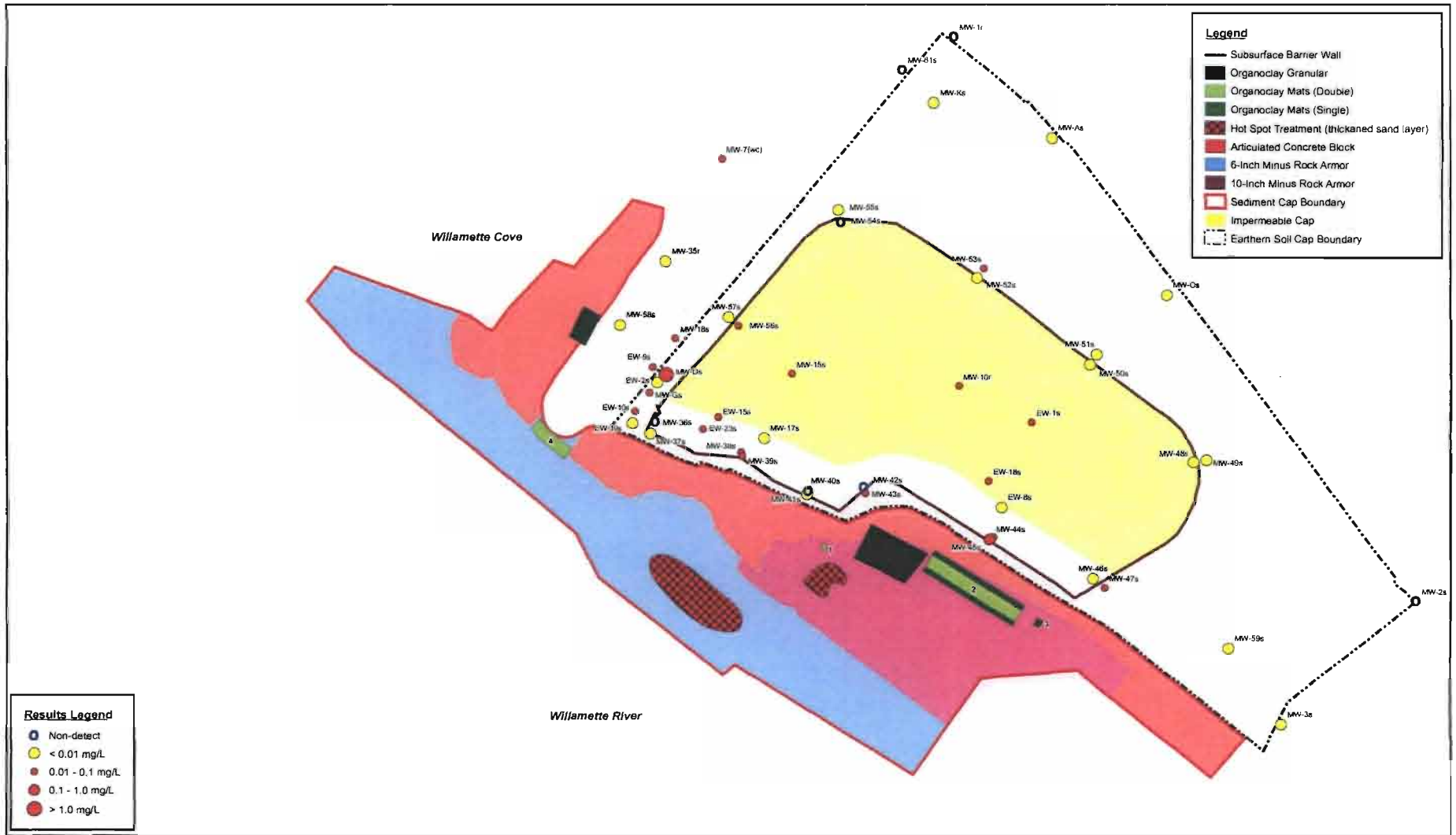


Figure 3-7
UPLAND SHALLOW GROUNDWATER INSIDE THE BARRIER WALL vs OUTSIDE THE BARRIER WALL
March 23, 2006 through September 26, 2007
McCORMICK and BAXTER CREOSOTING COMPANY
PORTLAND, OREGON





Map Reference:

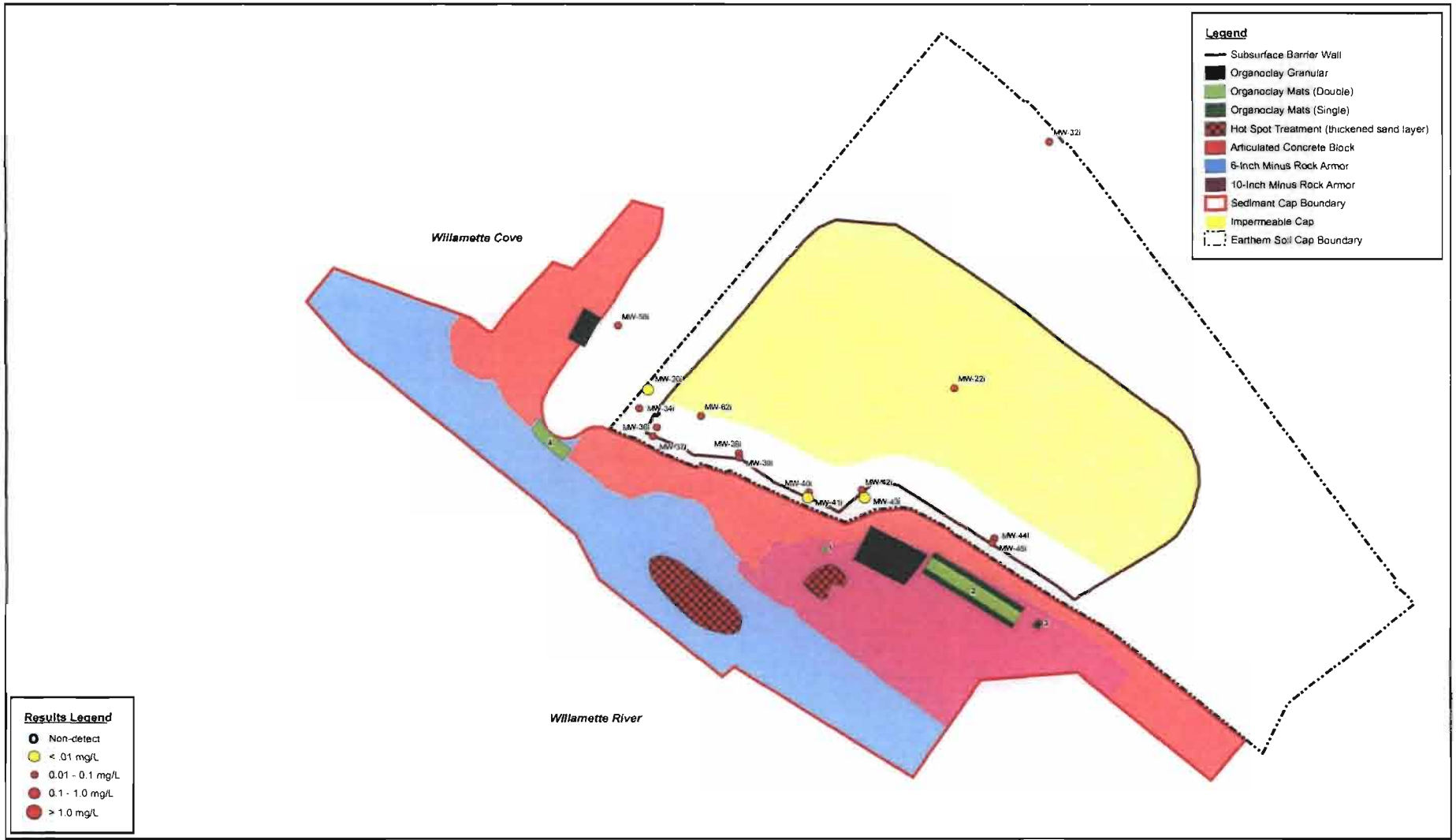
McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-1
SPRING 2006 TOTAL ARSENIC
GROUNDWATER SAMPLE RESULTS
FOR SHALLOW WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

\\ndms-projects\mcbax\2005 2006 Report Figures\figure 4-1 spring 2006 as gw-shallow.mxd



Map Reference:

McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-2
SPRING 2006 TOTAL ARSENIC
GROUNDWATER SAMPLE RESULTS
FOR INTERMEDIATE WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

/edms projects/mcbax/2005 2006 Report Figures/figure 4-2 spring 2006 as gw-intermediate.mxd

Map Reference:

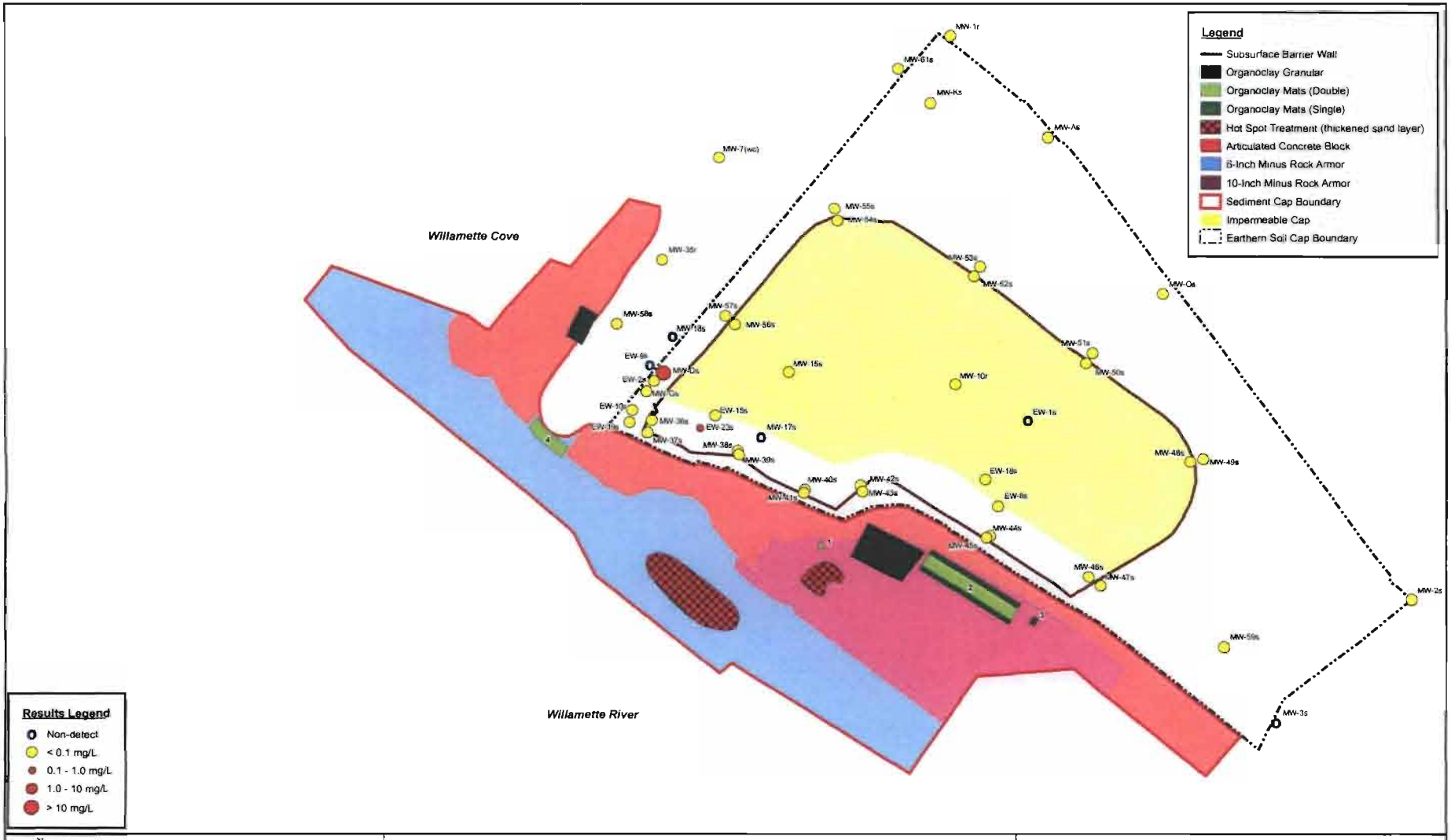
McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-3
SPRING 2006 TOTAL ARSENIC
GROUNDWATER SAMPLE RESULTS
FOR DEEP WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

/efm projects/mcbax/2005 2008 Report Figures/figure 4-3 spring 2006 as gw deep.mxd



Map Reference:

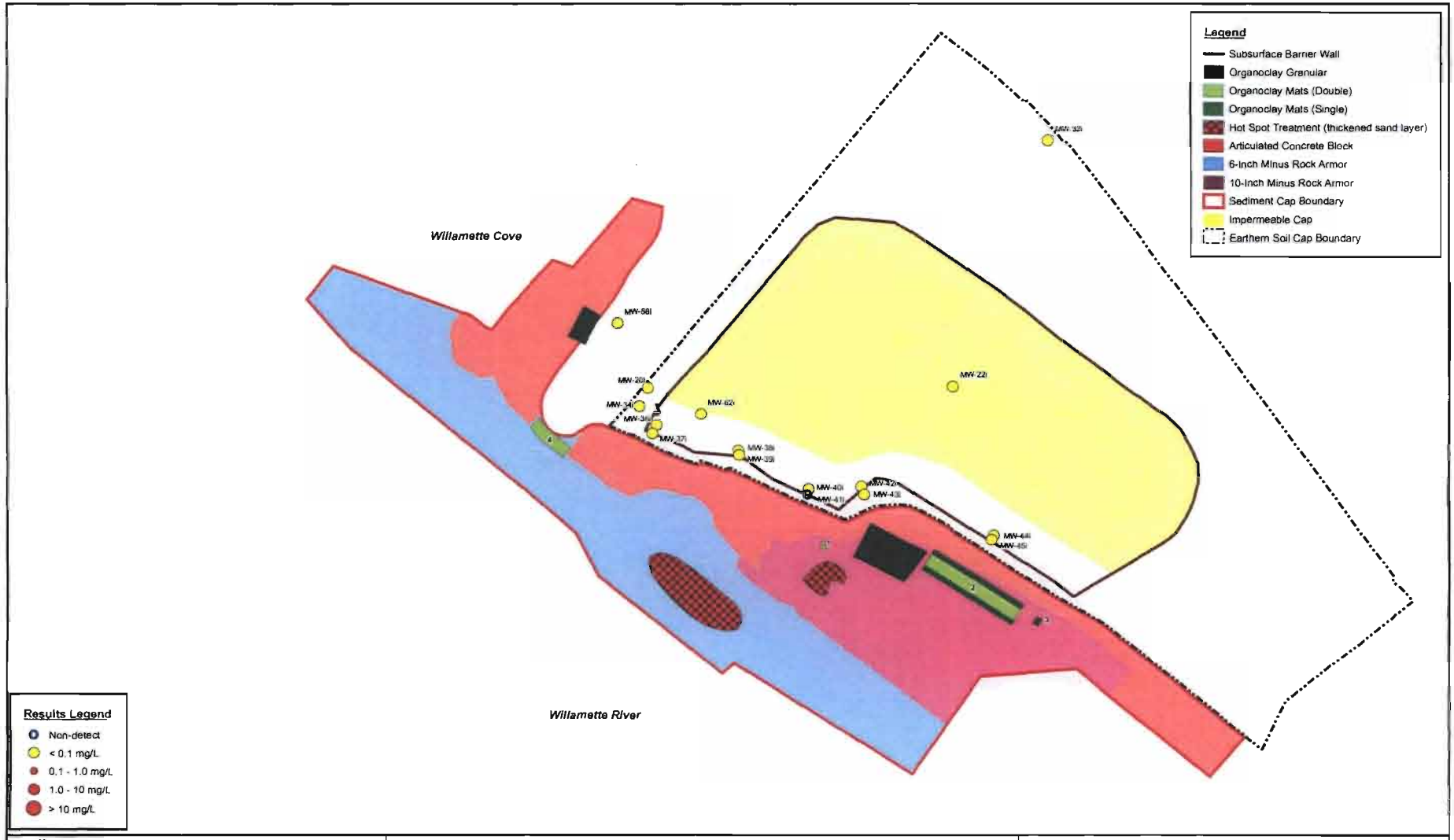
McCormick & Baxter Creosoting Company

Portland, Oregon

Figure 4-4
SPRING 2006 TOTAL CHROMIUM GROUNDWATER SAMPLE RESULTS FOR SHALLOW WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

fs/ms projects/mcbax/2005 2006 Report Figures/figure 4-4 spring 2006 cr gw-shallow.mxd



Map Reference:

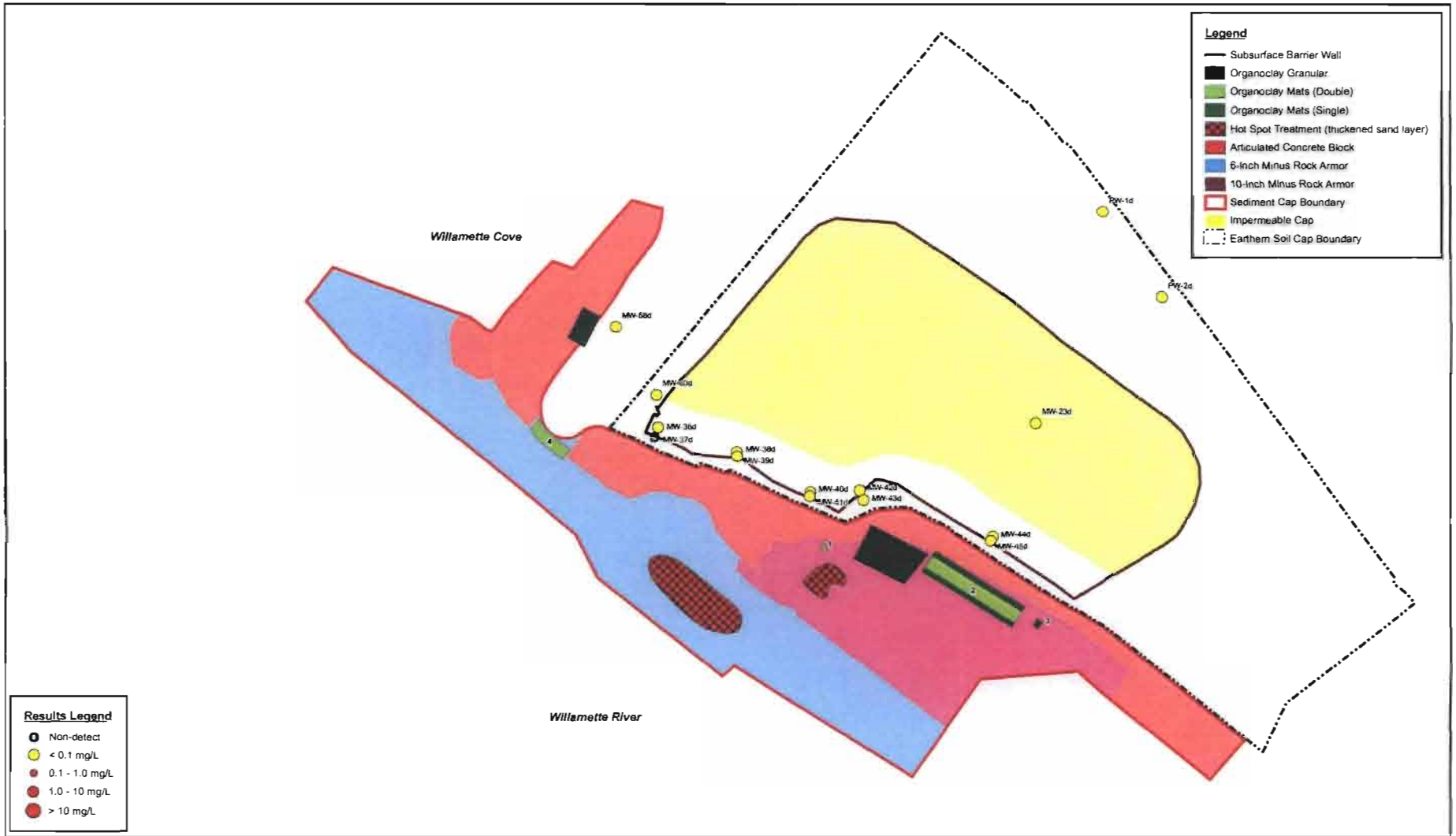
McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-5
SPRING 2006 TOTAL CHROMIUM
GROUNDWATER SAMPLE RESULTS
FOR INTERMEDIATE WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

/adms-projects/mcbax/2005 2006 Report Figures/figure 4-5 spring 2006 cr gw-intermediate.mxd



Map Reference:

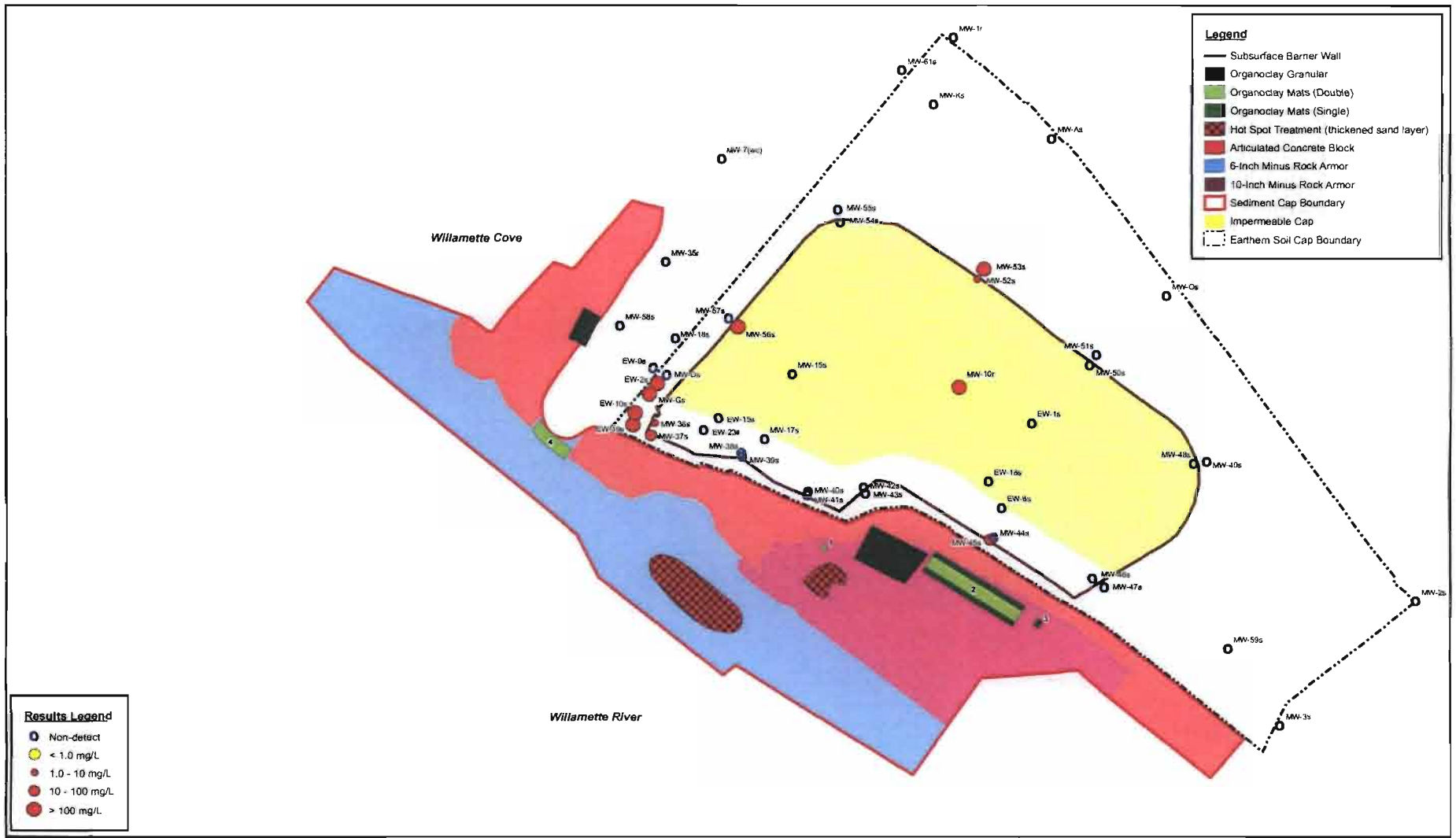
McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-6
SPRING 2006 TOTAL CHROMIUM
GROUNDWATER SAMPLE RESULTS
FOR DEEP WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

/kdms-projects/mcbax/2005 2006 Report Figures/figure 4-6 spring 2006 cr gw-deep.mxd



Map Reference:

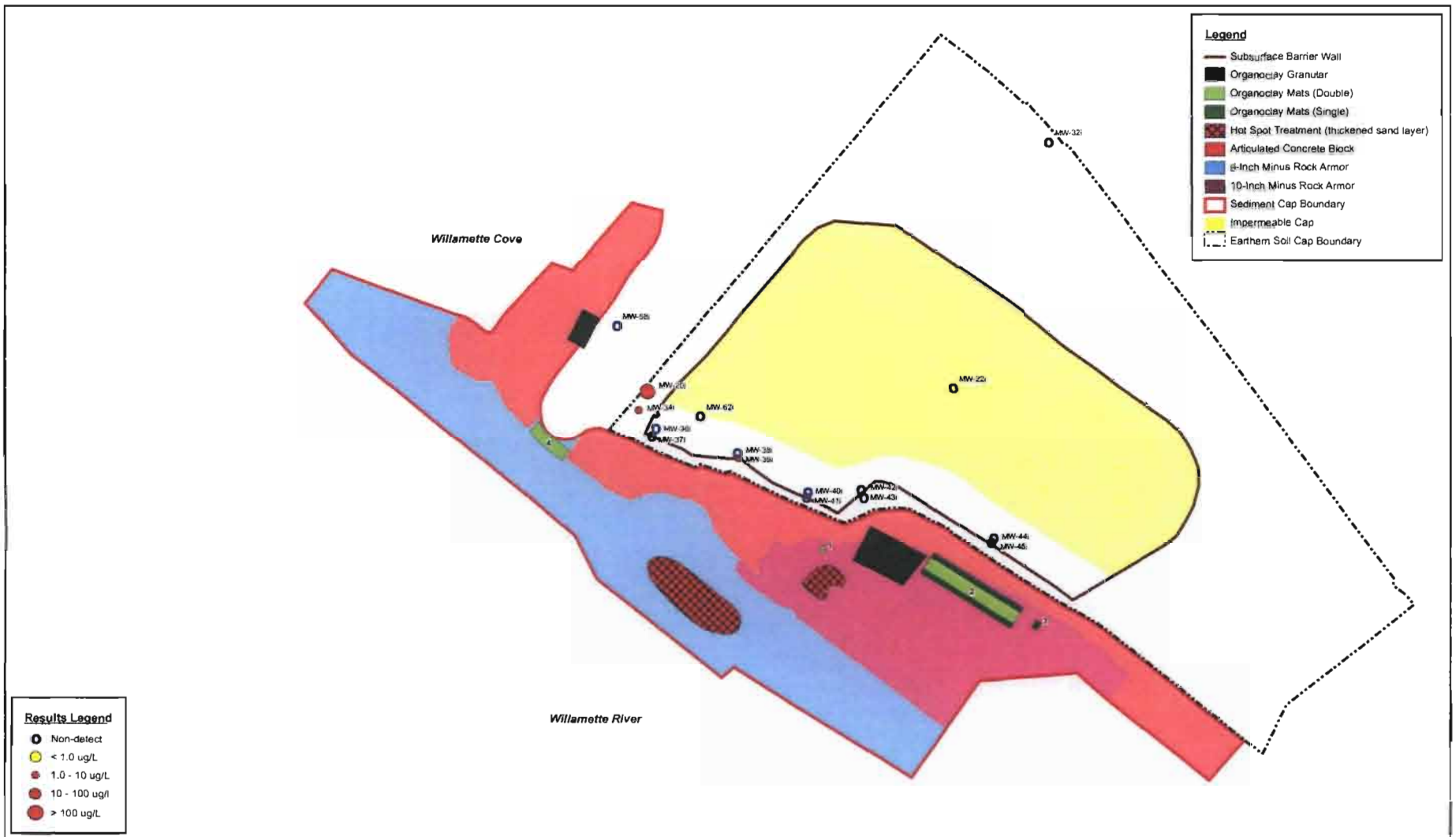
McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-7
SPRING 2006 PENTACHLOROPHENOL
GROUNDWATER SAMPLE RESULTS
FOR SHALLOW WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

/adms-projects/mcbax/2005 2006 Report Figures/figure 4-7 spring 2006 pcp (pw-shallow.mxd



Map Reference:

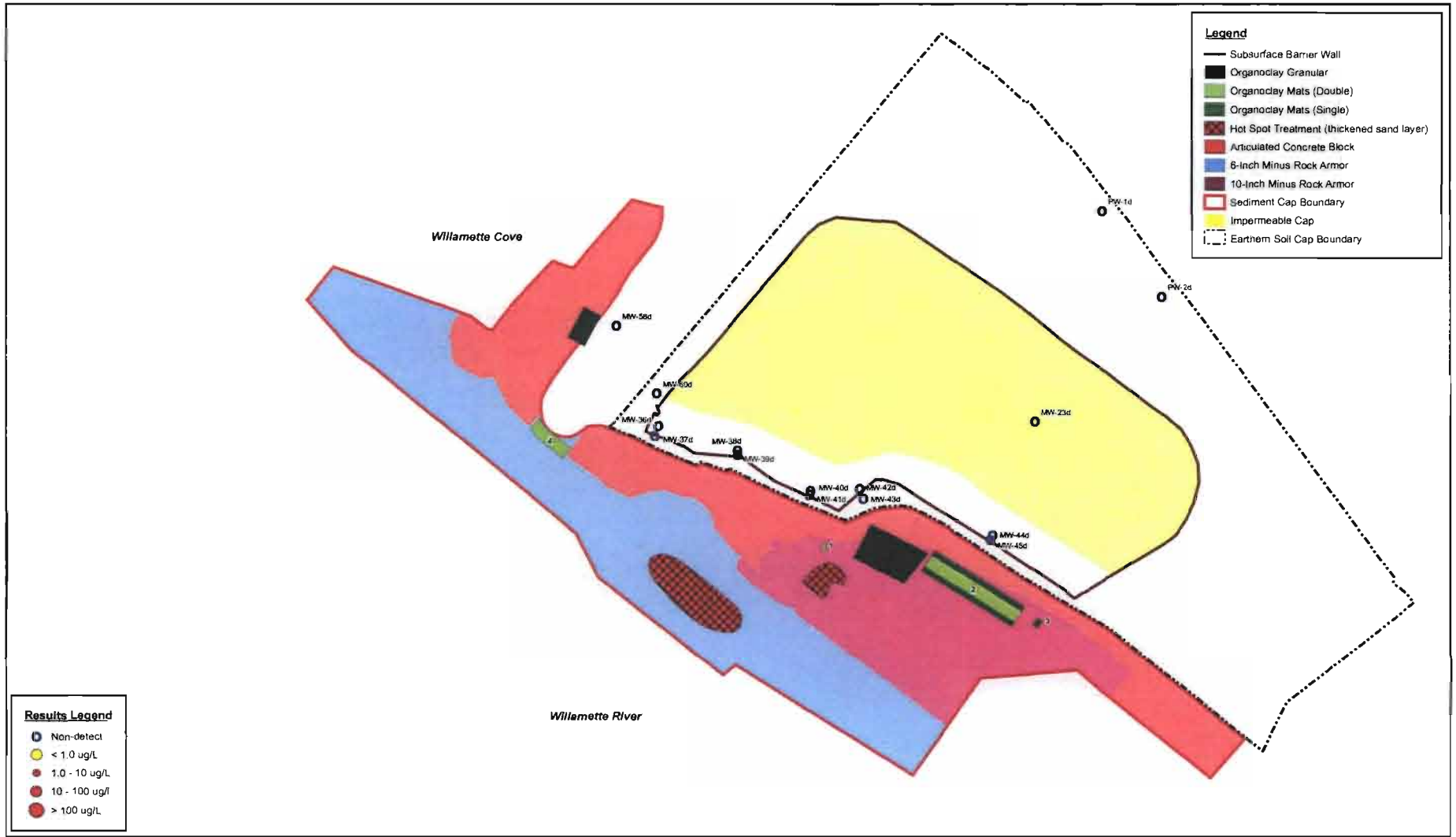
McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-8
SPRING 2006 PENTACHLOROPHENOL
GROUNDWATER SAMPLE RESULTS
FOR INTERMEDIATE WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

/adms-projects/mcbax/2005 2006 Report Figures/figure 4-8 spring 2006 pcp gw-intermediate.mxd



Map Reference:

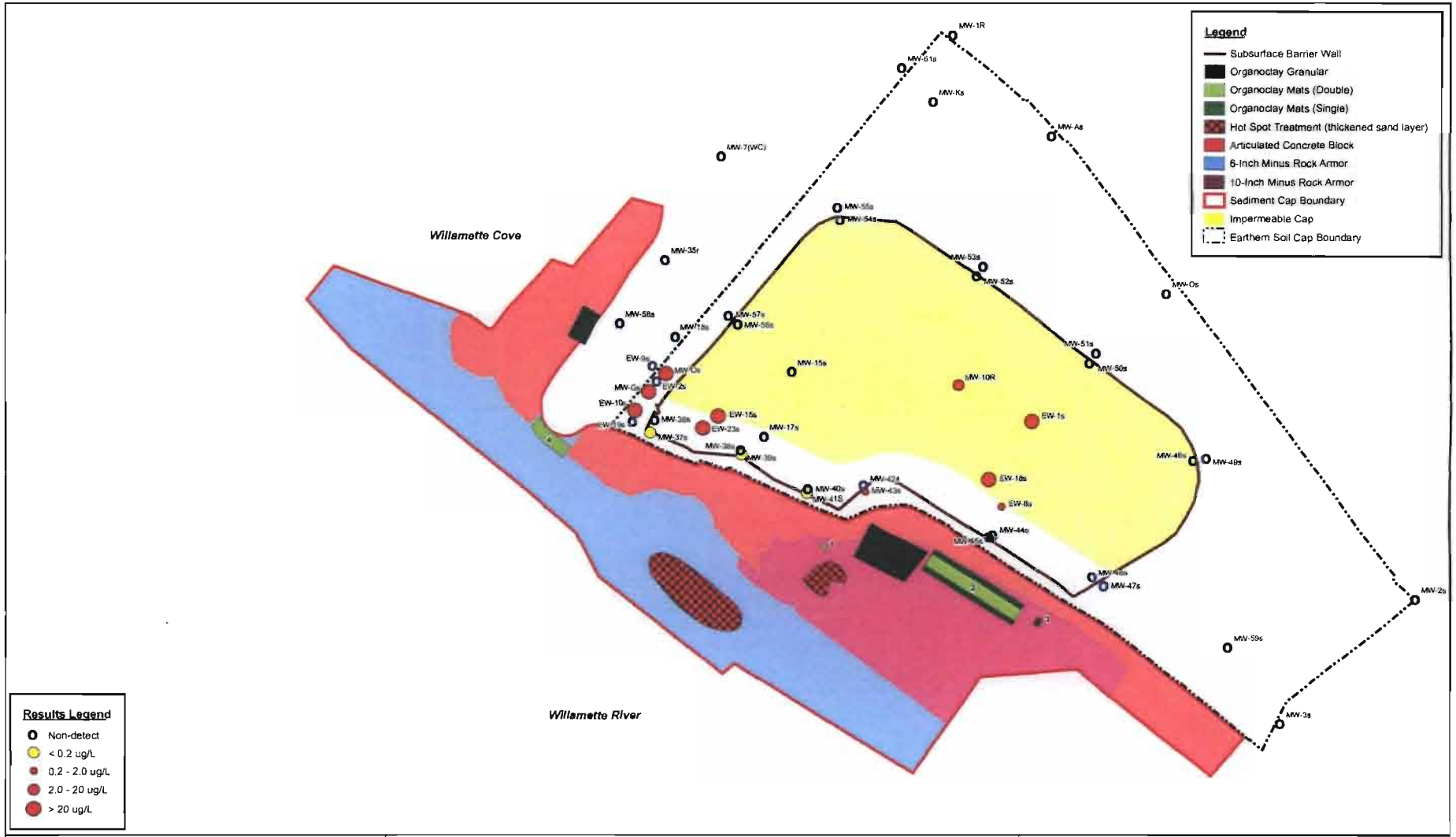
McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-9
SPRING 2006 PENTACHLOROPHENOL
GROUNDWATER SAMPLE RESULTS
FOR DEEP WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

/edms-projects/mcbax/2005 2006 Report Figures/figure 4-9 spring 2006 pcp gw-deep.mxd



Map Reference:

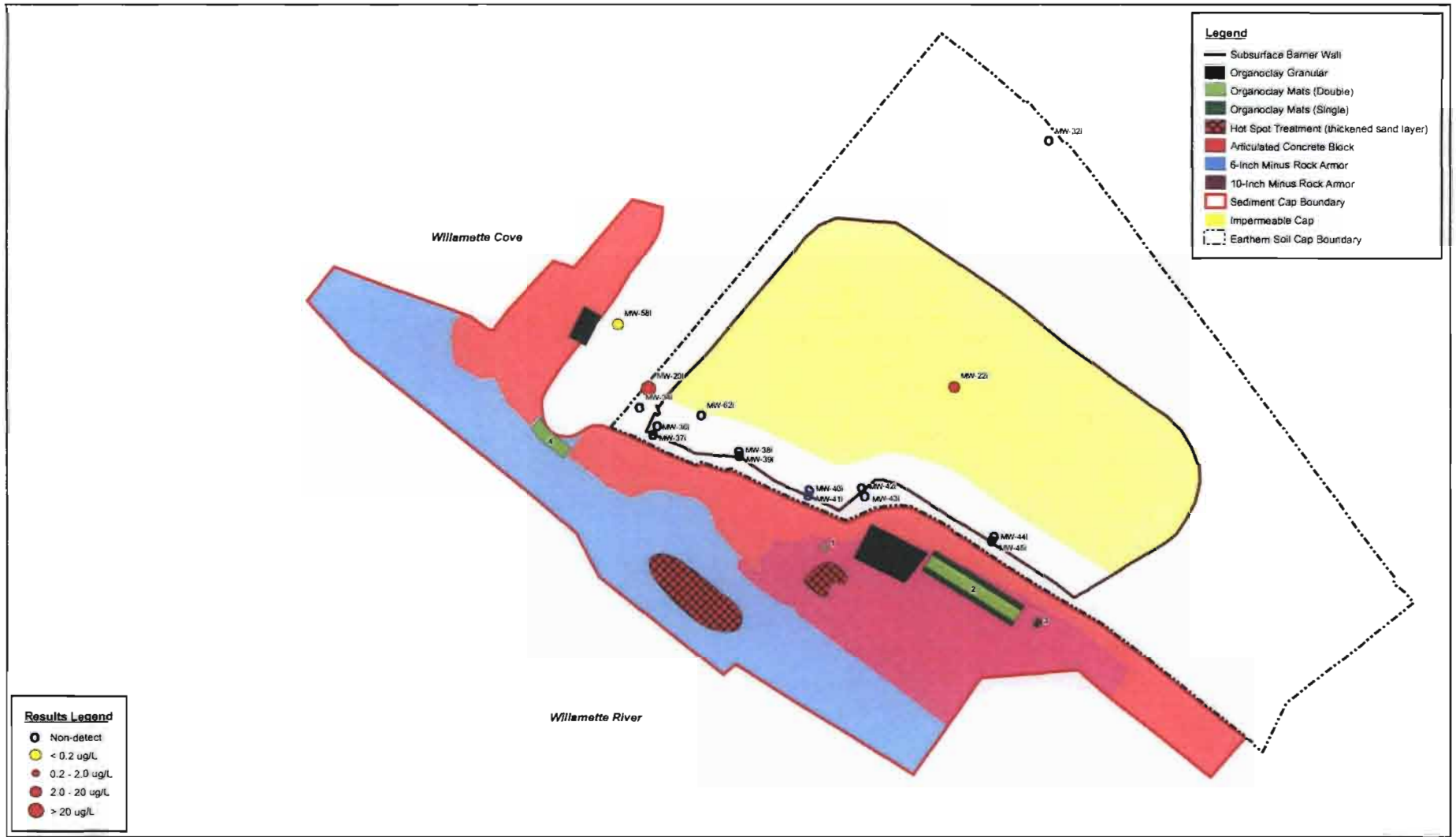
McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-10
SPRING 2006 BENZO(a)PYRENE
GROUNDWATER SAMPLE RESULTS
FOR SHALLOW WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

/edms-projects/mcbax/2005 2006 Report Figures/figure 4-10 spring 2006 bap gw-shallow.mxd



Map Reference:

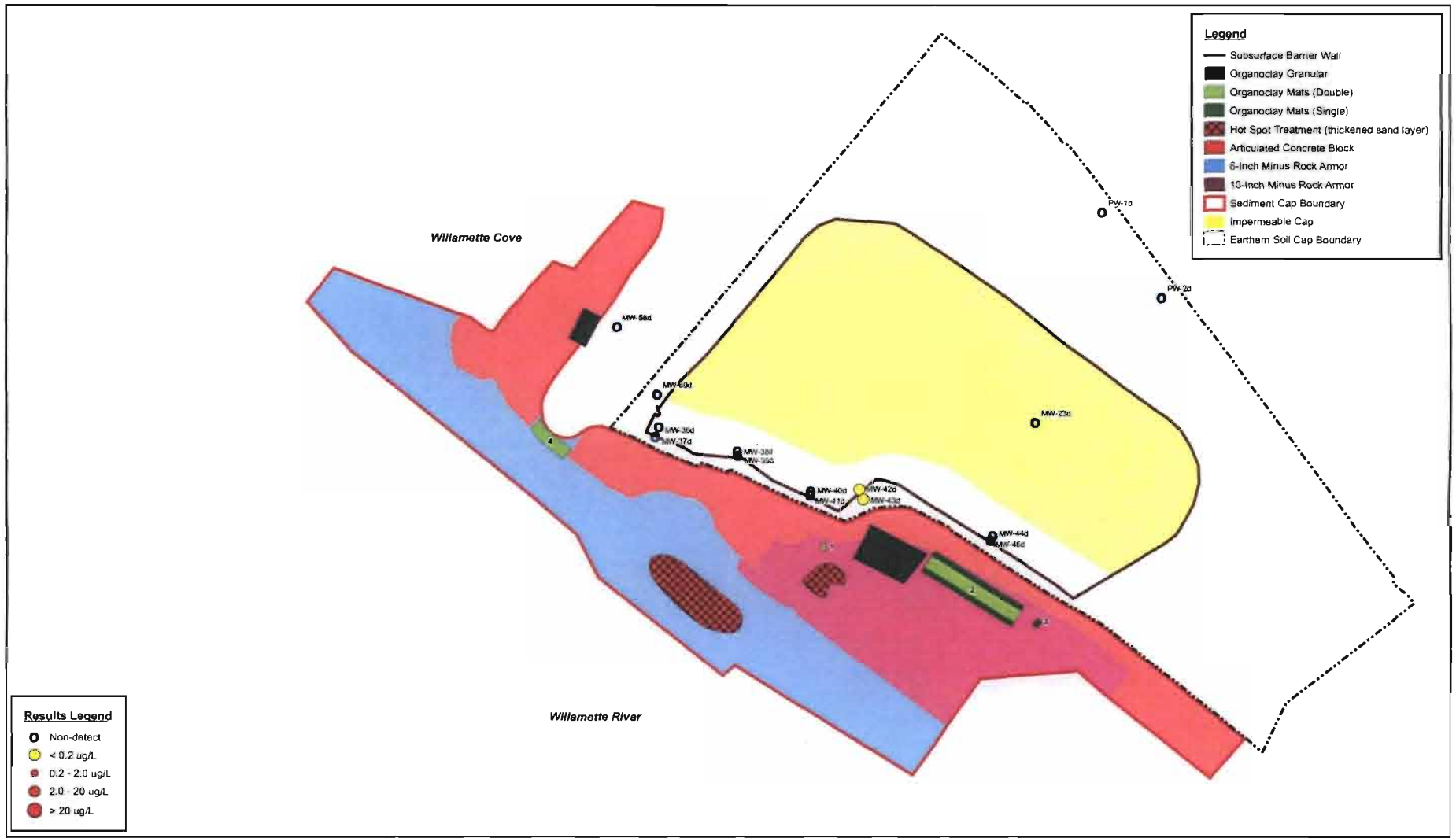
McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-11
SPRING 2006 BENZO(a)PYRENE
GROUNDWATER SAMPLE RESULTS
FOR INTERMEDIATE WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

Arcims-projects/mcbax/2005 2006 Report Figures/figure 4-11 spring 2006 bap gw-intermediate.mxd



Map Reference:

McCormick & Baxter
Creosoting Company

Portland, Oregon

Figure 4-12
SPRING 2006 BENZO(a)PYRENE
GROUNDWATER SAMPLE RESULTS
FOR DEEP WELLS

Date:	GIS:	Job Number:
11/27/2007	avh	002688.OY28.09

Xdms-projects/mcbax/2005 2006 Report Figures/figure 4-12 spring 2006 bap gw-deep.mxd

Tables

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TABLE 2-1
Groundwater and NAPL Elevations
February 13, 2007
McCormick and Baxter Creosoting Company
Portland, OR

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft)	LNAPL Elevation (ft NAVD88)	LNAPL Thickness (ft)	Specific Gravity of LNAPL	Depth to DNAPL (ft)	Depth to water (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL Corrected (ft NAVD88)
EW-10s	2/13/2007	845	29.52	trace				ND	20.70	8.82	
EW-15s	2/13/2007	910	43.12	30.91	12.21	0.83	0.98135	ND	31.74	11.38	12.20
EW-18s	2/13/2007	910	40.82	26.56	14.26	0.04	0.98135	ND	26.60	14.22	14.26
EW-19s	2/13/2007	823	26.06	ND				ND	17.02	9.04	
EW-1s	2/13/2007	935	41.41	ND				45.86	26.59	14.82	
EW-23s	2/13/2007	906	38.63	26.25	12.38	1.27	0.98135	ND	27.52	11.11	12.36
EW-2s	2/13/2007	830	42.48	ND				ND	32.39	10.09	
EW-8s	2/13/2007	923	40.57	ND				52.91	26.27	14.30	
EW-9s	2/13/2007	826	40.83	ND				ND	31.03	9.80	
MW-10r	2/13/2007	939	42.01	ND				ND	27.86	14.15	
MW-15s	2/13/2007	919	43.30	ND				ND	29.59	13.71	
MW-17s	2/13/2007	930	41.35	ND				ND	27.5	13.85	
MW-18s	2/13/2007	810	43.18	ND				ND	33.14	10.04	
MW-1r	2/13/2007	814	38.19	ND				ND	25.02	13.17	
MW-20i	2/13/2007	834	41.55	ND				70.93	33.21	8.34	
MW-22i	2/13/2007	945	42.35	ND				54.33	33.64	8.71	
MW-23d	2/13/2007	930	41.68	ND				ND	32.80	8.88	
MW-2s	2/13/2007	1020	38.37	ND				ND	24.77	13.60	
MW-32i	2/13/2007	800	39.37	ND				ND	26.72	12.65	
MW-34i	2/13/2007	821	32.75	ND				ND	24.36	8.39	
MW-35r	2/13/2007	840	32.27	ND				ND	21.82	10.45	
MW-36d	2/13/2007	817	30.52	ND				ND	22.22	8.30	
MW-36i	2/13/2007	816	30.26	ND				ND	21.96	8.30	
MW-36s	2/13/2007	815	30.83	ND				ND	19.10	11.73	
MW-37d	2/13/2007	821	26.15	ND				ND	17.87	8.28	
MW-37i	2/13/2007	820	25.99	ND				ND	17.68	8.31	
MW-37s	2/13/2007	819	24.97	ND				ND	16.32	8.65	
MW-38d	2/13/2007	831	31.92	ND				ND	23.56	8.36	
MW-38i	2/13/2007	830	32.18	ND				ND	23.78	8.40	
MW-38s	2/13/2007	829	32.38	ND				ND	20.35	12.03	
MW-39d	2/13/2007	836	29.89	ND				ND	21.69	8.20	
MW-39i	2/13/2007	834	30.20	ND				ND	21.85	8.35	
MW-39s	2/13/2007	833	29.85	ND				ND	21.23	8.62	
MW-3s	2/13/2007	1015	30.65	ND				ND	14.17	16.48	
MW-40d	2/13/2007	847	29.00	ND				ND	20.35	8.65	
MW-40i	2/13/2007	846	28.49	ND				ND	20.38	8.11	
MW-40s	2/13/2007	844	28.35	ND				ND	15.51	12.84	
MW-41d	2/13/2007	850	27.49	ND				ND	19.29	8.20	
MW-41i	2/13/2007	849	27.17	ND				ND	18.81	8.36	
MW-41s	2/13/2007	848	27.49	ND				ND	19.12	8.37	
MW-42d	2/13/2007	904	32.24	ND				ND	23.84	8.40	
MW-42i	2/13/2007	903	32.71	ND				ND	24.38	8.33	
MW-42s	2/13/2007	901	32.39	ND				ND	18.45	13.94	
MW-43d	2/13/2007	908	28.37	ND				ND	20.09	8.28	
MW-43i	2/13/2007	907	30.36	ND				ND	21.94	8.42	
MW-43s	2/13/2007	906	31.08	ND				ND	22.51	8.57	
MW-44d	2/13/2007	924	29.37	ND				ND	20.95	8.42	
MW-44i	2/13/2007	919	29.62	ND				ND	20.91	8.71	
MW-44s	2/13/2007	917	29.71	ND				ND	15.38	14.33	
MW-45d	2/13/2007	933	27.94	ND				ND	19.54	8.40	
MW-45i	2/13/2007	929	28.05	ND				ND	19.52	8.53	
MW-45s	2/13/2007	927	28.23	ND				ND	19.42	8.81	
MW-46s	2/13/2007	945	35.58	ND				ND	21.17	14.41	
MW-47s	2/13/2007	956	35.57	ND				ND	25.32	10.25	
MW-48s	2/13/2007	1028	38.96	ND				ND	24.37	14.59	
MW-49s	2/13/2007	1026	37.78	ND				ND	18.22	19.56	
MW-50s	2/13/2007	945	39.49	ND				ND	24.81	14.68	
MW-51s	2/13/2007	1000	39.68	ND				ND	20.1	19.58	
MW-52s	2/13/2007	1010	40.80	ND				ND	26.77	14.03	
MW-53s	2/13/2007	1008	40.58	ND				ND	22.05	18.53	
MW-54s	2/13/2007	910	41.86	ND				ND	27.9	13.96	
MW-55s	2/13/2007	905	41.14	ND				ND	25.93	15.21	
MW-56s	2/13/2007	900	43.52	30.94	12.58	1.52	0.98135	ND	32.46	11.06	12.55
MW-57s	2/13/2007	915	42.12	ND				ND	31.35	10.77	
MW-58d	2/13/2007	832	41.43	ND				ND	33.06	8.37	
MW-58i	2/13/2007	827	40.99	ND				ND	32.68	8.31	
MW-58s	2/13/2007	830	41.51	ND				ND	31.99	9.52	
MW-59s	2/13/2007	1009	35.76	ND				ND	19.65	16.11	
MW-60d	2/13/2007	813	40.15	ND				ND	31.78	8.37	
MW-61s	2/13/2007	850	43.67	ND				ND	27.69	15.98	
MW-62i	2/13/2007	924	42.71	ND				ND	34.22	8.49	
MW-7 WC	2/13/2007	846	36.69	ND				ND	23.95	12.74	
MW-As	2/13/2007	805	39.33	ND				ND	20.76	18.57	
MW-Ds	2/13/2007	854	43.02	ND				36.95	33.03	9.99	
MW-Gs	2/13/2007	850	40.33	ND				44.71	30.85	9.48	
MW-Ks	2/13/2007	855	44.23	ND				ND	27.69	16.54	
MW-Os	2/13/2007	1004	41.02	ND				ND	21.35	19.67	
PW-1d	2/13/2007	1006	44.07	ND				ND	31.45	12.62	
PW-2d	2/13/2007	1002	41.85	ND				ND	29.2	12.65	

TABLE 2-2
Groundwater and NAPL Elevations
June 18, 2007
McCormick and Baxter Creosoting Company
Portland, OR

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft)	LNAPL Elevation (ft NAVD88)	LNAPL Thickness (ft)	Specific Gravity of LNAPL	Depth to DNAPL (ft)	Depth to water (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL Corrected (ft NAVD88)
EW-10s	6/18/2007	1000	29.52	18.76	10.76	0.27	0.98135	ND	19.03	10.49	10.76
EW-15s	6/18/2007	1058	43.12	30.25	12.87	1.49	0.98135	ND	31.74	11.38	12.84
EW-18s	6/18/2007	1110	40.82	26.55	14.27	0.25	0.98135	ND	26.80	14.02	14.27
EW-19s	6/18/2007	956	26.06	ND				ND	15.26	10.80	
EW-1s	6/18/2007	1115	41.41	ND				45.44	26.43	14.98	
EW-23s	6/18/2007	1055	38.63	25.15	13.48	1.98	0.98135	ND	27.13	11.50	13.44
EW-2s	6/18/2007	1022	42.48	ND				ND	30.98	11.50	
EW-8s	6/18/2007	1105	40.57	ND				53.05	26.28	14.29	
EW-9s	6/18/2007	1018	40.83	ND				ND	29.55	11.28	
MW-10r	6/18/2007	1052	42.01	ND				ND	27.68	14.33	
MW-15s	6/18/2007	1045	43.30	ND				ND	29.28	14.02	
MW-17s	6/18/2007	1034	41.35	ND				ND	27.48	13.87	
MW-18s	6/18/2007	925	43.18	ND				ND	31.79	11.39	
MW-1r	6/18/2007	945	38.19	ND				ND	24.55	13.64	
MW-20i	6/18/2007	1013	41.55	ND				71.65	30.88	10.67	
MW-22i	6/18/2007	1130	42.35	ND				53.03	31.59	10.76	
MW-23d	6/18/2007	1120	41.68	ND				ND	30.83	10.85	
MW-2s	6/18/2007	1200	38.37	ND				ND	24.79	13.58	
MW-32i	6/18/2007	1130	39.37	ND				ND	26.23	13.14	
MW-34i	6/18/2007	1003	32.75	ND				ND	22.03	10.72	
MW-35r	6/18/2007	935	32.27	ND				ND	20.6	11.67	
MW-36d	6/18/2007	947	30.52	ND				ND	19.75	10.77	
MW-36i	6/18/2007	943	30.26	ND				ND	19.50	10.76	
MW-36s	6/18/2007	945	30.83	ND				ND	18.15	12.68	
MW-37d	6/18/2007	1005	26.15	ND				ND	15.54	10.61	
MW-37i	6/18/2007	1002	25.99	ND				ND	15.29	10.70	
MW-37s	6/18/2007	1000	24.97	ND				ND	14.30	10.67	
MW-38d	6/18/2007	1018	31.92	ND				ND	21.24	10.68	
MW-38i	6/18/2007	1016	32.18	ND				ND	21.36	10.82	
MW-38s	6/18/2007	1013	32.38	ND				ND	19.60	12.78	
MW-39d	6/18/2007	1028	29.89	ND				ND	19.28	10.61	
MW-39i	6/18/2007	1026	30.20	ND				ND	19.53	10.67	
MW-39s	6/18/2007	1021	29.85	ND				ND	19.20	10.65	
MW-3s	6/18/2007	1151	30.65	ND				ND	15.20	15.45	
MW-40d	6/18/2007	1038	29.00	ND				ND	18.12	10.88	
MW-40i	6/18/2007	1036	28.49	ND				ND	18.05	10.44	
MW-40s	6/18/2007	1042	28.35	ND				ND	15.13	13.22	
MW-41d	6/18/2007	1050	27.49	ND				ND	16.91	10.58	
MW-41i	6/18/2007	1048	27.17	ND				ND	16.54	10.63	
MW-41s	6/18/2007	1046	27.49	ND				ND	17.10	10.39	
MW-42d	6/18/2007	1102	32.24	ND				ND	21.74	10.50	
MW-42i	6/18/2007	1100	32.71	ND				ND	22.15	10.56	
MW-42s	6/18/2007	1058	32.39	ND				ND	18.42	13.97	
MW-43d	6/18/2007	1109	28.37	ND				ND	17.85	10.52	
MW-43i	6/18/2007	1107	30.36	ND				ND	19.81	10.55	
MW-43s	6/18/2007	1105	31.08	ND				ND	20.38	10.70	
MW-44d	6/18/2007	1125	29.37	ND				ND	18.81	10.56	
MW-44i	6/18/2007	1207	29.62	ND				ND	18.93	10.69	
MW-44s	6/18/2007	1123	29.71	ND				ND	15.49	14.22	
MW-45d	6/18/2007	1130	27.94	ND				ND	17.40	10.54	
MW-45i	6/18/2007	1132	28.05	ND				ND	17.50	10.55	
MW-45s	6/18/2007	1127	28.23	ND				ND	17.55	10.68	
MW-46s	6/18/2007	1140	35.58	ND				ND	21.20	14.38	
MW-47s	6/18/2007	1142	35.57	ND				ND	24.46	11.11	
MW-48s	6/18/2007	1210	38.96	ND				ND	24.01	14.95	
MW-49s	6/18/2007	1206	37.78	ND				ND	19.60	18.18	
MW-50s	6/18/2007	1055	39.49	ND				ND	24.73	14.76	
MW-51s	6/18/2007	1100	39.68	ND				ND	21.32	18.36	
MW-52s	6/18/2007	1120	40.80	ND				ND	26.56	14.24	
MW-53s	6/18/2007	1117	40.58	ND				ND	23.17	17.41	
MW-54s	6/18/2007	1014	41.86	ND				ND	27.72	14.14	
MW-55s	6/18/2007	1000	41.14	ND				ND	26.46	14.68	
MW-56s	6/18/2007	1037	43.52	30.28	13.24	1.32	0.98135	ND	31.60	11.92	13.22
MW-57s	6/18/2007	1018	42.12	ND				ND	30.2	11.92	
MW-58d	6/18/2007	926	41.43	ND				ND	30.59	10.84	
MW-58i	6/18/2007	928	40.99	ND				ND	30.3	10.69	
MW-58s	6/18/2007	925	41.51	ND				ND	30.5	11.01	
MW-59s	6/18/2007	1200	35.76	ND				ND	20.90	14.86	
MW-60d	6/18/2007	932	40.15	ND				ND	29.24	10.91	
MW-61s	6/18/2007	955	43.67	ND				ND	28.61	15.06	
MW-62i	6/18/2007	1028	42.71	ND				ND	32.02	10.69	
MW-7 WC	6/18/2007	943	36.69	ND				ND	23.78	12.91	
MW-As	6/18/2007	1133	39.33	ND				ND	21.71	17.62	
MW-Ds	6/18/2007	1032	43.02	ND				37.04	31.54	11.48	
MW-Gs	6/18/2007	1009	40.33	ND				43.3	29.18	11.15	
MW-Ks	6/18/2007	1005	44.23	ND				ND	28.69	15.54	
MW-Os	6/18/2007	1108	41.02	ND				ND	22.62	18.40	
PW-1d	6/18/2007	1114	44.07	ND				ND	30.93	13.14	
PW-2d	6/18/2007	1105	41.85	ND				ND	28.65	13.20	

TABLE 2-3
Groundwater and NAPL Elevations
September 26, 2007
McCormick and Baxter Creosoting Company
Portland, OR

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft)	LNAPL Elevation (ft NAVD88)	LNAPL Thickness (ft)	Specific Gravity of LNAPL	Depth to DNAPL (ft)	Depth to water (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL Corrected (ft NAVD88)
EW-10s	9/26/2007	1313	29.52	23.00	6.52	0.01	0.98135	D	23.01	6.51	6.52
EW-15s	9/26/2007	1348	43.12	32.78	10.34	3.62	0.98135	ND	36.40	6.72	10.27
EW-18s	9/26/2007	1358	40.82	28.07	12.75	0.68	0.98135	ND	28.75	12.07	12.74
EW-19s	9/26/2007	1311	26.06	ND				ND	18.85	7.21	
EW-1s	9/26/2007	1402	41.41	ND				45.25	27.83	13.58	
EW-23s	9/26/2007	1346	38.63	28.08	10.55	4.47	0.98135	ND	32.55	6.08	10.47
EW-2s	9/26/2007	1327	42.48	ND				ND	34.86	7.62	
EW-8s	9/26/2007	1353	40.57	ND				52.83	27.82	12.75	
EW-9s	9/26/2007	1324	40.83	ND				45.85	33.22	7.61	
MW-10r	9/26/2007	1439	42.01	ND				ND	29.2	12.81	
MW-15s	9/26/2007	1433	43.30	ND				ND	30.99	12.31	
MW-17s	9/26/2007	1423	41.35	ND				ND	29.33	12.02	
MW-18s	9/26/2007	1325	43.18	ND				ND	35.40	7.78	
MW-1r	9/26/2007	1307	38.19	ND				ND	27.27	10.92	
MW-20i	9/26/2007	1320	41.55	ND				68.98	35.57	5.98	
MW-22i	9/26/2007	1407	42.35	ND				53.43	35.46	6.89	
MW-23d	9/26/2007	1415	41.68	ND				ND	35.05	6.63	
MW-2s	9/26/2007	1537	38.37	ND				ND	27.24	11.13	
MW-32i	9/26/2007	1310	39.37	ND				ND	28.91	10.46	
MW-34i	9/26/2007	1315	32.75	ND				D	26.72	6.03	
MW-35r	9/26/2007	1331	32.27	ND				ND	23.69	8.58	
MW-36d	9/26/2007	1340	30.52	ND				ND	24.64	5.88	
MW-36i	9/26/2007	1351	30.26	ND				ND	24.35	5.91	
MW-36s	9/26/2007	1348	30.83	ND				ND	21.01	9.82	
MW-37d	9/26/2007	1403	26.15	ND				ND	20.34	5.81	
MW-37i	9/26/2007	1358	25.99	ND				ND	20.15	5.84	
MW-37s	9/26/2007	1355	24.97	ND				ND	18.09	6.88	
MW-38d	9/26/2007	1410	31.92	ND				ND	26.02	5.90	
MW-38i	9/26/2007	1412	32.18	ND				ND	26.18	6.00	
MW-38s	9/26/2007	1414	32.38	ND				ND	22.07	10.31	
MW-39d	9/26/2007	1422	29.89	ND				ND	24.01	5.88	
MW-39i	9/26/2007	1420	30.20	ND				ND	24.30	5.90	
MW-39s	9/26/2007	1418	29.85	ND				ND	22.69	7.16	
MW-3s	9/26/2007	1534	30.65	ND				ND	17.68	12.97	
MW-40d	9/26/2007	1433	29.00	ND				ND	22.77	6.23	
MW-40i	9/26/2007	1435	28.49	ND				ND	22.68	5.81	
MW-40s	9/26/2007	1437	28.35	ND				ND	17.35	11.00	
MW-41d	9/26/2007	1443	27.49	ND				ND	21.53	5.96	
MW-41i	9/26/2007	1440	27.17	ND				ND	21.23	5.94	
MW-41s	9/26/2007	1437	27.49	ND				ND	20.72	6.77	
MW-42d	9/26/2007	1445	32.24	ND				ND	26.24	6.00	
MW-42i	9/26/2007	1448	32.71	ND				ND	26.69	6.02	
MW-42s	9/26/2007	1451	32.39	ND				ND	20.03	12.36	
MW-43d	9/26/2007	1500	28.37	ND				ND	22.25	6.12	
MW-43i	9/26/2007	1458	30.36	ND				ND	24.33	6.03	
MW-43s	9/26/2007	1456	31.08	ND				ND	24.44	6.64	
MW-44d	9/26/2007	1508	29.37	ND				ND	23.07	6.30	
MW-44i	9/26/2007	1514	29.62	ND				ND	22.91	6.71	
MW-44s	9/26/2007	1511	29.71	ND				ND	16.89	12.82	
MW-45d	9/26/2007	1522	27.94	ND				ND	21.53	6.41	
MW-45i	9/26/2007	1525	28.05	ND				ND	21.73	6.32	
MW-45s	9/26/2007	1517	28.23	ND				ND	21.16	7.07	
MW-46s	9/26/2007	1549	35.58	ND				ND	22.76	12.82	
MW-47s	9/26/2007	1546	35.57	ND				ND	28.30	7.27	
MW-48s	9/26/2007	1522	38.96	ND				ND	25.07	13.89	
MW-49s	9/26/2007	1519	37.78	ND				ND	21.94	15.84	
MW-50s	9/26/2007	1444	39.49	ND				ND	25.99	13.50	
MW-51s	9/26/2007	1447	39.68	ND				ND	23.75	15.93	
MW-52s	9/26/2007	1509	40.80	ND				ND	28.1	12.70	
MW-53s	9/26/2007	1505	40.58	ND				ND	25.65	14.93	
MW-54s	9/26/2007	1403	41.86	ND				ND	29.3	12.56	
MW-55s	9/26/2007	1406	41.14	ND				ND	29.38	11.76	
MW-56s	9/26/2007	1335	43.52	32.78	10.74	2.31	0.98135	ND	35.09	8.43	10.70
MW-57s	9/26/2007	1410	42.12	ND				ND	33.85	8.27	
MW-58d	9/26/2007	1324	41.43	ND				ND	35.45	5.98	
MW-58i	9/26/2007	1322	40.99	ND				ND	35.09	5.90	
MW-58s	9/26/2007	1320	41.51	ND				ND	34.06	7.45	
MW-59s	9/26/2007	1529	35.76	ND				ND	23.53	12.23	
MW-60d	9/26/2007	1323	40.15	ND				ND	34.13	6.02	
MW-61s	9/26/2007	1351	43.67	ND				ND	31.81	11.86	
MW-62i	9/26/2007	1419	42.71	ND				ND	36.75	5.96	
MW-7 WC			Well was not gauged because well lock could not be removed.								
MW-As	9/26/2007	1549	39.33	ND				ND	23.35	15.98	
MW-Ds	9/26/2007	1330	43.02	ND				36.63	35.30	7.72	
MW-Gs	9/26/2007	1317	40.33	ND				D	32.92	7.41	
MW-Ks	9/26/2007	1358	44.23	ND				ND	32.04	12.19	
MW-Os	9/26/2007	1457	41.02	ND				ND	25.03	15.99	
PW-1d	9/26/2007	1500	44.07	ND				ND	33.5	10.57	
PW-2d	9/26/2007	1453	41.85	ND				ND	31.35	10.50	

TABLE 2-4
Groundwater and LNAPL Elevations
December 17, 2007
McCormick and Baxter Creosoting Company
Portland, OR

Well ID	Date	Time	Measuring Point Elevation (ft NAVD88)	Depth to LNAPL (ft)	LNAPL Elevation (ft NAVD88)	LNAPL Thickness (ft)	Specific Gravity of LNAPL	Depth to DNAPL (ft)	Depth to water (ft)	Groundwater Elevation (ft NAVD88)	Groundwater Elevation LNAPL Corrected (ft NAVD88)
EW-10s	12/17/2007	822	29.52	20.41	9.11	0.37	0.9908	ND	20.78	8.74	9.11
EW-15s	12/17/2007	931	43.12	31.91	11.21	1.99	0.9908	ND	33.90	9.22	11.19
EW-18s	12/17/2007	926	40.82	28.18	12.64	0.12	0.9755	ND	28.30	12.52	12.64
EW-19s	12/17/2007	819	26.06	ND				ND	16.62	9.44	
EW-1s	12/17/2007	943	41.41	ND				44.94	28.15	13.26	
EW-23s	12/17/2007	851	38.63	26.90	11.73	2.57	0.9908	ND	29.47	9.16	11.71
EW-2s	12/17/2007	842	42.48	ND				46.73	31.46	11.02	
EW-8s	12/17/2007	857	40.57	ND				52.86	27.81	12.76	
EW-9s	12/17/2007	837	40.83	ND				45.88	30.79	10.04	
MW-10r	12/17/2007	918	42.01	ND				ND	29.67	12.34	
MW-15s	12/17/2007	910	43.30	ND				ND	NO WATER	<11.85	
MW-17s	12/17/2007	859	41.35	ND				ND	29.33	12.02	
MW-18s	12/17/2007	808	43.18	ND				ND	33.01	10.17	
MW-1r	12/17/2007	754	38.19	ND				ND	27.85	10.34	
MW-20i	12/17/2007	833	41.55	ND				68.35	32.62	8.93	
MW-22i	12/17/2007	948	42.35	ND				53.18	32.23	10.12	
MW-23d	12/17/2007	WELL INADVERTANTLY NOT MEASURED DURING LOW TIDE EVENT									
MW-2s	12/17/2007	1028	38.37	ND				ND	26.09	12.28	
MW-32i	12/17/2007	744	39.37	ND				ND	28.54	10.83	
MW-34i	12/17/2007	826	32.75	ND				ND	23.81	8.94	
MW-35r	12/17/2007	814	32.27	ND				ND	21.93	10.34	
MW-36d	12/17/2007	826	30.52	ND				ND	21.69	8.83	
MW-36i	12/17/2007	822	30.26	ND				ND	21.51	8.75	
MW-36s	12/17/2007	816	30.83	ND				ND	19.80	11.03	
MW-37d	12/17/2007	834	26.15	ND				ND	17.15	9.00	
MW-37i	12/17/2007	831	25.99	ND				ND	17.05	8.94	
MW-37s	12/17/2007	829	24.97	ND				ND	15.90	9.07	
MW-38d	12/17/2007	837	31.92	ND				ND	22.86	9.06	
MW-38i	12/17/2007	848	32.18	ND				ND	23.29	8.89	
MW-38s	12/17/2007	845	32.38	ND				ND	21.41	10.97	
MW-39d	12/17/2007	857	29.89	ND				ND	20.61	9.28	
MW-39i	12/17/2007	853	30.20	ND				ND	20.98	9.22	
MW-39s	12/17/2007	852	29.85	ND				ND	20.73	9.12	
MW-3s	12/17/2007	1017	30.65	ND				ND	15.24	15.41	
MW-40d	12/17/2007	907	29.00	ND				ND	19.43	9.57	
MW-40i	12/17/2007	904	28.49	ND				ND	20.01	8.48	
MW-40s	12/17/2007	902	28.35	ND				ND	16.99	11.36	
MW-41d	12/17/2007	916	27.49	ND				ND	18.00	9.49	
MW-41i	12/17/2007	914	27.17	ND				ND	17.93	9.24	
MW-41s	12/17/2007	912	27.49	ND				ND	18.63	8.86	
MW-42d	12/17/2007	930	32.24	ND				ND	22.58	9.66	
MW-42i	12/17/2007	926	32.71	ND				ND	23.21	9.50	
MW-42s	12/17/2007	924	32.39	ND				ND	19.89	12.50	
MW-43d	12/17/2007	942	28.37	ND				ND	18.56	9.81	
MW-43i	12/17/2007	940	30.36	ND				ND	20.73	9.63	
MW-43s	12/17/2007	938	31.08	ND				ND	21.94	9.14	
MW-44d	12/17/2007	954	29.37	ND				ND	19.39	9.98	
MW-44i	12/17/2007	951	29.62	ND				ND	20.38	9.24	
MW-44s	12/17/2007	949	29.71	ND				ND	16.86	12.85	
MW-45d	12/17/2007	1002	27.94	ND				ND	19.70	8.24	
MW-45i	12/17/2007	959	28.05	ND				ND	18.33	9.72	
MW-45s	12/17/2007	957	28.23	ND				ND	18.92	9.31	
MW-46s	12/17/2007	1007	35.58	ND				ND	22.54	13.04	
MW-47s	12/17/2007	1009	35.57	ND				ND	24.94	10.63	
MW-48s	12/17/2007	1008	38.96	ND				ND	25.60	13.36	
MW-49s	12/17/2007	1010	37.78	ND				ND	20.46	17.32	
MW-50s	12/17/2007	920	39.49	ND				ND	26.31	13.18	
MW-51s	12/17/2007	925	39.68	ND				ND	22.94	16.74	
MW-52s	12/17/2007	946	40.80	ND				ND	28.61	12.19	
MW-53s	12/17/2007	944	40.58	ND				ND	25.08	15.50	
MW-54s	12/17/2007	847	41.86	ND				ND	29.72	12.14	
MW-55s	12/17/2007	845	41.14	ND				ND	28.36	12.78	
MW-56s	12/17/2007	921	43.52	ND				ND	37.19	6.33	
MW-57s	12/17/2007	851	42.12	ND				ND	31.48	10.64	
MW-58d	12/17/2007	806	41.43	ND				ND	32.81	8.62	
MW-58i	12/17/2007	810	40.99	ND				ND	32.52	8.47	
MW-58s	12/17/2007	803	41.51	ND				ND	31.76	9.75	
MW-59s	12/17/2007	1019	35.76	ND				ND	20.98	14.78	
MW-60d	12/17/2007	810	40.15	ND				ND	31.48	8.67	
MW-61s	12/17/2007	841	43.67	ND				ND	31.71	11.96	
MW-62i	12/17/2007	855	42.71	ND				ND	33.41	9.30	
MW-7 WC	12/17/2007	830	36.69	ND				ND	25.61	11.08	
MW-As	12/17/2007	956	39.33	ND				ND	21.77	17.56	
MW-Ds	12/17/2007	902	43.02	ND				37.3	32.76	10.26	
MW-Gs	12/17/2007	829	40.33	ND				ND	35.00	5.33	
MW-Ks	12/17/2007	840	44.23	ND				ND	32.03	12.20	
MW-Os	12/17/2007	936	41.02	ND				ND	24.2	16.82	
PW-1d	12/17/2007	939	44.07	ND				ND	33.22	10.85	
PW-2d	12/17/2007	930	41.85	ND				ND	29.98	11.87	

TABLE 2-5
LNAPL and DNAPL Measurement Summary
January 1, 2007 through March 31, 2007
McCormick and Baxter Creosoting Company

Date Measured	Well Number	Thickness (feet)	Extracted (Gallons) Based on Visual Observation (water + NAPL)[a]
LNAPL			
02/03/07	EW-10s	0.11	0.0
02/08/07	EW-10s	0.11	0.0
02/22/07	EW-10s	0.2	0.0
03/05/07	EW-10s	0.47	c
03/13/07	EW-10s	0.15	0.0
03/19/07	EW-10s	0.18	0.0
03/26/07	EW-10s	0.15	0.0
02/13/07	EW-15s	0.83	0.0
02/13/07	EW-18s	0.04	0.0
02/13/07	EW-23s	1.27	0.0
02/13/07	MW-56s	1.52	0.0
DNAPL			
02/13/07	EW-1s	2.12	0.0
02/13/07	EW-8s	1.89	0.0
01/02/07	MW-20i	2.49	2.0
01/09/07	MW-20i	2.65	1.0
01/18/07	MW-20i	4.18	2.0
02/03/07	MW-20i	5.43	2.5
02/08/07	MW-20i	3.06	2.0
02/13/07	MW-20i	3.88	2.5
02/22/07	MW-20i	2.31	1.5
03/01/07	MW-20i	3.17	2.0
03/05/07	MW-20i	0.82	0.0
03/13/07	MW-20i	5.02	2.5
03/19/07	MW-20i	2.31	2.0
03/26/07	MW-20i	3.81	2.0
02/13/07	MW-22i	2.27	0.0
01/02/07	MW-Ds	1.33	0.0
01/09/07	MW-Ds	1.17	0.0
01/18/07	MW-Ds	1.65	0.3
02/03/07	MW-Ds	1.89	0.3
02/08/07	MW-Ds	1.48	0.0
02/13/07	MW-Ds	1.83	0.3
02/22/07	MW-Ds	1.84	0.5
03/01/07	MW-Ds	1.98	0.3
03/05/07	MW-Ds	1.10	0.0
03/13/07	MW-Ds	1.58	0.5
03/19/07	MW-Ds	1.30	0.0
03/26/07	MW-Ds	1.68	0.3
01/02/07	MW-Gs	1.17	0.0
01/09/07	MW-Gs	1.85	0.3
02/13/07	MW-Gs	0.14	0.0
02/22/07	MW-Gs	1.35	0.0
03/01/07	MW-Gs	1.31	0.0
03/05/07	MW-Gs	0.73	0.0
03/13/07	MW-Gs	0.64	0.0
03/19/07	MW-Gs	0.65	0.0
03/26/07	MW-Gs	1.15	0.0
NAPL Corrected Drum Gauging Total[b]			**10.50**

Footnotes:
[a] Extracted volume based on visual observations at time of extraction for water + NAPL.
[b] Volume is based on total volume of drum gauging minus 38% to account for water correction.
Extraction Criteria: minimum of 0.4 feet for LNAPL and 1.5 feet for DNAPL
[c] Although thickness warranted extraction, no LNAPL could be recovered because LNAPL dispersed once bailer entered the LNAPL.

TABLE 2-6
LNAPL and DNAPL Measurement Summary
April 1, 2007 through June 30, 2007
McCormick and Baxter Creosoting Company

Date Measured	Well Number	Thickness (feet)	Extracted (Gallons) Based on Visual Observation (water + NAPL)[a]
LNAPL			
04/02/07	EW-10s	0.3	0.0
04/19/07	EW-10s	0.35	0.0
04/24/07	EW-10s	0.25	0.0
04/30/07	EW-10s	0.15	0.0
05/07/07	EW-10s	0.25	0.0
05/14/07	EW-10s	0.26	0.0
05/21/07	EW-10s	0.45	c
05/30/07	EW-10s	0.28	0.0
06/04/07	EW-10s	0.27	0.0
06/11/07	EW-10s	0.24	0.0
06/18/07	EW-10s	0.27	0.0
06/25/07	EW-10s	0.14	0.0
06/18/07	EW-15s	1.49	0.0
06/18/07	EW-18s	0.25	0.0
06/18/07	EW-23s	1.98	0.0
06/18/07	MW-56s	1.32	0.0
DNAPL			
06/18/07	EW-1s	2.54	0.0
06/18/07	EW-8s	1.75	0.0
06/25/07	EW-9s	0.75	0.0
04/02/07	MW-20i	3.33	1.0
04/09/07	MW-20i	3.82	2.0
04/19/07	MW-20i	5.11	2.0
04/24/07	MW-20i	3.06	2.5
04/30/07	MW-20i	5.63	2.0
05/07/07	MW-20i	3.47	2.0
05/14/07	MW-20i	2.97	2.0
05/21/07	MW-20i	2.37	2.0
05/30/07	MW-20i	5.05	2.0
06/04/07	MW-20i	3.03	1.0
06/11/07	MW-20i	3.36	2.5
06/18/07	MW-20i	3.16	1.5
06/25/07	MW-20i	3.78	2.0
06/18/07	MW-22i	3.57	0.0
04/02/07	MW-Ds	1.83	0.5
04/09/07	MW-Ds	0.57	0.0
04/19/07	MW-Ds	1.74	1.0
04/24/07	MW-Ds	1.47	0.0
04/30/07	MW-Ds	1.83	1.0
05/07/07	MW-Ds	1.73	1.5
05/14/07	MW-Ds	1.62	1.0
05/21/07	MW-Ds	1.48	0.0
05/30/07	MW-Ds	1.56	1.5
06/04/07	MW-Ds	1.40	0.0
06/11/07	MW-Ds	1.48	0.0
06/18/07	MW-Ds	1.74	0.5
06/25/07	MW-Ds	1.65	1.3
04/02/07	MW-Gs	1.43	0.0
04/09/07	MW-Gs	1.02	0.0
04/19/07	MW-Gs	1.95	0.8
04/24/07	MW-Gs	1.78	0.8
04/30/07	MW-Gs	2.50	0.5
05/07/07	MW-Gs	3.86	0.5
05/14/07	MW-Gs	0.53	0.0
05/21/07	MW-Gs	1.06	0.0
05/30/07	MW-Gs	0.75	0.0
06/04/07	MW-Gs	0.80	0.0
06/11/07	MW-Gs	1.04	0.0
06/18/07	MW-Gs	1.48	0.0
06/25/07	MW-Gs	1.98	0.5
NAPL Corrected Drum Gauging Total[b]			**14.86**

Footnotes:
[a] Extracted volume based on visual observations at time of extraction for water + NAPL.
[b] Volume is based on total volume of drum gauging minus 38% to account for water correction.
Extraction Criteria: minimum of 0.4 feet for LNAPL and 1.5 feet for DNAPL
[c] Although thickness warranted extraction, no LNAPL could be recovered because LNAPL dispersed once bailer entered the LNAPL.

TABLE 2-7
LNAPL and DNAPL Measurement Summary
July 1, 2007 through September 30, 2007
McCormick and Baxter Creosoting Company

Date Measured	Well Number	Thickness (feet)	Extracted (Gallons) Based on Visual Observation (water + NAPL)[a]
LNAPL			
07/02/07	EW-10s	0.22	0.00
07/09/07	EW-10s	0.38	0.00
07/18/07	EW-10s	0.14	0.00
07/23/07	EW-10s	0.20	0.00
07/31/07	EW-10s	0.06	0.00
08/06/07	EW-10s	0.08	0.00
09/07/07	EW-10s	0.11	0.00
09/26/07	EW-10s	0.01	0.00
09/26/07	MW-56s	2.31	0.00
09/26/07	EW-23s	4.47	0.00
09/26/07	EW-15s	3.62	0.00
09/26/07	EW-18s	0.68	0.00
DNAPL			
09/26/07	EW-1s	2.73	0.00
09/26/07	EW-8s	1.97	0.00
07/23/07	EW-9s	0.53	0.00
09/14/07	EW-9s	0.67	0.00
09/26/07	EW-9s	0.60	0.00
07/02/07	MW-20i	2.92	2.50
07/09/07	MW-20i	4.61	2.50
07/18/07	MW-20i	6.50	3.25
07/23/07	MW-20i	3.25	2.00
07/31/07	MW-20i	3.36	2.00
08/06/07	MW-20i	3.86	2.50
09/07/07	MW-20i	7.71	2.50
09/14/07	MW-20i	5.70	1.50
09/26/07	MW-20i	5.83	c
09/26/07	MW-22i	3.17	0.00
07/02/07	MW-Ds	1.26	0.00
07/09/07	MW-Ds	1.79	1.50
07/18/07	MW-Ds	1.96	1.25
07/23/07	MW-Ds	1.17	0.00
07/31/07	MW-Ds	1.14	0.00
08/06/07	MW-Ds	0.57	0.00
09/07/07	MW-Ds	2.28	0.50
09/14/07	MW-Ds	0.89	0.00
09/26/07	MW-Ds	2.15	c
07/02/07	MW-Gs	0.39	0.00
07/09/07	MW-Gs	0.15	0.00
07/18/07	MW-Gs	3.87	0.75
07/23/07	MW-Gs	0.34	0.00
07/31/07	MW-Gs	0.26	0.00
08/06/07	MW-Gs	1.20	0.00
09/07/07	MW-Gs	2.01	0.25
09/14/07	MW-Gs	1.74	1.00
NAPL Corrected Drum Gauging Total[b]			**10.08**

Footnotes:
[a] Extracted volume based on visual observations at time of extraction for water + NAPL.
[b] Volume is based on total volume of drum gauging minus 38% to account for water correction.
Extraction Criteria: minimum of 0.4 feet for LNAPL and 1.5 feet for DNAPL
[c] Extraction was not performed because of construction activities on site.

TABLE 2-8
LNAPL and DNAPL Measurement Summary
October 1, 2007 through December 31, 2007
McCormick and Baxter Creosoting Company

Date Measured	Well Number	Thickness (feet)	Extracted (Gallons) Based on Visual Observation (water + NAPL)[a]
LNAPL			
10/22/07	EW-10s	0.01	0.0
11/05/07	EW-10s	0.02	0.0
12/17/07	EW-10s	0.37	0.0
12/27/07	EW-10s	0.10	0.0
12/17/07	EW-15s	1.99	c
12/17/07	EW-18s	0.12	0.0
12/17/07	EW-23s	2.57	c
DNAPL			
12/17/07	EW-1s	3.04	c
12/17/07	EW-2s	0.01	0.0
12/17/07	EW-8s	1.94	c
10/02/07	EW-9s	0.53	0.0
10/22/07	EW-9s	0.67	0.0
11/13/07	EW-9s	0.93	0.0
12/17/07	EW-9s	0.57	0.0
10/02/07	MW-20i	6.75	2.5
10/09/07	MW-20i	4.29	2.5
10/22/07	MW-20i	6.96	2.5
11/05/07	MW-20i	6.50	2.5
11/13/07	MW-20i	7.96	2.8
11/20/07	MW-20i	5.06	3.5
11/26/07	MW-20i	4.80	3.0
12/04/07	MW-20i	7.84	2.5
12/10/07	MW-20i	3.92	2.8
12/17/07	MW-20i	6.46	2.0
12/27/07	MW-20i	5.10	2.0
12/17/07	MW-22i	3.42	0.0
10/02/07	MW-Ds	2.91	1.0
10/09/07	MW-Ds	1.29	0.0
10/22/07	MW-Ds	2.11	1.8
11/05/07	MW-Ds	1.36	0.0
11/13/07	MW-Ds	1.58	1.0
11/20/07	MW-Ds	1.03	0.0
11/26/07	MW-Ds	1.14	0.0
12/04/07	MW-Ds	1.84	1.5
12/10/07	MW-Ds	1.38	0.0
12/17/07	MW-Ds	1.48	0.0
10/02/07	MW-Gs	0.20	0.0
10/22/07	MW-Gs	0.39	0.0
11/05/07	MW-Gs	1.05	0.0
11/13/07	MW-Gs	9.29	1.5
11/20/07	MW-Gs	5.06	2.0
11/26/07	MW-Gs	5.25	1.5
12/04/07	MW-Gs	2.93	0.8
12/27/07	MW-Gs	6.40	1.5
NAPL Corrected Drum Gauging Total[b]			**14.47**

Footnotes:
[a] Extracted volume based on visual observations at time of extraction for water + NAPL.
[b] Volume is based on total volume of drum gauging minus 38% to account for water correction.
Extraction Criteria: minimum of 0.4 feet for LNAPL and 1.5 feet for DNAPL
[c] Well was not extracted from because it is located inside the barrier wall.

TABLE 2-9
Cumulative NAPL Extraction Summary
McCormick Baxter Creosoting

Date	Manual NAPL Extracted (DNAPL + LNAPL)	Total Monthly Treatment System NAPL Extracted (DNAPL & LNAPL)	Monthly Total NAPL Extracted	Total NAPL Extracted
Pre-Barrier Wall Extraction Volumes				
Jun-89			*0*	*0*
Feb-93			*1097*	*1097*
Feb-95			*1021*	*2118*
Dec-95	31.03	0	31.03	*2149*
Jan-96	20.8	0	20.8	*2170*
Feb-96	52.4	0	52.4	*2222*
Mar-96	66.05	0	66.05	*2288*
Apr-96	35.87	0	35.87	*2324*
May-96	23.36	0	23.36	*2348*
Jun-96	31.68	0	31.68	*2379*
Jul-96	29.8	0	29.8	*2409*
Aug-96	73.02	0	73.02	*2482*
Sep-96	33.5	0	33.5	*2516*
Oct-96	43.8	0	43.8	*2559*
Nov-96	39	0	39	*2598*
Dec-96	25.3	0	25.3	*2624*
Jan-97	40.36	0	40.36	*2664*
Feb-97	31.04	0	31.04	*2695*
Mar-97	34.18	0	34.18	*2729*
Apr-97	32.04	0	32.04	*2761*
May-97	8.64	0	8.64	*2770*
Jun-97	11.6	0	11.6	*2781*
Jul-97	28.29	0	28.29	*2810*
Aug-97	52.33	0	52.33	*2862*
Sep-97	38.9	0	38.9	*2901*
Oct-97	32.3	0	32.3	*2933*
Nov-97	53.8	0	53.8	*2987*
Dec-97	53.3	0	53.3	*3040*
Jan-98	33.17	112.32	145.49	*3186*
Feb-98	27.05	5.9	32.95	*3219*
Mar-98	51.1	3.83	54.93	*3274*
Apr-98	33.37	7.67	41.04	*3315*
May-98	31.45	7.67	39.12	*3354*
Jun-98	12.08	7.67	19.75	*3374*
Jul-98	9.34	8.11	17.45	*3391*
Aug-98	14.95	8.11	23.06	*3414*
Sep-98	14.17	8.11	22.28	*3436*
Oct-98	16	8.11	24.11	*3461*
Nov-98	11.3	8.11	19.41	*3480*
Dec-98	5.2	16.15	21.35	*3501*
Jan-99	15.28	0	15.28	*3517*
Feb-99	14.12	0	14.12	*3531*
Mar-99	47.74	0	47.74	*3578*
Apr-99	7.44	0	7.44	*3586*
May-99	12.82	0	12.82	*3599*
Jun-99	10.7	0	10.7	*3609*
Jul-99	6.6	7.85	14.45	*3624*
Aug-99	13.84	7.85	21.69	*3646*
Sep-99	35.88	7.85	43.73	*3689*
Oct-99	6.85	7.85	14.7	*3704*
Nov-99	7.47	7.85	15.32	*3719*
Dec-99	2.15	7.85	10	*3729*
Jan-00	3.46	21.17	24.63	*3754*
Feb-00	1.75	21.17	22.92	*3777*
Mar-00	0.98	21.17	22.15	*3799*
Apr-00	1.05	21.17	22.22	*3821*
May-00	1.9	21.17	23.07	*3844*
Jun-00	0.41	21.17	21.58	*3866*
Jul-00	14.5	21.7	36.2	*3902*
Aug-00	25.36	21.7	47.06	*3949*
Sep-00	21.83	21.6	43.43	*3993*
Oct-00	18.63	0	18.63	*4011*
Nov-00	17.38	0	17.38	*4029*

TABLE 3-1
Vertical Gradients
Low Tide Event February 13, 2007
McCormick and Baxter Creosoting Company
Portland, Oregon

Well ID	Mid-point value	Direction
MW-36s to MW-36d	0.05599	down
MW-36s to MW-36i	0.12580	down
MW-36i to MW-36d	0.00000	down
MW-37s to MW-37d	0.00651	down
MW-37s to MW-37i	0.01556	down
MW-37i to MW-37d	0.00086	down
MW-40s to MW-40d	0.06875	down
MW-40s to MW-40i	0.17720	down
MW-40i to MW-40d	0.01577	up
MW-41s to MW-41d	0.00286	down
MW-41s to MW-41i	0.00039	down
MW-41i to MW-41d	0.00471	down
MW-44s to MW-44d	0.09353	down
MW-44s to MW-44i	0.19940	down
MW-44i to MW-44d	0.00829	down
MW-45s to MW-45d	0.00683	down
MW-45s to MW-45i	0.01164	down
MW-45i to MW-45d	0.00361	down

Notes:
1. Gradients calculated using EPA vertical gradient calculator.
   http://www.epa.gov/athens/learn2model/part-two/onsite/vgradient02.htm
2. Vertical Gradients were calculated using the following parameters.

Well ID	TOC Elevation (NAVD88)	Distance from TOC to Top of Screen	Screen Length (ft)
MW-36d	30.52	82.32	5
MW-36i	30.26	48.06	5
MW-36s	30.83	13.63	15
MW-37d	26.15	77.95	5
MW-37i	25.99	42.79	5
MW-37s	24.97	13.52	15
MW-40d	29.00	80.05	5
MW-40i	28.49	45.29	5
MW-40s	28.35	11.40	15
MW-41d	27.49	79.79	5
MW-41i	27.17	45.47	5
MW-41s	27.84	11.54	15
MW-44d	29.37	82.42	5
MW-44i	29.62	47.67	5
MW-44s	29.71	13.76	15
MW-45d	27.94	80.99	5
MW-45i	28.05	45.10	5
MW-45s	28.23	13.03	15

TABLE 3-2
Vertical Gradients
Low Tide Event June 18, 2007
McCormick and Baxter Creosoting Company
Portland, Oregon

Well ID	Mid-point value	Direction
MW-36s to MW-36d	0.03094	down
MW-36s to MW-36i	0.06921	down
MW-36i to MW-36d	0.00029	up
MW-37s to MW-37d	0.00104	down
MW-37s to MW-37i	0.00131	up
MW-37i to MW-37d	0.00257	down
MW-40s to MW-40d	0.03828	down
MW-40s to MW-40i	0.10340	down
MW-40i to MW-40d	0.01285	up
MW-41s to MW-41d	0.00314	up
MW-41s to MW-41i	0.00907	up
MW-41i to MW-41d	0.00147	down
MW-44s to MW-44d	0.05797	down
MW-44s to MW-44i	0.12550	down
MW-44i to MW-44d	0.00371	down
MW-45s to MW-45d	0.00230	down
MW-45s to MW-45i	0.00520	down
MW-45i to MW-45d	0.00028	down

Notes:
1. Gradients calculated using EPA vertical gradient calculator.
   http://www.epa.gov/athens/learn2model/part-two/onsite/vgradient02.htm
2. Vertical Gradients were calculated using the following parameters.

Well ID	TOC Elevation (NAVD88)	Distance from TOC to Top of Screen	Screen Length (ft)
MW-36d	30.52	82.32	5
MW-36i	30.26	48.06	5
MW-36s	30.83	13.63	15
MW-37d	26.15	77.95	5
MW-37i	25.99	42.79	5
MW-37s	24.97	13.52	15
MW-40d	29.00	80.05	5
MW-40i	28.49	45.29	5
MW-40s	28.35	11.40	15
MW-41d	27.49	79.79	5
MW-41i	27.17	45.47	5
MW-41s	27.84	11.54	15
MW-44d	29.37	82.42	5
MW-44i	29.62	47.67	5
MW-44s	29.71	13.76	15
MW-45d	27.94	80.99	5
MW-45i	28.05	45.10	5
MW-45s	28.23	13.03	15

TABLE 3-3
Vertical Gradients
Low Tide Event September 26, 2007
McCormick and Baxter Creosoting Company
Portland, Oregon

Well ID	Mid-point value	Direction
MW-36s to MW-36d	0.06533	down
MW-36s to MW-36i	0.14860	down
MW-36i to MW-36d	0.00088	down
MW-37s to MW-37d	0.01912	down
MW-37s to MW-37i	0.04961	down
MW-37i to MW-37d	0.00086	down
MW-40s to MW-40d	0.07947	down
MW-40s to MW-40i	0.20140	down
MW-40i to MW-40d	0.01226	up
MW-41s to MW-41d	0.01381	down
MW-41s to MW-41i	0.03366	down
MW-41i to MW-41d	0.00059	down
MW-44s to MW-44d	0.00841	down
MW-44s to MW-44i	0.24280	up
MW-44i to MW-44d	0.18370	down
MW-45s to MW-45d	0.01115	down
MW-45s to MW-45i	0.03235	down
MW-45i to MW-45d	0.00250	up

Notes:
1. Gradients calculated using EPA vertical gradient calculator.
   http://www.epa.gov/athens/learn2model/part-two/onsite/vgradient02.htm
2. Vertical Gradients were calculated using the following parameters.

Well ID	TOC Elevation (NAVD88)	Distance from TOC to Top of Screen	Screen Length (ft)
MW-36d	30.52	82.32	5
MW-36i	30.26	48.06	5
MW-36s	30.83	13.63	15
MW-37d	26.15	77.95	5
MW-37i	25.99	42.79	5
MW-37s	24.97	13.52	15
MW-40d	29.00	80.05	5
MW-40i	28.49	45.29	5
MW-40s	28.35	11.40	15
MW-41d	27.49	79.79	5
MW-41i	27.17	45.47	5
MW-41s	27.84	11.54	15
MW-44d	29.37	82.42	5
MW-44i	29.62	47.67	5
MW-44s	29.71	13.76	15
MW-45d	27.94	80.99	5
MW-45i	28.05	45.10	5
MW-45s	28.23	13.03	15

TABLE 3-4
Vertical Gradients
Low Tide Event December 17, 2007
McCormick and Baxter Creosoting Company
Portland, Oregon

Well ID	Mid-point value	Direction
MW-36s to MW-36d	0.03612	Down
MW-36s to MW-36i	0.08471	Down
MW-36i to MW-36d	0.00235	Up
MW-37s to MW-37d	0.00123	Down
MW-37s to MW-37i	0.00589	Down
MW-37i to MW-37d	0.00171	Up
MW-40s to MW-40d	0.02973	Down
MW-40s to MW-40i	0.11100	Down
MW-40i to MW-40d	0.03182	Up
MW-41s to MW-41d	0.00466	Up
MW-41s to MW-41i	0.00115	Up
MW-41i to MW-41d	0.00735	Up
MW-44s to MW-44d	0.04596	Down
MW-44s to MW-44i	0.13150	Down
MW-44i to MW-44d	0.02114	Up
MW-45s to MW-45d	0.01774	Down
MW-45s to MW-45i	0.01687	Up
MW-45i to MW-45d	0.04111	Down

Notes:
1. Gradients calculated using EPA vertical gradient calculator. http://www.epa.gov/athens/learn2model/part-two/onsite/vgradient02.htm
2. Vertical Gradients were calculated using the following parameters.

Well ID	TOC Elevation (NAVD88)	Distance from TOC to Top of Screen	Screen Length (ft)
MW-36d	30.52	82.32	5
MW-36i	30.26	48.06	5
MW-36s	30.83	13.63	15
MW-37d	26.15	77.95	5
MW-37i	25.99	42.79	5
MW-37s	24.97	13.52	15
MW-40d	29.00	80.05	5
MW-40i	28.49	45.29	5
MW-40s	28.35	11.40	15
MW-41d	27.49	79.79	5
MW-41i	27.17	45.47	5
MW-41s	27.84	11.54	15
MW-44d	29.37	82.42	5
MW-44i	29.62	47.67	5
MW-44s	29.71	13.76	15
MW-45d	27.94	80.99	5
MW-45i	28.05	45.10	5
MW-45s	28.23	13.03	15

Table 4-1
McCormick and Baxter Creosoting Company Superfund Site
Groundwater Analytical Results
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SAMPLE LOCATION			PW-1d		PW-2d		MW-1r		MW-1r Duplicate[1]		MW-2s		MW-3s		MW-7(wc)		MW-10r[3]		MW-10r Duplicate[4]	
Sample Date			4/25/2006		4/24/2006		5/19/2006		5/19/2006		4/28/2006		5/15/2006		4/25/2006		5/17/2006		5/17/2006	
Sample Time			10:42		15:51		9:02		9:02		15:30		16:42		13:17		10:01		10:01	
Well Depth			deep		deep		shallow		shallow		shallow		shallow		shallow		shallow		shallow	
NAPL (Historically)			--		--		--		--		--		--		--		NAPL		--	
Inside/Outside Barrier Wall			outside		outside		outside		outside		outside		outside		outside		inside		inside	
CONTAMINANT OF INTEREST		MCLs																		
Total Metals (mg/L)																				
Arsenic		0.01	0.00216		0.00255		0.000664	U	0.000664	U	0.000664	U	0.00347	J	0.0159		0.0832		0.0831	
Chromium		0.10	0.00228		0.000810		0.00370		0.00365		0.000472	J	0.000605	U[2]	0.00670		0.00475		0.00427	
Copper		1.30	0.00154		0.000300	U[2]	0.00528		0.00494		0.00124	U[2]	0.00312	J	0.00249		0.00424		0.00387	
Zinc		5.00	0.00562	U[2]	0.00297	U[2]	0.00449	U[2]	0.00426	U[2]	0.00209		0.00446	J	0.00509	U[2]	0.00737		0.0146	
Pentachlorophenol (ug/L)		1.0	0.952	U	0.943	U	0.99	U	1	U	0.943	U	0.98	U	0.962	U	621		573	
Polyaromatic Hydrocarbons (ug/L)																				
Acenaphthene	L		0.0476	U	0.0472	U	0.124		0.367		0.0472	U	0.049	U	0.0481	U	477		412	
Acenaphthylene	L		0.0476	U	0.0472	U	0.0495	U	0.05	U	0.0472	U	0.049	U	0.0481	U	12	U	12.3	U
Anthracene	L		0.0476	U	0.0472	U	0.0502	J	0.14		0.0472	U	0.049	U	0.0481	U	66.1		50.7	
Benzo (a) anthracene	H, C		0.0476	U	0.0472	U	0.0495	U	0.0749	J	0.0472	U	0.049	U	0.0481	U	32.8		21.6	
Benzo (a) pyrene	H, C	0.2	0.0476	U	0.0472	U	0.0495	U	0.05	U	0.0472	U	0.049	U	0.0481	U	12.6		12.3	U
Benzo (b) fluoranthene	H, C		0.0476	U	0.0472	U	0.0495	U	0.05	U	0.0472	U	0.049	U	0.0481	U	28.2		24.5	U
Benzo (k) fluoranthene	H, C		0.0476	U	0.0472	U	0.0495	U	0.05	U	0.0472	U	0.049	U	0.0481	U	12	U	24.5	U
Benzo (ghi) perylene	H, C		0.0476	U	0.0472	U	0.0495	U	0.05	U	0.0472	U	0.049	U	0.0481	U	12	U	12.3	U
Chrysene	H, C		0.0476	U	0.0472	U	0.0495	U	0.0836	J	0.0472	U	0.049	U	0.0481	U	32		21.2	
Dibenzo (a,h) anthracene	H, C		0.0952	U	0.0943	U	0.099	U	0.1	U	0.0943	U	0.098	U	0.0962	U	24	U	24.5	U
Fluoranthene	H		0.0476	U	0.0472	U	0.0796	J	0.323		0.0472	U	0.0495	U	0.0481	U	161		111	
Fluorene	L		0.0476	U	0.0472	U	0.2		0.453		0.0472	U	0.0495	U	0.0481	U	251		212	
Indeno (1,2,3-cd) pyrene	H, C		0.0476	U	0.0472	U	0.0495	U	0.05	U	0.0472	U	0.0495	U	0.0481	U	12	U	12.3	U
Napthalene	L		0.0476	U	0.0472	U	0.705		1.53		0.0472	U	0.0887	U[2]	0.0481	U	19100		17000	
Phenanthrene	L		0.0476	U	0.0472	U	0.151		0.634		0.0472	U	0.0495	U	0.0481	U	386		294	
Pyrene	H		0.0476	U	0.0472	U	0.0753	J	0.238		0.0472	U	0.0495	U	0.0481	U	114		79.7	
Total LPAHs			0.1428	U	0.1416	U	1.2302		3.124		0.1416	U	0.16735	U	0.1443	U	20280.1		17968.7	
Total HPAHs			0.2618	U	0.25955	U	0.1549		0.7195		0.25955	U	0.27025	U	0.26455	U	380.6		233.5	
Total Carcinogenic PAHs			0.2142	U	0.21235	U	0.22275	U	0.1585		0.21235	U	0.22075	U	0.21645	U	105.6		42.8	
Total PAHs			0.4046	U	0.40115	U	1.3851		3.8435		0.40115	U	0.4376	U	0.40885	U	20660.7		18202.2	
FIELD PARAMETERS																				
Temperature (°c)			15.05		16.92		19.34		19.34		15.29		15.57		16.86		23.71		23.71	
Oxidation Reduction Potential (mV)			-109		--		168		168		97		-70		-194		-39		-39	
pH			6.67		7.3		6.59		6.59		5.8		6.72		6.9		6.51		6.51	
Specific Conductance (Ms/cm)			0.986		0.805		59.6		59.6		0.364		61.5		0.9		62.5		62.5	
Turbidity (NTU)			141		447		37		37		39		2.5		32.6		21		21	
Dissolved Oxygen (mg/L)			0.07		0.13		0.3		0.3		6.4		0		0.2		0.3		0.3	

Table 4-1
McCormick and Baxter Creosoting Company Superfund Site
Groundwater Analytical Results
Spring 2006

SAMPLE LOCATION		MW-15s		MW-17s		MW-18s		MW-20i		MW-22i		MW-23d		MW-32i		MW-34i		MW-35r		MW-36s		MW-36i		MW-36d	
Sample Date		5/19/2006		5/19/2006		5/22/2006		5/19/2006		5/22/2006		4/27/2006		4/24/2006		5/22/2006		4/25/2006		5/16/2006		5/12/2006		5/11/2006	
Sample Time		15:36		13:36		14:22		11:36		12:31		13:15		10:01		13:30		14:35		15:02		12:46		9:36	
Well Depth		shallow		shallow		shallow		intermediate		shallow		shallow		shallow		shallow		shallow		shallow		intermediate		deep	
NAPL (Historically)		NAPL		--		--		NAPL		NAPL		--		--		NAPL		--		--		--		--	
Inside/Outside Barrier Wall		inside		inside		inside		outside		inside		inside		outside		outside		outside		inside		inside		inside	
CONTAMINANT OF INTEREST																									
Total Metals (mg/L)																									
Arsenic		0.0159		0.00290		0.0220		0.00686		0.0571		0.00307		0.0100		0.0486		0.00104		0.00332	U	0.0553		0.0450	
Chromium		0.00054	J	0.000121	U	0.000121	U	0.00700		0.000990	J	0.00102		0.00503		0.000550	J	0.000860	J	0.0340		0.0127		0.00222	
Copper		0.00201		0.000133	U	0.000133	U	0.00221		0.00275		0.000784	J	0.000820	U[2]	0.000310	J	0.000480	U[2]	0.00590	J	0.0115		0.000270	J
Zinc		0.00477	U	0.00140	U	0.00249	U[2]	0.0281		0.00981		0.00184	J	0.00237	U[2]	0.00438	U[2]	0.00462	U[2]	0.00676	J	0.0303		0.00142	J
Pentachlorophenol (ug/L)		9.9	U	1	U	0.98	U	3150		49	U	0.952	U	0.943	U	1.09		0.952	U	5.36		1	U	0.98	U
Polyaromatic Hydrocarbons (ug/L)																									
Acenaphthene	L	51.1		0.05	U	0.829		5640		357		0.264		0.0472	U	1.22		0.0476	U	0.171	U[2]	25.7		0.529	
Acenaphthylene	L	1.49	U	0.05	U	0.049	U	95.2	U	9.22		0.0476	U	0.0472	U	0.0485	U	0.0476	U	0.0495	U	0.1	U	0.098	U
Anthracene	L	3.37		0.107		0.146		1650		47		0.144		0.0472	U	0.13		0.0476	U	0.0495	U	0.129	U[2]	0.118	U[2]
Benzo (a) anthracene	H, C	0.495	U	0.05	U	0.049	U	845		18		0.0476	U	0.0472	U	0.0485	U	0.0476	U	0.0495	U	0.05	U	0.0735	U[2]
Benzo (a) pyrene	H, C	0.495	U	0.05	U	0.049	U	228		4.25	J	0.0476	U	0.0472	U	0.0485	U	0.0476	U	0.0495	U	0.05	U	0.0558	U[2]
Benzo (b) fluoranthene	H, C	0.495	U	0.05	U	0.049	U	623		5.76		0.0476	U	0.0472	U	0.0485	U	0.0476	U	0.0495	U	0.05	U	0.0581	U[2]
Benzo (k) fluoranthene	H, C	0.495	U	0.05	U	0.049	U	47.6	U	5.07		0.0476	U	0.0472	U	0.0485	U	0.0476	U	0.0495	U	0.05	U	0.0522	U[2]
Benzo (ghi) perylene	H, C	0.495	U	0.05	U[+]	0.049	U	47.6	U	2.45	U	0.0476	U	0.0472	U	0.0485	U	0.0476	U	0.0495	U	0.05	U	0.0579	U[2]
Chrysene	H, C	0.495	U	0.05	U	0.049	U	744		14.7		0.0476	U	0.0472	U	0.0485	U	0.0476	U	0.0495	U	0.05	U	0.0748	U[2]
Dibenzo (a,h) anthracene	H, C	0.99	U	0.1	U	0.098	U	95.2	U	4.9	U	0.0952	U	0.0943	U	0.0971	U	0.0952	U	0.099	U	0.1	U	0.098	U
Fluoranthene	H	3.44		0.129		0.26		4340		125		0.53		0.0569	J	0.13		0.0476	U	0.0918	U[2]	0.093	U[2]	0.0914	J
Fluorene	L	28.8		0.05	U	0.468		4670		197		0.282		0.0472	U	0.37		0.0476	U	0.0495	U	0.899		0.0826	U[2]
Indeno (1,2,3-cd) pyrene	H, C	0.495	U	0.05	U	0.049	U	52.7	J	2.45	U	0.0476	U	0.0472	U	0.0485	U	0.0476	U	0.0495	U	0.05	U	0.0495	U[2]
Napthalene	L	1440		0.184		0.211		32700		9120		0.548		0.0472	U	5.7		0.0476	U	0.0495	U	1.87		1.92	
Phenanthrene	L	34.2		0.0591	J	0.049	U	9490		284		0.123		0.0472	U	0.445		0.0476	U	0.0495	U	0.173	U[2]	0.111	U[2]
Pyrene	H	1.86		0.0973	J	0.166		2840		76.9		0.314		0.0472	U	0.089	J	0.0476	U	0.078	U[2]	0.0743	U[2]	0.0862	U[2]
Total LPAHs		1557.47		0.3501		1.654		54150		10014.22		1.361		0		7.865		0.1428	U	0.20925	U	28.469		2.449	
Total HPAHs		5.3		0.2263		0.426		9672.7		251.58		0.844		0.0569		0.219		0.2618	U	0.30765	U	0.30865	U	0.0914	
Total Carcinogenic PAHs		2.2275	U	0.225	U	0.2205	U	2492.7		49.68		0.2142	U	0.21235	U	0.2183	U	0.2142	U	0.22275	U	0.225	U	0.2599	U
Total PAHs		1562.77		0.5764		2.08		63822.7		10265.8		2.205		0.0569		8.084		0.4046	U	0.5169	U	28.77765		2.5404	
FIELD PARAMETERS																									
Temperature (°c)		16.53		15.3000		15.49		--		15.6		15.86		16.81		--		17.53		30.17		23.06		18.97	
Oxidation Reduction Potential (mV)		-83		209.0000		-65		--		-41		-214				--		-56		129		-151		-151	
pH		7.16		6.6900		7.15		--		6.71		7.38		6.72		--		6.57		6.19		7.53		7.79	
Specific Conductance (Ms/cm)		53.1		37.0000		59.4		--		0.117		0.752		0.9		--		0.811		41.5		72.9		76	
Turbidity (NTU)		5.6		4.7000		2.6		--		14		12.8		12.1		--		20.1		29		38		4.9	
Dissolved Oxygen (mg/L)		0.3		0.6000		0.7		--		0.7		0.04		0.09		--		0.64		1.1		1.1		1.9	

Table 4-1
McCormick and Baxter Creosoting Company Superfund Site
Groundwater Analytical Results
Spring 2006

SAMPLE LOCATION		MW-37s		MW-37i		MW-37d		MW-38s		MW-38i		MW-38d		MW-39s		MW-39i		MW-39d		MW-39d Duplicate[6]		MW-40s		MW-40i		MW-40d[5]	
Sample Date		5/8/2006		5/4/2006		5/16/2006		5/16/2006		5/12/2006		5/10/2006		5/8/2006		5/4/2006		5/3/2006		5/4/2006		5/16/2006		5/12/2006		5/10/2006	
Sample Time		9:26		16:32		15:47		13:21		10:32		16:21		16:45		14:37		15:25		15:25		10:37		9:12		14:48	
Well Depth		shallow		intermediate		deep		shallow		intermediate		deep		shallow		intermediate		deep		deep		shallow		intermediate		deep	
NAPL (Historically)		--		--		--		--		--		--		--		--		--		--		--		--		--	
Inside/Outside Barrier Wall		outside		outside		outside		inside		inside		inside		outside		outside		outside		outside		inside		inside		inside	
CONTAMINANT OF INTEREST																											
Total Metals (mg/L)																											
Arsenic		0.00213		0.0513		0.0353		0.0234		0.0224		0.0223		0.0153		0.0383		0.0304		0.0378		0.00332	U	0.0104		0.0103	
Chromium		0.00252		0.00824		0.000605	U	0.0102		0.0320		0.00579		0.0111		0.00211		0.00157		0.00212		0.0154		0.0152		0.00190	
Copper		0.00153	J	0.00476		0.0105		0.00478	J	0.00534		0.000570	J	0.00719		0.00262		0.00355		0.00133	J	0.00887	J	0.00387		0.000350	J
Zinc		0.00350	U[2]	0.0114		0.00966	J	0.00662	J	0.0121		0.00208	U[2]	0.0120		0.00309	U[2]	0.00258	U[2]	0.00205	U[2]	0.0102	J	0.0126		0.00218	U[2]
Pentachlorophenol (ug/L)		31.6		9.9	U	0.98	U	0.98	U	1	U	18.9	U	1	U	4.22		1	U	3.78		0.98	U	0.99	U	0.943	U
Polyaromatic Hydrocarbons (ug/L)																											
Acenaphthene	L	8.89	J[5]	0.0495	U	1.15		0.153	U[2]	0.0603	U[2]	4.81	J[5]	0.373	J[5]	0.0643	J	4.71		0.0773	J	0.139	U[2]	0.117	U[2]	0.0646	J[5]
Acenaphthylene	L	0.25	U	0.0495	U	0.049	U	0.049	U	0.05	U	0.943	U	0.0583	J	0.05	U	0.1	U	0.05	U	0.049	U	0.0495	U	0.0472	U
Anthracene	L	0.442		0.0495	U	0.125	U[2]	0.101	U[2]	0.05	U	0.943	U	0.246		0.0635	J	0.274		0.0722	J	0.0645	U[2]	0.0829	U[2]	0.0472	U
Benzo (a) anthracene	H, C	0.109		0.0495	U	0.049	U	0.049	U	0.05	U	0.943	U	0.0927	J	0.05	U	0.05	U	0.05	U	0.049	U	0.0523	J	0.0472	U
Benzo (a) pyrene	H, C	0.0853	J[5]	0.0495	U	0.049	U	0.049	U	0.05	U	0.943	U	0.0707	J[5]	0.05	U	0.05	U	0.05	U	0.049	U	0.0495	U	0.0472	U
Benzo (b) fluoranthene	H, C	0.111		0.0495	U	0.049	U	0.049	U	0.05	U	0.943	U	0.0862	J	0.05	U	0.05	U	0.05	U	0.049	U	0.0502	U[2]	0.0472	U
Benzo (k) fluoranthene	H, C	0.107		0.0495	U	0.049	U	0.049	U	0.05	U	0.943	U	0.087	J	0.05	U	0.05	U	0.05	U	0.049	U	0.0495	U	0.0472	U
Benzo (ghi) perylene	H, C	0.0878	J	0.0495	U	0.049	U	0.049	U	0.05	U	0.943	U	0.0586	J	0.05	U	0.05	U	0.05	U	0.049	U	0.0495	U	0.0472	U
Chrysene	H, C	0.111		0.0495	U	0.049	U	0.049	U	0.05	U	0.943	U	0.11		0.05	U	0.05	U	0.05	U	0.049	U	0.061	U[2]	0.0472	U
Dibenzo (a,h) anthracene	H, C	0.1	U	0.99	U	0.098	U	0.098	U	0.1	U	1.89	U	0.1	U	0.1	U	0.1	U	0.1	U	0.098	U	0.099	U	0.0943	U
Fluoranthene	H	0.257		0.0495	U	0.049	U	0.113	U[2]	0.0936	U[2]	0.943	U	0.264		0.287		0.0792	J	0.289		0.0535	U[2]	0.113	U[2]	0.0656	J
Fluorene	L	2.52		0.0495	U	0.049	U	0.117	U[2]	0.0617	U[2]	0.943	U	0.29		0.0745	J	0.0528	J	0.0847	J	0.0681	U[2]	0.11	U[2]	0.0637	J
Indeno (1,2,3-cd) pyrene	H, C	0.0898	J	0.0495	U	0.0495	U	0.049	U	0.05	U	0.943	U	0.0575	J	0.05	U	0.05	U	0.05	U	0.049	U	0.0495	U	0.0472	U
Napthalene	L	50		47.4		28.2		0.107	U[2]	0.268	U[2]	56.6		0.195		0.106		25.9		0.268		0.167	U[2]	0.321	U[2]	0.222	
Phenanthrene	L	1.18		0.0495	U	0.049	U	0.118	U[2]	0.0744	U[2]	0.943	U	0.156		0.0567	J	0.1	U	0.057	J	0.0641	U[2]	0.15	U[2]	0.0472	U
Pyrene	H	0.193		0.0495	U	0.049	U	0.0857	J	0.0704	U[2]	0.943	U	0.195		0.175		0.05	U	0.181		0.0559	U[2]	0.0995	U[2]	0.0549	J
Total LPAHs		63.032		47.4		29.35		0.3225		0.2822	U	61.41		1.3183		0.365		30.9368		0.5592		0.27585	U	0.4152	U	0.3503	
Total HPAHs		1.1509		0.71775	U	0.26975	U	0.0857		0.307	U	5.1885	U	1.0217		0.462		0.0792		0.47		0.2752	U	0.0523		0.1205	
Total Carcinogenic PAHs		0.7009		0.66825	U	0.22075	U	0.2205	U	0.225	U	4.2455	U	0.5627		0.225	U	0.225	U	0.225	U	0.2205	U	0.0523		0.21235	U
Total PAHs		64.1829		48.11775		29.35		0.4082		0.5892	U	66.5985		2.34		0.827		31.016		1.0292		0.55105	U	0.4675		0.4708	
FIELD PARAMETERS																											
Temperature (°c)		21.65		27.93		15.9		24.97		16.87		25.07		21.96		25.08		21.1		25.08		25.43		17.68		20.48	
Oxidation Reduction Potential (mV)		37		-204		-153		-93		-122		-112		-103		-145		-160		-145		6		-101		-128	
pH		6.72		6.98		7.73		6.82		7.74		7.76		7.03		6.74		7.03		6.74		6.76		7.77		7.83	
Specific Conductance (Ms/cm)		52.3		1		82.9		57.4		58		0.9		77.7		0.95		0.94		0.95		40.3		49.5		75	
Turbidity (NTU)		38		55		28		36		23		36		50		29.2		20.5		29.2		60		40		5.6	
Dissolved Oxygen (mg/L)		2.3		0.16		0		0		2		3.1		1.6		1.6		4.26		1.6		0.3		2.7		1.4	

Table 4-1
McCormick and Baxter Creosoting Company Superfund Site
Groundwater Analytical Results
Spring 2006

SAMPLE LOCATION		MW-41s		MW-41i		MW-41d		MW-42s		MW-42i		MW-42d		MW-43s		MW-43i		MW-43d		MW-44s		MW-44i		MW-44d		MW-45s		MW-45s Duplicate[8]	
Sample Date		5/8/2006		5/15/2006		5/3/2006		5/16/2006		5/11/2006		5/10/2006		5/5/2006		5/4/2006		5/3/2006		5/15/2006		5/11/2006		5/10/2006		5/5/2006		5/5/2006	
Sample Time		13:32		14:06		13:57		7:42		15:42		13:21		15:58		11:38		11:20		9:56		11:37		11:16		9:31		9:31	
Well Depth		shallow		intermediate		deep		shallow		intermediate		deep		shallow		intermediate		deep		shallow		intermediate		deep		shallow		intermediate	
NAPL (Historically)		--		--		--		--		--		--		--		--		--		--		--		--		--		--	
Inside/Outside Barrier Wall		outside		outside		outside		inside		inside		inside		outside		outside		outside		inside		inside		inside		outside		outside	
CONTAMINANT OF INTEREST																													
Total Metals (mg/L)																													
Arsenic		0.00435		0.00348	J	0.0132		0.00332	U	0.0349		0.0206		0.0131		0.00360		0.00832		0.0747		0.0492		0.00890		0.145		0.152	
Chromium		0.0246		0.00061	U	0.00657		0.03160		0.00224		0.00341		0.0635		0.0157		0.00834		0.00356	J	0.00147		0.00396		0.00628		0.0102	
Copper		0.00746		0.00718	J	0.00160	J	0.0150		0.00525		0.00110	J	0.0230		0.00352		0.0114		0.00579	J	0.000564	J	0.00116	J	0.0137		0.0134	
Zinc		0.00940		0.00944	J	0.00223	U[2]	0.0262		0.00970		0.00281	U[2]	0.0222		0.00661		0.0199		0.00755	J	0.00298	J	0.00192	U[2]	0.0174		0.0159	
Pentachlorophenol (ug/L)		0.99	U	0.99	U	0.962	U	0.98	U	0.98	U	0.943	U	0.943	U	0.98	U	0.99	U	19.8	U	9.8	U	0.952	U	19.5		20	U
Polyaromatic Hydrocarbons (ug/L)																													
Acenaphthene	L	0.79	J[5]	0.0495	U	0.0481	U	0.49		3.54		0.116	J[5]	0.397		0.307		4.43		105		227		1.6	J[5]	145		122	
Acenaphthylene	L	0.0697	J	0.0495	U	0.0481	U	0.049	U	0.049	U	0.0472	U	0.131		0.049	U	0.0495	U	1.98	U	24.5	U	0.0476	U	3.88	U	3.00	U
Anthracene	L	0.125		0.0495	U	0.0572	J	0.14	U[2]	0.124	U[2]	0.149		0.575		0.134		4.62		2.23		13.3		0.448		7.69		5.83	
Benzo (a) anthracene	H, C	0.0724	J	0.0495	U	0.0481	U	0.049	U	0.0533	U[2]	0.0683	J	0.388		0.0784	J	0.892		0.99	U	0.49	U	0.0513	J	0.971	U	1.00	U
Benzo (a) pyrene	H, C	0.055	J[5]	0.0495	U	0.0481	U	0.049	U	0.0566	U[2]	0.0728	J[5]	0.261		0.049	U	0.104		0.99	U	0.49	U	0.0476	U	0.971	U	1.00	U
Benzo (b) fluoranthene	H, C	0.0633	J	0.0495	U	0.0481	U	0.049	U	0.0987	U[2]	0.162		0.402		0.049	U	0.295		0.99	U	0.49	U	0.0476	U	0.971	U	1.00	U
Benzo (k) fluoranthene	H, C	0.0695	J	0.0495	U	0.0481	U	0.049	U	0.0802	U[2]	0.0832	J	0.223		0.049	U	0.181		0.99	U	0.49	U	0.0476	U	0.971	U	1.00	U
Benzo (ghi) perylene	H, C	0.0573	J	0.0495	U	0.0481	U	0.049	U	0.0549	U[2]	0.0629	J	0.233		0.049	U	0.0573	J	0.99	U	0.49	U	0.0476	U	0.971	U	1.00	U
Chrysene	H, C	0.0803	J	0.0495	U	0.0481	U	0.049	U	0.101	U[2]	0.126		0.561		0.0888	J	1.02		0.99	U	0.49	U	0.0555	J	0.971	U	1.00	U
Dibenzo (a,h) anthracene	H, C	0.099	U	0.099	U	0.0962	U	0.098	U	0.098	U	0.0943	U	0.114		0.098	U	0.099	U	1.98	U	0.98	U	0.0952	U	1.94	U	2.00	U
Fluoranthene	H	0.22		0.0495	U	0.182		0.112	U[2]	0.225	U[2]	0.328		2.07		4.32		15.5		1.32	J	14		0.695		6.47		5.05	
Fluorene	L	0.436		0.0495	U	0.0481	U	0.0827	U[2]	0.0712	U[2]	0.0844	J	0.368		0.164		1.8		44.5		125		1.6		74.5		60.4	
Indeno (1,2,3-cd) pyrene	H, C	0.056	J	0.0495	U	0.0481	U	0.049	U	0.0565	U[2]	0.0623	J	0.211		0.049	U	0.0628	J	0.99	U	0.49	U	0.0476	U	0.971	U	1.00	U
Napthalene	L	1.76		0.313	U[2]	0.079	J	0.484	U[2]	1.45	U[2]	0.711		1.08		3.12		0.23		1280		4420		1.77		5450		4550	
Phenanthrene	L	0.228		0.0495	U	0.118		0.135	U[2]	0.0952	U[2]	0.156		0.574		0.197		29.1		21.6		141		3.82		58.6		45.5	
Pyrene	H	0.155		0.0495	U	0.106		0.084	U[2]	0.146	U[2]	0.236		1.28		2.06		6.92		0.99	U	6.6		0.333		3.35		2.68	
Total LPAHs		3.4087		0.28025	U	0.2542		0.49		3.54		1.2164		3.125		3.922		40.18		1453.33		4926.3		9.238		5735.79		4783.73	
Total HPAHs		0.8288		0.27225	U	0.288		0.3185	U	0.4851	U	1.2015		5.743		6.5472		25.0321		1.32		20.6		1.1348		9.82		7.73	
Total Carcinogenic PAHs		0.4538		0.22275	U	0.21645	U	0.2205	U	0.2996	U	0.6375		2.393		0.1672		2.6121		4.455	U	2.205	U	0.1068		4.3685	U	4.5	U
Total PAHs		4.2375		0.5525	U	0.5422		0.8085		4.0251	U	2.4179		8.868		10.4692		65.2121		1454.65		4946.9		10.3728		5745.61		4791.46	
FIELD PARAMETERS																													
Temperature (°c)		21.79		18.09		21.9		19.4		17.02		22.81		17.45		26.47		19.47		22.2		18.55		20.63		19.23		19.23	
Oxidation Reduction Potential (mV)		-6		-97		-149		13		-123		-107		114		-61		-39		-67		-84		-137		30		30	
pH		6.94		7.72		6.98		6.79		7.37		7.45		5.86		6.74		6.88		6.79		6.86		7.83		5.85		5.85	
Specific Conductance (Ms/cm)		68.9		43.1		0.9		32		103		0.239		0.9		0.9		0.848		53.1		94.7		47.2		0.869		0.869	
Turbidity (NTU)		25		14		11.6		170		60		6.9		30		56.6		341		30		4.6		11		6.8		6.8	
Dissolved Oxygen (mg/L)		2.9		0		0.8		4.2		0.07		1.7		0.16		2.88		0.09		1.5		1.1		1.8		0		0	

Table 4-1
McCormick and Baxter Creosoting Company Superfund Site
Groundwater Analytical Results
Spring 2006

SAMPLE LOCATION		MW-45i		MW-45d		MW-46s		MW-47s		MW-48s		MW-49s		MW-50s		MW-51s		MW-52s		MW-53s		MW-54s		MW-55s		MW-56s[3]		MW-57s	
Sample Date		5/18/2006		5/2/2006		4/27/2006		4/27/2006		5/2/2006		5/18/2006		5/2/2006		4/26/2006		5/1/2006		4/26/2006		5/1/2006		4/26/2006		5/17/2006		5/9/2006	
Sample Time		16:48		16:28		11:07		9:42		12:17		14:21		9:47		12:17		16:35		10:25		15:13		9:02		11:04		17:06	
Well Depth		intermediate		deep		shallow		shallow		shallow		shallow		shallow		shallow		shallow		shallow		shallow		shallow		shallow		shallow	
NAPL (Historically)		--		--		--		--		--		--		--		--		--		--		--		--		NAPL		--	
Inside/Outside Barrier Wall		outside		outside		inside		outside		inside		outside		inside		outside		inside		outside		inside		outside		inside		outside	
CONTAMINANT OF INTEREST																													
Total Metals (mg/L)																													
Arsenic		0.0426		0.0122		0.00891		0.0135		0.00633		0.00276		0.00307		0.000940	J	0.00394		0.0132		0.000664	U	0.00547		0.0210		0.00762	
Chromium		0.00424		0.00327		0.00116		0.00106		0.00164		0.000870	J	0.000359	J	0.000890	J	0.00347		0.00102		0.00157		0.000480		0.000560	J	0.00994	
Copper		0.00096	J	0.00201		0.000312	J	0.000212	J	0.00300		0.00101	J	0.00582		0.000800	U[2]	0.00653		0.00125	J	0.00213		0.000580	U[2]	0.000740	J	0.0102	
Zinc		0.00207	J	0.00253	U[2]	0.00145	J	0.00186	J	0.00501		0.00241	J	0.00639		0.00413	U[2]	0.0141		0.00688		0.0144		0.00751		0.00522		0.0336	
Pentachlorophenol (ug/L)		49.5	U	0.971	U	0.943	U	0.962	U	1	U	0.99	U	0.98	U	0.952	U	4.92	J	1650		0.962	U	0.952	U	928		192	U
Polyaromatic Hydrocarbons (ug/L)																													
Acenaphthene	L	114		1.16		0.884		1.95		0.388		25.9		6.93		4.91		0.0495	U	0.0472	U	0.0728	J	0.0476	U	507		147	J[5]
Acenaphthylene	L	2.48	U	0.0485	U	0.0472	U	0.0481	U	0.05	U	0.22		0.049	U	0.0476	U	0.0495	U	0.0472	U	0.0481	U	0.0476	U	12.1		9.62	U
Anthracene	L	2.48	U	0.0495	J	0.0548		0.0632	J	0.152		0.237		0.148		0.104		0.0901	J	0.474		0.0693	J	0.146		71.7		9.62	U
Benzo (a) anthracene	H, C	2.48	U	0.0485	U	0.0472	U	0.0481	U	0.05	U	0.0495	U	0.049	U	0.0476	U	0.0495	U	0.0472	U	0.0481	U	0.0476	U	23		9.62	U
Benzo (a) pyrene	H, C	2.48	U	0.0485	U	0.0472	U	0.0481	U	0.05	U	0.0495	U	0.049	U	0.0476	U	0.0495	U	0.0472	U	0.0481	U	0.0476	U	11.9	U	9.62	U
Benzo (b) fluoranthene	H, C	2.48	U	0.0485	U	0.0472	U	0.0481	U	0.05	U	0.0495	U	0.049	U	0.0476	U	0.0495	U	0.0472	U	0.0481	U	0.0476	U	11.9	U	9.62	U
Benzo (k) fluoranthene	H, C	2.48	U	0.0485	U	0.0472	U	0.0481	U	0.05	U	0.0495	U	0.049	U	0.0476	U	0.0495	U	0.0472	U	0.0481	U	0.0476	U	11.9	U	9.62	U
Benzo (ghi) perylene	H, C	2.48	U	0.0485	U	0.0472	U	0.0481	U	0.05	U	0.0495	U	0.049	U	0.0476	U	0.0495	U	0.0472	U	0.0481	U	0.0476	U	11.9	U	9.62	U
Chrysene	H, C	2.48	U	0.0485	U	0.0472	U	0.0481	U	0.05	U	0.0495	U	0.049	U	0.0476	U	0.0495	U	0.0472	U	0.0481	U	0.0476	U	21		9.62	U
Dibenzo (a,h) anthracene	H, C	4.95	U	0.0971	U	0.0943	U	0.0962	U	0.1	U	0.099	U	0.098	U	0.0952	U	0.099	U	0.0943	U	0.0962	U	0.0952	U	23.8	U	19.2	U
Fluoranthene	H	2.48	U	0.0621	J	0.0603	J	0.0487	J	0.05	U	0.0495	U	0.049	U	0.0476	U	0.0801	J	0.0472	U	0.112		0.0476	U	181		14.4	J
Fluorene	L	24.3		0.576		0.0472	U	0.0868	J	0.0558	J	6.51		0.0517	J	0.0476	U	0.0495	U	0.0472	U	0.0977		0.0476	U	282		69.9	
Indeno (1,2,3-cd) pyrene	H, C	2.48	U	0.0485	U	0.0472	U	0.0481	U	0.05	U	0.0495	U	0.049	U	0.0476	U	0.0495	U	0.0472	U	0.0481	U	0.0476	U	11.9	U	9.62	U
Napthalene	L	724		0.284		0.0472	U	0.0481	U	16.6		23.2		0.049	U	0.0476	U	0.0495	U	0.0472	U	0.0481	U	0.0476	U	12800		1600	
Phenanthrene	L	7.31		0.385		0.0472	U	0.131		0.05	U	0.165		0.0786	J	0.0476	U	0.0495	U	0.0472	U	0.179		0.0476	U	505		66.5	
Pyrene	H	2.48	U	0.0485	U	0.0484	J	0.0481	U	0.05	U	0.0495	U	0.049	U	0.0476	U	0.0612	J	0.0933	J	0.0677	J	0.0476	U	114		9.62	U
Total LPAHs		869.61		2.4545		0.9388		2.231		17.1958		56.232		7.2083		5.014		0.0901		0.474		0.4188		0.146		14177.8		1883.4	
Total HPAHs		13.635	U	0.0621		0.1087		0.0487		0.275	U	0.27225	U	0.2695	U	0.2618	U	0.1413		0.0933		0.1797		0.2618	U	339		14.4	
Total Carcinogenic PAHs		11.155	U	0.2183	U	0.21235	U	0.21645	U	0.225	U	0.22275	U	0.2205	U	0.2142	U	0.22275	U	0.21235	U	0.21645	U	0.2142	U	44		43.27	U
Total PAHs		869.61		2.5166		1.0475		2.2797		17.4708		56.232		7.4778		5.2758		0.2314		0.5673		0.5985		0.4078		14516.8		1897.8	
FIELD PARAMETERS																													
Temperature (°c)		25.81		22.09		18.12		17.35		18.06		18.9		19.21		16.09		17.93		17.03		19.98		16.56		--		21.31	
Oxidation Reduction Potential (mV)		-113		-162		-61		-13		-33		-26		-39		-6		96		-115		138		-100		--		-54	
pH		6.85		6.79		5.57		5.9		6		6.44		6.26		6.34		5.92		6.41		4.93		6.39		--		6.92	
Specific Conductance (Ms/cm)		62.7		0.822		0.99		0.9		0.999		51.6		0.9		0.928		0.815		0.9		0.407		0.883		--		57.2	
Turbidity (NTU)		7.9		29		7		0		10.3		1.6		0		30		237		35.2		263		13.5		--		65	
Dissolved Oxygen (mg/L)		0		0.21		0.03		0.01		0.05		0.1		0.1		0.18		0.23		0.09		0.51		0.06		--		1.3	

Table 4-1
McCormick and Baxter Creosoting Company Superfund Site
Groundwater Analytical Results
Spring 2006

SAMPLE LOCATION		MW-58s		MW-58i		MW-58d		MW-59s		MW-60d		MW-61s		MW-62i		MW-As		MW-Ds[7]		MW-Gs		MW-Ks		MW-As		EW-1s[3,7]		EW-2s	
Sample Date		5/9/2006		5/18/2006		4/27/2006		4/26/2006		5/9/2006		4/25/2006		5/10/2006		5/18/2006		5/18/2006		5/19/2006		4/28/2006		5/18/2006		5/17/2006		5/19/2006	
Sample Time		13:56		9:41		16:55		18:01		11:07		16:43		9:22		11:41		11:57		13:42		16:50		11:41		14:23		8:45	
Well Depth		shallow		intermediate		deep		shallow		deep		shallow		intermediate		shallow		shallow		shallow		shallow		shallow		shallow		shallow	
NAPL (Historically)		--		--		--		--		--		--		--		--		NAPL		NAPL		--		--		NAPL		NAPL	
Inside/Outside Barrier Wall		outside		outside		outside		outside		outside		outside		inside		outside		outside		outside		outside		outside		inside		outside	
CONTAMINANT OF INTEREST																													
Total Metals (mg/L)																													
Arsenic		0.00309		0.0453		0.00696		0.00803		0.0269		0.000664	U	0.0376		0.00589		2.71		0.0244		0.00495		0.00318		0.0145		0.00110	
Chromium		0.00347		0.0220		0.00310		0.00109		0.00844		0.00138		0.00111		0.00159		212		0.00236		0.00127		0.00031	J	0.00012	U	0.0149	
Copper		0.00343		0.0155		0.000599	J	0.000503	J	0.00139	J	0.000660	U[2]	0.00083	U[2]	0.00206		5.10		0.00796		0.00924		0.00181	J	0.000150	J	0.00410	
Zinc		0.00368	U[2]	0.0277		0.00192	J	0.00556		0.00273	U[2]	0.00653	U[2]	0.00383	J	0.00254	J	2.21		0.0422		0.151		0.12300		0.0101		0.00388	U
Pentachlorophenol (ug/L)		0.952	U	0.99	U	0.952	U	0.943	U	9.71	U	0.962	U	0.962	U	0.971	U	240000	U	2730		0.943	U	0.952	U	952	U	562	
Polyaromatic Hydrocarbons (ug/L)																													
Acenaphthene	L	0.325	J[5]	2.26		0.0476	U	0.0472	U	89.5	J[5]	0.0481	U	121	J[5]	0.206		494000		952		0.0472	U	0.0476	U	9200		245	
Acenaphthylene	L	0.0476	U	0.0495	U	0.0476	U	0.0472	U	0.971	U	0.0481	U	0.962	U	0.0485	U	12000	U	19	U	0.0472	U	0.0476	U	99.6		23.8	U
Anthracene	L	0.0499	J	0.514		0.0476	U	0.0472	U	2.41		0.0481	U	0.427		0.0617	J	166000		230		0.0472	U	0.0476	U	2150		68.1	
Benzo (a) anthracene	H, C	0.0476	U	0.46		0.0476	U	0.0472	U	0.485	U	0.0481	U	0.0481	U	0.0669	J	98900		112		0.0472	U	0.0476	U	1850		49.6	
Benzo (a) pyrene	H, C	0.0476	U	0.133		0.0476	U	0.0472	U	0.485	U	0.0481	U	0.0481	U	0.0485	U	27400		28.5		0.0472	U	0.0476	U	532		23.8	U
Benzo (b) fluoranthene	H, C	0.0476	U	0.178		0.0476	U	0.0472	U	0.485	U	0.0481	U	0.0481	U	0.0485	U	91900		78.6		0.0472	U	0.0476	U	752		63.4	
Benzo (k) fluoranthene	H, C	0.0476	U	0.157		0.0476	U	0.0472	U	0.485	U	0.0481	U	0.0481	U	0.0485	U	12000	U	4.76	U	0.0472	U	0.0476	U	648		23.8	U
Benzo (ghi) perylene	H, C	0.0476	U	0.0495	U	0.0476	U	0.0472	U	0.485	U	0.0481	U	0.0481	U	0.0485	U	12000	U	5.79	J	0.0472	U	0.0476	U	104		23.8	U
Chrysene	H, C	0.0476	U	0.385		0.0476	U	0.0472	U	0.485	U	0.0481	U	0.0481	U	0.0632	J	91500		97.6		0.0472	U	0.0476	U	1530		50.6	
Dibenzo (a,h) anthracene	H, C	0.0952	U	0.099	U	0.0952	U	0.0943	U	0.971	U	0.0962	U	0.0962	U	0.0971	U	24000	U	9.52	U	0.0943	U	0.0952	U	95.2	U	47.6	U
Fluoranthene	H	0.0697	J	2.49		0.0476	U	0.0472	U	5.93		0.0481	U	0.163		0.266		440000		557		0.0472	U	0.0515	J	8640		210	
Fluorene	L	0.182		2.06		0.0476	U	0.0472	U	22.1		0.0481	U	27.6		0.194		510000		710		0.0472	U	0.0476	U	8310		191	
Indeno (1,2,3-cd) pyrene	H, C	0.0476	U	0.0495	U	0.0476	U	0.0472	U	0.485	U	0.0481	U	0.0481	U	0.0485	U	12000	U	6.49	J	0.0472	U	0.0476	U	116		23.8	U
Napthalene	L	1.31		4.57		0.0476	U	0.0472	U	3870		0.0481	U	2.22		0.738		1860000		14400		0.0472	U	0.0476	U	15800		263	
Phenanthrene	L	0.0683	J	4.75		0.0476	U	0.0472	U	16.3		0.0481	U	2.18		0.458		971000		1530		0.0472	U	0.0476	U	18100		279	
Pyrene	H	0.0797	J	1.55		0.0476	U	0.0472	U	3.15		0.0481	U	0.312		0.181		277000		375		0.0472	U	0.0476	U	6370		137	
Total LPAHs		1.9352		14.154		0.1428	U	0.1416	U	4001.281		0.1443	U	153.427		1.6577		4001000		17822		0.1416	U	0.1428	U	53659.6		1046.1	
Total HPAHs		0.1494		5.353		0.2618	U	0.25955	U	13.446		0.26455	U	0.475		0.5771		1026700		1260.98		0.25955	U	0.0515		20542		510.6	
Total Carcinogenic PAHs		0.2142	U	1.313		0.2142	U	0.21235	U	2.183	U	0.21645	U	0.21645	U	0.1301		309700		328.98		0.21235	U	0.2142	U	5532		163.6	
Total PAHs		2.0846		19.507		0.4046	U	0.40115	U	4014.727		0.40885	U	153.902		2.2348		5027700		19082.98		0.40115	U	0.1943		74201.6		1556.7	
FIELD PARAMETERS																													
Temperature (°c)		20.77		19.4		22.83		14.6		17.76		19.75		18.44		19.07		--		--		16.01		15.83		--		--	
Oxidation Reduction Potential (mV)		-52		-148		-178		-20		-135		96		-130		-98		--		--		-144		-101		--		--	
pH		7.23		7.6		7.32		5.94		7.58		6.18		7.36		6.83		--		--		6.52		6.17		--		--	
Specific Conductance (Ms/cm)		30.3		56.3		0.999		0.54		82.2		0.434		57.6		65.1		--		--		0.767		0.807		--		--	
Turbidity (NTU)		12		250		45.5		40.8		14		17.6		6.5		6		--		--		83.7		52.6		--		--	
Dissolved Oxygen (mg/L)		2.6		0		0.7		0		1.5		1.3		1.8		0.1		--		--		0		0		--		--	

Table 4-1
McCormick and Baxter Creosoting Company Superfund Site
Groundwater Analytical Results
Spring 2006

SAMPLE LOCATION		EW-8s		EW-9s		EW-10s		EW-15s		EW-18s		EW-19s[3]		EW-23s		Rinsate1-051706		Rinsate2-052206	
Sample Date		5/22/2006		5/18/2006		5/19/2006		5/22/2006		5/22/2006		5/17/2006		5/22/2006		5/17/2006		5/22/2006	
Sample Time		10:01		15:30		15:41		10:30		9:20		14:12		11:55		16:55		15:42	
Well Depth		shallow		shallow		shallow		shallow		shallow		shallow		shallow					
NAPL (Historically)		NAPL		NAPL		NAPL		NAPL		NAPL		NAPL		NAPL					
Inside/Outside Barrier Wall		inside		inside		outside		inside		inside		outside		inside					
CONTAMINANT OF INTEREST																			
Total Metals (mg/L)																			
Arsenic		0.00854		0.0402		0.0156		0.0221		0.0291		0.00216		0.0294		0.000664	U	0.000664	U
Chromium		0.000400	J	0.000121	U	0.00375		0.00229		0.000400	J	0.000380	J	0.148		0.0163		0.00147	
Copper		0.000133	U	0.000890	J	0.000630	J	0.00113	J	0.00271		0.000620	J	0.00335		0.00045	J	0.000133	U
Zinc		0.00364	U[2]	0.000620	J	0.00535	U[2]	0.00418	U[2]	0.00341	U[2]	0.00362	J	0.00850	U[2]	0.00132	J	0.00109	U[2]
Pentachlorophenol (ug/L)		20.8	U	95.2	U	1030		95.2	U	95.2	U	366		1920	U	0.962	U	0.962	U
Polyaromatic Hydrocarbons (ug/L)																			
Acenaphthene	L	500		327		2420		1150		616		67.1		14700		0.169		0.0646	J
Acenaphthylene	L	12.1		4.76	U	48.1	U	19	U	19	U	12.3	U	213		0.0481	U	0.0481	U
Anthracene	L	14.7		34.5		651		274		139		12.3	U	4200		0.0481	U	0.0481	U
Benzo (a) anthracene	H, C	5.78		11.3		340		140		81.7		12.3	U	2440		0.0481	U	0.0481	U
Benzo (a) pyrene	H, C	1.29	J	4.76	U	89.2		39.2		27.8		12.3	U	667		0.0481	U	0.0481	U
Benzo (b) fluoranthene	H, C	2.05	J	10.4		236		70.3		26.4		12.3	U	1120		0.0481	U	0.0481	U
Benzo (k) fluoranthene	H, C	1.42	J	4.76	U	24	U	39.4		34.9		12.3	U	667		0.0481	U	0.0481	U
Benzo (ghi) perylene	H, C	1.04	U	4.76	U	24	U	8.9	J	7.12	J	12.3	U	138	J	0.0481	U	0.0481	U
Chrysene	H, C	4.01		11.1		299		129		69.7		12.3	U	2180		0.079	J	0.0481	U
Dibenzo (a,h) anthracene	H, C	2.08	U	9.52	U	48.1	U	9.52	U	9.52	U	24.5	U	192	U	0.0962	U	0.0962	U
Fluoranthene	H	47.3		63.6		1740		673		420		12.3	U	12100		0.225		0.0709	J
Fluorene	L	267		225		1810		859		367		24		12600		0.117		0.0481	U
Indeno (1,2,3-cd) pyrene	H, C	1.04	U	4.76	U	24	U	9.95		7.87	J	12.3	U	158	J	0.0481	U	0.0481	U
Napthalene	L	6760		4010		18900		5370		3000		915		53200		2.88		0.468	
Phenanthrene	L	247		241		3610		1450		674		12.3	U	21800		0.199		0.0481	U
Pyrene	H	28		38.9		1220		442		316		12.3	U	7870		0.153		0.0487	J
Total LPAHs		7800.8		4837.5		27391		9103		4796		1006.1		106713		3.365		0.5326	
Total HPAHs		89.85		135.3		3924.2		1551.75		991.49		67.6	U	27340		1.168		0.1196	
Total Carcinogenic PAHs		14.55		32.8		964.2		436.75		255.49		55.3	U	7370		0.79		0.21645	U
Total PAHs		7890.65		4972.8		31315.2		10654.75		5787.49		1006.1		134053		4.533		0.6522	
FIELD PARAMETERS																			
Temperature (°c)		15.32		--		--		--		--		21.58		--		--		--	
Oxidation Reduction Potential (mV)		91		--		--		--		--		107		--		--		--	
pH		6.5		--		--		--		--		6.47		--		--		--	
Specific Conductance (Ms/cm)		71.7		--		--		--		--		37.5		--		--		--	
Turbidity (NTU)		4.9		--		--		--		--		10		--		--		--	
Dissolved Oxygen (mg/L)		3.8		--		--		--		--		0		--		--		--	

TABLE 3-1 DEFINITIONS AND END NOTES

Definitions:

Groundwater Performance Goals = As described in the Second Five-Year Review (DEQ, September 2006), the EPA has determined that Alternate Concentration Limits (ACLs) are not valid as substitutes for Maximum Contaminant Levels (MCLs) in groundwater at this Site. Invalidation of ACLs at this Site also affects whether the groundwater remedial action objectives derived from the provisions in CERCLA for using ACLs remain valid for the Site (i.e., no exceedance of contaminant background concentrations in the Willamette River). The DEQ and EPA anticipate that: 1) groundwater standards for the Site will be established following a rigorous analysis of site conditions and all relevant data; and 2) (assuming MCLs cannot be met) the application of a waiver pursuant to Section 122(d)(4) of CERCLA for MCLs to comply with the threshold criterion (meeting ARARs) for all remedies implemented pursuant to any final CERCLA ROD.

ACLs = Alternate Concentration Limits.
MCLs = Primary Drinking Water Standard Maximum Contaminant Levels.
MRL= Method Reporting Limit. Reporting Level at, or above, the lowest standard of the Calibration Table.
MDL= Method Detection Limit. Reporting Level at, or above, the statistically derived limit based on 40CFR, part 136, Appendix B.
bold = Indicates the analyte was detected above MDLs.
italic-bold = Indicates the analyte was detected in excess of ACLs.
underlined-bold = Indicates the analyte was detected in excess of MCLs.
Shaded = Indicates NAPL was historically present in well or during sampling.
ND = Not Detected; see detection limits of individual constituents.
J = Estimated Value.
U = Value Below MDL (value represents MDL).
WC = Willamette Cove well.
L = Low Molecular Weight PAH (LPAH)
H = High Molecular Weight PAH (HPAH)
C = Carcinogenic PAH
ug/L = micrograms per liter
mg/L = milligrams per liter

End Notes:

[1] Sample ID for laboratory is MW-Er.

[2] Qualified as not detected because analytes were detected in the method blank (values represent amount detected in sample).

[3] Samples were inadvertently left out of refrigerator by Test America; all sample results for PAH's + PCP must be considered estimates only.

[4] Sample ID for laboratory is EW-31r.

[5] Due to recoveries outside of method control limits in lab MS/MSD samples, results must be considered estimated levels only.

[6] Sample ID for laboratory is MW-Bs.

[7] Free Product in Sample.

[8] Sample ID for laboratory is MW-69i.

A Historical Groundwater Contour Maps

Included only with the O&M Report CD.

B Percentage Water Content Technical Memoranda

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Technical Memorandum

To: Kevin Parrett, Project Manager; -- McCormick and Baxter Superfund Site

Date: May 7, 2007

From: Ecology and Environment

Subject: Percentage Water Content for Extracted NAPL From MW-20i and MW-Ds

1.0 Introduction

This technical memorandum presents the methodology and calculations used to determine percentage water content of NAPL extracted from monitoring wells MW-20i and MW-Ds at the McCormick and Baxter Creosoting Company (McCormick and Baxter) site in Portland, Oregon. The average calculated percentage of water will be applied to the total volume of liquid extracted from the site in order to better estimate the volume of pure NAPL being extracted from the site. To determine the water percentage, the different freezing temperatures of water and NAPL were used to separate the two liquids from each other, the volume of each liquid was then determined, and the percentage water content was calculated. Section 2.0 offers a detailed description of the methodology used to determine the water content.

2.0 Methodology

The following is a step by step description of the methodology used to determine the percent water content of MW-20i and MW-Ds:

1. NAPL was extracted from MW-20i and MW-Ds, as part of routine extractions performed at the site, and placed into separate metal containers each with a volume of approximately 3.5 gallons.
2. After approximately 1 ½ to 2 gallons of NAPL-water was accumulated, a steel rod with a metal plate at one end was placed into the center of each container to act as a handle upon freezing. The rod extended to the bottom of each container with the metal plate on the submerged end.

3. In order to obtain good NAPL-water separation the containers were allowed to settle for one week undisturbed.
4. After one week the containers were placed in a freezer for a minimum of 2 days. Placing the containers in the freezer resulted in the water layer freezing while the NAPL layer remained a liquid, allowing the two liquids to be separated.
5. Prior to removing the containers from the freezer four buckets were marked in ½-inch increments from 0 to 12 inches.
6. Once frozen, the containers of NAPL-water were removed from the freezer , with the steel rods acting as handles to pull the frozen water out of the containers. A blow torch was used to heat the outside of the containers to loosen the frozen water from the edges.
7. Any DNAPL that adhered to the bottom of the frozen water was scraped back into the container with the remaining DNAPL.
8. The ice was placed into one bucket and the DNAPL poured into another for each of the two wells tested (resulting in four buckets).
9. The ice was allowed to melt and the thickness of liquid of water and DNAPL was read off the sides of their respective buckets.
10. Once a total thickness of liquid was determined, the percent water content was calculated.
11. To represent thickness of liquid as gallons of liquid, the volume of liquid per one inch was calculated. This was done by pouring one gallon of water into the bucket and determining the thickness of water that one gallon represented (Equation 1).

3.0 Calculations

Table 1 provides a summary of NAPL and water measurements in both inches and gallons for each of the wells, as well as the percent water content for each of the wells. In order to determine the volume in gallons the conversion of 0.36 gallons per inch of liquid was used. This conversion factor was determined using Equation 1.

Table 1: NAPL and Water Measurement for MW-20i and MW-Ds

		Inches	Gallons
MW-20i	DNAPL	2.5	0.9
	Water	2.25	0.81
	Total Liquid	4.75	1.71
	Percent Water	47%	
MW-Ds	DNAPL	2.5	0.9
	Water	3.0	1.08
	Total Liquid	5.5	1.98
	Percent Water	55%	

(Equation 1) Inches of Water to Gallons of Water:

$$\frac{1gallon}{x} = \frac{2.75inches}{1.0inches}$$

$x = 0.36gallons$ per 1.0 inch of liquid

4.0 Summary

After performing field test it was determined that 51% is the average percent water content of MW-20i and MW-Ds. This procedure will also be performed on NAPL-water extracted from MW-Gs once enough liquid has accumulated. The average percentage of water for all three wells will be applied to future quarterly drum gauging measurements in order to determine the volume of pure NAPL extracted from the site. MW-20i MW-Ds, and MW-Gs are the primary DNAPL wells extracted from on the site and it will be assumed they are representative of other DNAPL wells that may be periodically extracted from during weekly extraction activities.

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Technical Memorandum

To: Project File; -- McCormick and Baxter Superfund Site

Date: November 20, 2007

From: Ecology and Environment

Subject: Percentage Water Content for Extracted NAPL From MW-20i, MW-Ds, and MW-Gs

1.0 Introduction

This technical memorandum presents the methodology and calculations used to determine percentage water content of NAPL extracted from monitoring wells MW-20i, MW-Ds, and MW-Gs at the McCormick and Baxter Creosoting Company (McCormick and Baxter) site in Portland, Oregon. The water content of NAPL extracted from monitoring wells MW-20i and MW-Ds was previously determined in May 2007 to be 51 percent. Results from this November 2007 water content determination will be compared to the May (51%) to determine the degree of variation. The average calculated percentage of water will be applied to the total volume of liquid extracted from the site from January 1, 2007 through September 30, 2007 in order to better estimate the volume of pure NAPL being extracted from the site. To determine the water percentage, the different freezing temperatures of water and NAPL were used to separate the two liquids from each other, the volume of each liquid was then determined, and the percentage water content was calculated. Section 2.0 offers a detailed description of the methodology used to determine the water content.

2.0 Methodology

The following is a description of the methodology used to determine the percent water content of MW-20i, MW-Ds, and MW-Gs:

1. NAPL was extracted from MW-20i, MW-Ds, and MW-Gs, as part of routine extractions performed at the site, and placed into separate metal containers each capable of holding approximately 3.5 gallons.

2. After approximately 1 to 3 gallons of total extracted liquid (NAPL-water) was accumulated, a steel rod with a metal plate at one end was placed into the center of each container to act as a handle upon freezing. The rod extended to the bottom of each container with the metal plate on the submerged end.
3. In order to obtain good NAPL-water separation the containers were allowed to settle for one week undisturbed.
4. After one week the containers were placed in a freezer for a minimum of 2 days. Placing the containers in the freezer resulted in the water layer freezing while the NAPL layer remained a liquid, allowing the two liquids to be separated.
5. Prior to removing the containers from the freezer six buckets were marked in ½-inch increments from 0 to 12 inches.
6. Once frozen, the containers of NAPL-water were removed from the freezer , with the steel rods acting as handles to pull the frozen water out of the containers. A blow torch was used to heat the outside of the containers to loosen the frozen water from the edges.
7. Any DNAPL that adhered to the bottom of the frozen water was scraped back into the container with the remaining DNAPL.
8. The ice was placed into one bucket and the DNAPL poured into another for each of the two wells tested (resulting in six buckets).
9. The ice was allowed to melt and the thickness of water and DNAPL was read off the sides of their respective buckets.
10. Once a total thickness of liquid was determined, the percent water content was calculated.
11. To represent thickness of liquid as gallons of liquid, the volume of liquid per one inch was calculated. This was done by pouring one gallon of water into the bucket and determining the thickness of water that one gallon represented (Equation 1).

3.0 Calculations

Table 1 provides a summary of NAPL and water measurements in both inches and gallons for each of the wells, as well as the percent water content for each of the wells. In order to determine the volume in gallons the conversion of 0.36 gallons per inch of liquid was used. This conversion factor was determined using Equation 1.

Table 1: NAPL and Water Measurement for MW-20i, MW-Ds, MW-Gs

		Inches	Gallons
MW-20i	DNAPL	5.0	1.8
	Water	2.0	0.72
	Total Liquid	7.0	2.52
	Percent Water	29.5	
MW-Ds	DNAPL	1.0	0.36
	Water	0.875	0.315
	Total Liquid	1.875	0.675
	Percent Water	21.3	
MW-Gs	DNAPL	2.25	0.81
	Water	0.75	0.27
	Total Liquid	3.0	1.08
	Percent Water	25.0	

(Equation 1) Inches of Water to Gallons of Water:

$$\frac{1gallon}{x} = \frac{2.75inches}{1.0inches}$$

$x = 0.36gallons$ per 1.0 inch of liquid

4.0 Summary and Recommendations

Averaging the results from MW-20i, MW-Ds, and MW-Gs results in a percent water content of 25 percent, for the November determination. Previously the water content was determined to be 51 percent. NAPL collected for the May calculation was extracted during February and March 2007, NAPL collected for the November calculation was extracted during August and September. Although the extractions occurred during different seasons, there has not been enough data collected to establish a seasonal percent water content. Therefore, the average of the May and November calculations (38%) will be used to determine the amount of pure NAPL extracted from the site from January 1, 2007 through September 30, 2007. MW-20i MW-Ds, and MW-Gs are the primary DNAPL wells extracted from on the site and it will be assumed they are representative of other DNAPL wells that may be periodically extracted from during weekly extraction activities. E & E recommends DEQ continue to determine the percent water content for various seasons to establish if there is a correlation between water content and seasonal site conditions.

C Alternative Pumping Strategy Assessment

Automated LNAPL Extraction Pilot Test

On April 4, 2006, E & E conducted a pilot test for automated LNAPL extraction. Pumping equipment was provided free of charge by Xitech Instruments, Inc. through their northwest representative. Initially, the test had been planned for automated DNAPL recovery, however, recoverable quantities of DNAPL were only present in 2 inch diameter wells. Automated DNAPL recovery equipment from Xitech is only designed for 4-inch diameter wells.

The LNAPL extraction test was performed on monitoring well MW-15s located in the FWDA at the top of the bank. Pumping equipment consisted of a Xitech model ADJ 205 skimmer pump, which operates on a float system to allow for fluctuations in LNAPL thickness. A membrane sensor distinguishes between LNAPL and groundwater, allowing only LNAPL to enter the pumping chamber. LNAPL is discharged using compressed nitrogen stored in a high pressure cylinder adjacent to the well. LNAPL discharge is controlled by an electronic regulator/timer, which for this test was powered by a 12 volt marine battery. Extracted liquids were stored in a 55-gallon DOT drum.

The pumping test operated for 11 days beginning on April 4, 2006 and continuing until April 20, 2006. The pumping system was deactivated on a daily basis and for weekends to prevent potentially overfilling the drum, while the site was unoccupied. During the test, pumping duration and the number of pumping cycles per day were varied, in an attempt to optimize the system for maximum LNAPL recovery. In general, pumping durations were increased, from one minute to 10 minutes and finally to five minutes. Conversely, the number of pumping cycles was decreased fro 12 per day to three per day.

Initial observations indicated that the pumping system was working well. Dark liquid, believed to be LNAPL was observed in the discharge tubing during pumping cycles and manual measurements using a measuring stick indicated that LNAPL was accumulating in the product drum. LNAPL thickness was not gauged with an electronic interface probe due to the nature of the creosote product, which contains a significant portion of water, often resulting in false measurements. Stick measurements also proved to be inaccurate as LNAPL material would smear the measuring stick providing a false positive measurement. Following completion of the pilot test, the drum lid was removed, and a bailer was lowered into the drum to measure LNAPL thickness. Total LNAPL thickness was measured at less than ¼ inch. Therefore almost all of the recovered liquid proved to be groundwater.

The reason for such limited LNAPL recovery is likely due to the nature of the creosote LNAPL material, which contains a significant percentage of groundwater. Historic NAPL measurements onsite indicate that up to 51 percent of extracted NAPL material is water. This would explain the appearance of LNAPL within the discharge tubing. In summary, LNAPL (or DNAPL) extraction using this type of automated pumping is inefficient due to the high volume of water removed in comparison to actual LNAPL. Based on discussions with DEQ, it was decided that further evaluation of this technology for the McCormick and Baxter site was not warranted.

Attachment B

002688.OY28

Site Observation and Activity Summary

McCormick & Baxter Creosoting Company Site Portland, Oregon

Task Order No. 71-03-28

May 2008

Prepared for:

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
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List of Abbreviations and Acronyms

ACB	Articulated Concrete Block
Clearwater	Clearwater Environmental Services, Inc.
DEA	David Evans and Associates, Inc.
DEQ	Oregon Department of Environmental Quality
E & E	Ecology and Environment, Inc.
GSI	GSI Water Solutions, Inc.
McCormick & Baxter	McCormick & Baxter Creosoting Company
NAPL	nonaqueous phase liquid
NAVD 88	North American Vertical Datum 1988
NMFS	National Marine Fisheries Service
OC	Organoclay
O&M	Operation and Maintenance
Site	McCormick & Baxter Creosoting Company Site
WCM	West Coast Marine Cleaning, Inc.

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1 Site Observations

Site observations included in this report are for the reporting period from January 1, 2007 through December 31, 2007. Site observations and maintenance activities were carried out according to the Draft O&M Plan (DEQ, 2007). During the months of July, August, and September 2007, sediment cap inspections were generally performed on a weekly basis; during the remainder of the reporting period, sediment cap inspections were performed on a monthly basis. Soil cap inspections were performed on a monthly basis during the reporting period. These weekly and monthly inspections are considered routine inspections and are documented in observation forms developed for the site. Table 1-1 provides a site activity log, which lists each visitor to the Site and the purpose of the visit. Appendices A and B contain the routine inspection observation forms for the soil cap and sediment cap, respectively. Routine inspections were performed by Clearwater, the operation and maintenance sub-contractor for the site. Site inspections were also performed during monthly site meetings and miscellaneous site visits. The observations from monthly site meetings are documented in the monthly meeting minutes, which are included as Appendix C. Appendix D contains photo documentation. Observations of interest from the routine inspections and monthly site meetings are summarized below. Miscellaneous site visit observations of interest were documented in field notes and emails and are summarized in this report.

1.1 Sediment Cap Observations

The sediment cap was inspected 38 times between January 1, 2007 and December 31, 2007 during routine inspections, miscellaneous site visits, monthly site meetings, construction oversight, and water sampling. Inspections were more frequent during the low-water period from mid-July through October. The following Sections 1.1.1 through 1.1.4 describe sediment cap observations regarding sheen, habitat enhancement features and wildlife, sediment cap features, and vandalism and/or trespassing.

1.1.1 Sheen Observations

Sheen was observed during most site inspections between June 25, 2007 and October 23, 2007. The frequency of site inspections during this period was increased to track and attempt to determine the origin of the sheen. In January 2007, sheen was observed emanating from a log that had washed up on shore. Below are the details regarding the date, location, and description of the sheen for

each sheen occurrence. Locations of the organoclay mats can be viewed in Attachment I – Updated Record Drawings.

- 1/24/2007 – During a monthly site meeting, sheen was observed coming from a treated log, which had washed up on shore, near the south end of the site. The sheen emanated approximately 50 feet along the bank.

- 6/25/2007 – During a routine inspection, continuous bands of sheen were observed extending from the tank farm area to the southern end of the site. The sheen extended out from the shore for more than 10 feet. No source for the sheen could be identified. It did not appear to come from the site.

- 6/26/2007 – During the June monthly site meeting, several areas of sheen were also observed, but not as extensive as the previous day. Small spots and bands of sheen continued to be seen at the southern end of the site at the articulated concrete block edge treatment, along the eastern edge of the organoclay (OC) mat number two, and in Willamette Cove. The most extensive area of sheen was along the eastern edge of OC-2, where sheen had collected in puddles left by the outgoing tide at four locations. On each puddle, the sheen formed a nearly continuous sheet on the surface of the water. The sheen appeared to become increasingly concentrated in the puddles as the water levels continued to drop. At the southern end of the site, the sheen ranged from approximately quarter- to fist-sized in diameter. It was not observed in continuous bands as described during the initial inspection or continuous sheets as found along the OC-2. In Willamette Cove, the sheen also ranged approximately from quarter- to fist-sized. No source for any of the sheens could be identified during the site walk; there was no associated odor; and the sheen was observed only on the surface of the sediment and/or water, not in the underlying soils. To evaluate the nature of the sheen, water samples were collected from the four areas of sheen along the shoreward edge of the OC-2 and from four areas on the riverward side of the mat. The results of the sampling are presented in Attachment C of this O&M Report.

- 6/27/2007 – During the morning of 6/27/2007 there was a high tide and no sheen was visible at the site. In the afternoon water levels were lower and sheen was observed in locations and amounts similar to 6/26/2007. Daily site inspections were recorded from 6/27/2007 to 7/9/2007 as part of environmental monitoring for sediment cap repairs occurring at the site. Sediment cap repairs are discussed in Attachment E of this O&M Report. Inspections were performed in the morning and afternoon.

- 6/28/2007 – During the morning inspection, sheen was observed in wide bands throughout Willamette Cove, under the Burlington Northern Railroad Bridge, and along the outer bank of the embayment. No sheen was present within the embayment, at OC-2 through OC-5 (OC-6 was not yet

installed), or southern portion of the site. During a mid-morning inspection, the sheen appeared to be decreasing. However at 12:30 p.m., the sheen in Willamette Cove appeared to be increasing and coming from off-site to the north, indicating a possible release from offsite to the north of the site. The Oregon Emergency Response System was called and notified of the release. The fire department responded but did not find the sheen to be significant.

- 6/29/2007 – Five small quarter-sized spots of sheen were observed in Willamette Cove, trapped in the articulated concrete block (ACB) voids. Sheen was not observed anywhere else on the site.

- 7/3/2007 – Sheen of varying amounts was observed at several locations. Several small quarter- to fist-sized spots of sheen were observed at the north end of the embayment (near the OC-1 and OC-5), the northern end of the OC-2, and Willamette Cove. Two solid sheets of sheen were also observed shoreward at the south end of OC-2. These sheets were a thin milky film. The two sheets corresponded to two puddles that had formed during the outgoing tide and were about 15 feet x 5 feet in size.

- 7/5/2007 – Three spots of sheen were found trapped in the ACB voids in Willamette Cove. Sheen was also observed in the same areas as on 7/3/2007, but in smaller sizes: quarter-sized spots and 3 feet x 5 feet sheets.

- 7/6/2007 – One quarter-sized spot of sheen was observed in Willamette Cove during the morning inspection, no other sheen was observed on the site during the morning or afternoon inspection.

- 7/9/2007 – 7/9/2007 is the last day of daily beach inspections related to construction activities at the site. On this date, sheen was observed in quarter- to fist-sized spots shoreward of OC-2 at three locations.

- 7/23/2007 – During a routine inspection two 2 inch x 3 inch spots of sheen were observed at the northwest end of Willamette Cove, outside the footprint of the sediment cap.

- 8/6/2007 – Three locations shoreward of OC-2 contained quarter- to fist-sized spots of sheen during a routine inspection.

- 8/17/2007 – Heidi Blischke of GSI Water Solutions, Inc. (GSI) and David Cole of DEQ performed a site visit in an effort to determine the source of the sheen. During the previous sheen observations, it had been noted that generally, sheen was not visible during high tide, but developed as the tide was outgoing, indicating the outgoing tide may be when the sheen was being released. Observations were made from 11:00 a.m. to 5:00 p.m.. Dur-

ing that time, small quarter- to fist-sized sheen was observed at 4:30 p.m. at two locations shoreward of OC-2. Observations from the 8/17/2007 site visit are discussed in Attachment C of this O&M report.

- 8/20/2007 – During a routine inspection, sheen was observed at three locations: south and north of OC-2 and in Willamette Cove. Near the OC mat, the sheen was in bands along the shoreline; in Willamette Cove the sheen were small spots.

- 8/21/2007 – During the August monthly site meeting, one two-inch diameter spot of ebullition-induced sheen was observed at the southern end of the embayment adjacent to Triangle Park. The sheen dissipated by the time it reached the shore and no other sheen was observed. This was the first time in 2007 that ebullition-induced sheen was observed at the site.

- 9/14/2007 – Quarter- to fist-sized spots of sheen were observed at the north end and riverward of OC-2, and at the southern end of the site during a routine inspection.

- 9/21/2007 – During the Fall 2007 water sampling event, one location of ebullition riverward at the northern end of OC-2 was observed to be releasing sheen. The sheen was consistently released each time ebullition occurred, as gas bubbles reached the water surface (as opposed to a single release). E & E and Clearwater installed an additional OC mat to intercept the NAPL being released at this location. Installation of the OC mat, referred to as OC-6, is discussed in Section 3.2 of this attachment.

- 9/27/2007 - Small dime-to-quarter-sized spots of sheen were observed for approximately ten minutes in sand at the northern edge of the OC-2 during sampling to identify the source of the summer sheen releases. The results of this sampling event are discussed in Attachment C of this O&M report.

- 10/23/2007 – Organic sheen was observed in the vicinity of OC-6.

In general, the sheen was observed near OC-2 consistently over a 2 month period. Except for the sheen observed on 1/24/2007 (from a log), 8/21/2007, and 9/27/2007, no source of any of the sheen occurrences could be identified. Sampling events were performed on June 26, 2007 and September 27, 2007 in an effort to identify the source and mechanism. These sampling events are documented in Attachment C of this O&M report. The sheen observed at the site appeared to be a thin film, whitish in color rather than the multi-colored (i.e., rainbow) sheen typically connected with petroleum. On many occasions, the sheen was not readily visible unless viewed from an angle that allowed sunlight to reflect from the sheen to reveal its presence. Figure 1-1 shows general locations of the 18 sheen observations and indicates how many times sheen was observed at each location during the reporting period. Only the sheen that occurred near the

OC mats and perhaps near the OC in Willamette Cove appeared to be from the Site. Because the sheen was observed only from June to approximately September, the site should be closely monitored during this time period next year to determine if it is a seasonal occurrence or a one time event due to conditions present in 2007. DEQ followed up with the Port of Portland and the Lower Willamette Group regarding the sheen that originated from Willamette Cove across the cove from the M&B sediment cap.

1.1.2 Habitat Enhancement Features and Wildlife

As part of the sediment cap construction, habitat enhancement features such as boulder clusters and sand cover were installed. This section provides observations regarding the condition of installed habitat features, as well as features that have developed since 2004, which also enhance habitat, such as large woody debris. Observations for this section were made on September 14, 2007. Figure 1-2 shows the distribution of sand and woody debris along the shoreline and the location of wildlife paths that were installed in September 2007.

As indicated on Figure 2-2, sand cover remains over a large portion of the north end of the site, with only a small gap and narrow band where ACB is exposed. Towards the southern end of the site the bank slope is steeper, and a greater amount of the ACB is exposed. Sand washes away and/or becomes deposited on site with the ingoing and outgoing tides, seasonal changes in river levels, and wave action from marine vessels. Compared to previous years, sand appears to be accumulating heavily on the eastern side of the reef that forms the embayment. Sand also accumulates noticeably at the north end of the shoreline near the Burlington Northern Railroad Bridge.

Large woody debris has accumulated along the entire length of the shoreline. The majority of the woody debris has been deposited during high water levels near the top of ACB. Three areas of the site accumulate woody debris at a greater rate than the remainder of the site: the southern end of the site, at the location where the shoreline curves to the west, and at the northern end of the site near the Burlington Northern Railroad Bridge.

Boulder clusters remain in place as indicated on the record drawings.

In May 2007, a neighborhood resident walking along the shoreline discovered two small goslings that had become trapped in the ACB voids. After the incident was reported to DEQ, E & E was directed to inspect the shoreline and identify goose travel paths between upland areas and the river that could potentially cross ACB voids. At that time, E & E addressed three routes (as evidenced by the presence of tracks in the sand) by placing additional sand in the ACB voids to create more level pathways. The area where the goslings were found was in a wider area of exposed ACB that was not practical to address at the time. It was determined during the May monthly meeting that additional travel paths would be created during the summer using gravel. The paths were constructed at the end of September

2007 at four locations indicated on Figure 2-2. Four-inch minus gravel was chosen to construct the paths because it would not wash away with tides as easily as sand. The paths were constructed using heavy equipment that placed the gravel from the top of ACB down to an elevation of approximately 15 ft NAVD. The end-points for the lower elevation of the paths were based on the normal high water level during the months of April and May, at the request of National Marine Fisheries Service (NMFS). The paths are approximately 5 feet wide and vary in length.

Numerous different wildlife species have been observed at the site throughout the reporting period. The most evident species present along the shoreline portion of the sediment cap are various birds including Canada geese, common crows, pigeons, blue herons, and osprey. Bald eagles have also been observed at the site. Within the river small fish, clams, and crayfish are commonly found. The upland portion provides habitat for rabbits, ground squirrels, and possibly other rodents in addition to nesting and foraging areas for water fowl. A sea lion and potentially nutria have also been observed at the site

Several instances of animal burrows were observed at the site. Most of the burrows were located in upland portions of the site and are discussed in Section 2.2.1. However, one burrow was found at the top of the ACB near the south end of the site. In this location, the animal burrowed through the turf reinforcement matting. The burrow was filled with gravel by Clearwater, but was re-excavated by the animal to a depth of approximately 2 feet 4 inches. Based on the proximity of the burrow to water, the size of rock that was re-excavated, and an unconfirmed observation of nutria in the vicinity; it is likely the burrow was created by nutria. Nutria burrows typically can extend in length from 3 to 18 feet. No aggressive action to remove burrowing animals or fill burrows appears necessary at this time. However, E & E recommends continued monitoring of burrow activity, and if nutria activity increases, anchoring of a section of fencing over and around burrow locations may be warranted.

1.1.3 Sediment Cap Features

In addition to documenting sheen and habitat conditions at the site, inspections also document visible changes in the sediment cap features. Generally the sediment cap remains unchanged. Difference image analysis conducted by David Evans and Associates, Inc. (DEA), and discussed in detail in Attachment E of this O&M report, indicates a stable surface with no extreme cases of deepening or shoaling of the cap. During site inspections, several broken ACB blocks have been observed. It is likely the blocks were broken during high water when a log may have become lodged in the blocks. Also during routine inspections and monthly meetings, several gaps between ACB mat seams were noted. These gaps were monitored during later inspections and, as warranted, grouted in September 2007.

Five buoys are deployed at the site to warn mariners of underwater hazards; two are located in Willamette Cove and three are located along the site shoreline. During this reporting period, three of the buoys were moved from initial positions by high river levels and debris catching on the anchor lines. West Coast Marine Cleaning, Inc. (WCM) was employed to re-locate the buoys once river levels and the amount of floating debris had decreased, on March 21, 2007. In late 2007, buoys were once again pushed downstream from initial positions during high river flow; WCM re-positioned the buoys on January 8, 2008 (note that the re-positioning by WCM occurred after the reporting period, but the shifting of the buoys due to river flow occurred before the end of 2007).

1.1.4 Vandalism and Trespassing

The shoreline along the site and in Willamette Cove is accessible to the public via walking paths and is often used by community members for recreation. However, throughout the reporting period trash and graffiti were left at the site and in Willamette Cove and in June 2007 a transient shelter, built using woody debris from the site, was discovered among the large woody debris. During subsequent inspections no occupants were ever observed. The shelter was left in place because it posed no threat and was built from debris that had washed ashore. During high river levels it will likely be washed away.

1.2 Soil Cap Observations

The soil cap was inspected 23 times between January 1, 2007 and December 31, 2007 during routine inspections, miscellaneous site visits, and monthly site meetings. The following Sections 2.2.1 through 2.2.2 describe soil cap observations regarding wildlife, and vandalism and/or trespassing.

1.2.1 Wildlife

During the reporting period the site has been inhabited by rabbits, squirrels, Canada geese and other various birds, and coyote. Animal burrows were observed at several locations in the southwest corner of the site during inspections. Concern was raised that the burrowing animals may compromise the integrity of the soil cap.

An investigation of the burrowing activity at the site was conducted to assess the extent of existing burrows in the southwestern corner of the upland fenced area. Two burrow holes were observed on August 3, 2007 in opposite corners of the retention pond area. Bait stations to collect foot prints were set on evening of August 24, 2007 by dusting a 2 foot by 2 foot square area with flour to a depth of 1/4 inch and placing peanut butter in the center. The sites were revisited the following morning and observations of tracking were made by collecting photos and measurements of foot prints. The bait stations and surface clearings captured tracks from a coyote or dog, several from rabbits and a common cat. The cat tracks were most prominent at the bait station and on the spoil pile from the large burrow in the south corner of the storm water holding area.

The burrows were excavated on September 19, 2007 using a shovel and hand removal. The burrow in the south corner of the retention pond had a diameter of 6 inches and reached a maximum depth of 1 foot 6 inches with a total horizontal length of approximately 6 feet before terminating at a dead end. In the north corner of the retention pond a burrow with a diameter of 3 inches reached a maximum depth of 9 inches as it traveled from entrance to exit staying relatively parallel to the surface. The total length of the burrow was 5 feet. Several cottontail rabbits were sighted on the site in the upland fenced area and in the vegetation above the ACB.

Cottontails occurring in this area typically do not dig their own burrows; they utilize those made by other animals such as ground squirrels, coyotes, etc. It is unclear what mammal dug the burrow in the south corner of the storm water holding area, although it appears that rabbits or a cat may have been using it. Ground squirrels are common to the area and have created the burrow in the north corner of the storm water holding area. Their burrows typically extend from 1 to 3 feet underground, although there are unconfirmed instances of burrowing down much further where large colonies inhabit a burrow network (Larsen, 2007). They prefer hillsides and low earth banks, sometimes using structures such as trees and boulders for cover.

A study conducted on the effect of rodent burrowing on a sediment cap over a contaminated dried lake bed found that the rodents and plants compromised the integrity of the cap (Anderson, 2007). The management recommendation addresses the vegetation growing over the surface of the cap. If there is food for the rodents, they will inevitably seek it out and inhabit the area. Studies show that rodenticide is effective for killing the rodents but their burrows can be easily reinhabited. Destroying the burrows wasn't shown to be an effective way of deterring rodent activity (UC IPM, 2007).

In summary, future burrow activity should be monitored through periodic site inspections. If significant burrow activity is observed, additional investigation into the depth of burrows, which animals are creating and inhabiting the burrows, and whether they threaten the function of the site cap may be warranted. In particular signs of nutria should be looked for. No aggressive action to remove burrowing animals or fill burrows appears necessary at this time.

1.2.2 Vandalism and Trespassing

Entrance to the site and the adjacent Metro property to the north is through a gate on North Edgewater road. The gate is locked with a series of locks for the two railroads, DEQ, and other city agencies that at times require access to this area. Throughout the reporting period the locks and chain on the North Edgewater gate were cut numerous times. In some instances it is assumed the locks were cut by a legitimate agency needing access to the area, but that did not have the combina-

tion or key to the locks. In other instances the locks were cut by people looking to gain vehicle access to Willamette Cove and/or dump trash. These breaches of North Edgewater did not directly affect the site since the site is contained by its own security fencing.

During the reporting period, there were two instances of breaches to the site security fencing. One occurred when someone cut a hole in the security fencing surrounding the office trailers. Observations the next day indicated they gained access to the site but did not do any damage to the site facilities. Trash and broken glass was left near the hole in the fence and against the shop building. The fence was repaired and trash picked up by Clearwater. The second instance was first observed during a routine site visit by Clearwater. When Clearwater arrived onsite, the northwest entrance gate was open and the chain which had previous secured it was cut. Tire tracks were observed on the soil cap along the northern edge of the site. While on the soil cap the vehicle drove over irrigation piping causing damage. No other damage to the site was observed. It was later discovered that a tree had fallen on power lines, and the power company gained access to the site to repair the power line. DEQ developed an informational paper to provide to utilities, Police, fire, and other parties. Also, the Site locks were replaced with heavy duty security locks/chains.

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2 Maintenance Activities

Maintenance activities were performed by E & E's subcontractor, Clearwater. Activities ranged from weekly maintenance of pumps and regulators to non-routine tasks such as fence repairs and OC mat installation. In addition to Clearwater, non-routine maintenance activities were performed by Moen Machinery Company, the City of Portland, Ampere Electric, Equipco Services, Advanced American Construction, and NRC Environmental Services. The following section discusses regular maintenance tasks and non-routine tasks that occurred from January 1, 2007 through December 31, 2007. During the reporting period, site support services such as phone service, solid waste, and waste water were provided by Qwest, Verizon, Trashco Services, and Schultz Clearwater Sanitation.

2.1 Routine Maintenance

On a regular basis, Clearwater performed maintenance on the pumps, compressor, regulators, lines, the oil interface meter used to perform NAPL gauging and extraction, and site vehicle (Kubota). Regular maintenance is crucial for keeping the equipment in proper working order, and avoiding delays due to faulty equipment. During the reporting period, the oil interface meter was sent to Equipco Services for repair of the wiper blade. The wiper blade's function is to clean the measuring tape before it is spooled back into the reel; over time the blade becomes clogged with debris and requires cleaning for proper spooling. Moen Machinery Company provides maintenance services for the site vehicle. During the reporting period the site vehicle received a new fuel pump, windshield latches, and the recommended annual inspection and maintenance. A blend of bio-diesel was originally used as the fuel for the site vehicle; however, during the annual inspection Moen Machinery recommended that bio-diesel not be used to increase the life of the fuel system.

2.2 Non-routine Maintenance Activities

In addition to routine maintenance, Clearwater and other service providers also performed non-routine maintenance activities resulting from site observations and meetings. The activities and service providers are summarized below.

Clearwater removed treated timbers that had washed up along the shoreline during high water to minimize the potential for these timbers to contaminate site sediments. The first removal occurred on January 11, 2007 and the second re-

moval occurred from September 19, 2007 through September 25, 2007. During the January removal, Clearwater used a skid steer to load timbers into a dump truck and disposed of them at the Hillsboro Landfill. The timbers removed were generally located near the base of the access road at the northern end of the shoreline and were easily accessible. During the September removal, treated timbers were removed from various locations along the shoreline. Clearwater used an excavator to move the timbers to an area near the north shoreline access road. They then used a chainsaw to cut the larger timbers into sections. A loader was used to stockpile the timbers near the site support facilities until they were loaded into a dump truck and disposed of at the Hillsboro Landfill.

An irrigation system and pressure reducing valve were installed at the site in 2006 by the City of Portland, through an agreement with DEQ. During the winter, the system was turned off and drained to prevent freeze damage, and the pressure reducing valve was removed from the fire hydrant and stored in the shop. In March 2007, the pressure reducing valve was re-installed by Clearwater and the irrigation system was re-commissioned by the City of Portland. The City performed inspections along the system to check for freeze or other damage, repaired any damage, and began operating the system when weather conditions warranted irrigation. In September 2007, the irrigation system was again de-commissioned and the pressure reducing valve was removed.

The support facility area is illuminated at night by an overhead security light located near the shop building. The light utilizes a photocell that automatically turns the light on and off depending on the time of day. The photocell began malfunctioning and causing the light to either remain on during the day or fail to turn off at night. Ampere Electric was retained to perform the repair work for the light. In addition to replacing the broken photocell, Ampere also lowered the photocell to within approximately 15 feet of the ground. Previously the photocell was mounted at the top of the light pole and required the rental of a scissor lift each time a repair was needed. The new photocell was installed on June 15, 2007.

As discussed in Attachment C of the 2006 O&M Report (E & E 2007), several areas of the sediment cap where identified as being deficient in rock armoring. From June 26, 2007 through July 11, 2007 additional rock armoring placement and diver inspections were performed. Six inch minus rock armoring was placed at five locations, and 10 inch minus rock armoring was placed at one location within the embayment. Three additional areas were inspected by divers, but were not found to require additional rock placement. Refer to Attachment E of this O&M report for details regarding the construction activities including placement methods, material volume and sources, environmental monitoring, and photo documentation. In September 2007, DEA performed a topographic survey of the embayment to better reflect river bottom elevations following the placement of rock armor in this area. Survey results are depicted in the updated record drawing for sediment cap features (Attachment I to this 2007 O&M Report).

Fence repairs were required twice during the reporting period. In one area along the eastern edge of the site, the clamps securing the fence to the support post had been removed and the bottom of the fence fabric was propped up by a piece of wood. Clearwater re-secured the fence fabric to the post with clamps and removed the wood that propped the fence up. Also, on the eastern edge of the site, a previous fence patch failed after the wire ties used to make the repair rusted and broke. This area was repaired by weaving a new piece of fence fabric over the hole. Weaving in a new piece of fabric ensures the repair will not rust and fail in the future.

On September 23, 2007, E & E was onsite performing surface water, inter-armoring water, and sub-armoring water sampling. During sampling activities, E & E observed a gas ebullition releasing sheen along the riverward edge of OC-2. The amount of sheen was continuous and significant enough that DEQ requested an additional section of OC mat be installed immediately (OC-6). A 20 feet x 15 feet section of mat was installed at the site as indicated on the record drawings in Attachment I of the O&M Report. Prior to placing the mat, Clearwater used the bucket of an excavator, previously onsite for other maintenance purposes, to smooth out the river bottom in the area. The mat was then installed, a thin layer of sand was placed over the mat and then rock armoring was placed on top. During the installation, water levels rose and became too high for the excavator to complete placing the rock armoring over the mat. At a later date, when water levels were again low, additional rock and ACB blocks were placed on the mat to ensure it was well anchored. The corners of the mat were surveyed by DEA; the surveyor was already onsite to document locations for the water sampling that was occurring.

Waste materials that had accumulated at the site in the course of operations, including NAPL extracted from wells, wastewater generated in the course of groundwater monitoring, and solid waste generated during NAPL collection and measurement activities, were removed from the site for off-site disposal by NRC Environmental Services on November 27, 2007. A total of 13 drums of wastewater, 11 drums of NAPL, and 8 solid waste totes were removed for disposal as hazardous waste. Documentation for disposal activities is provided in Appendix E.

Two drums were found to have washed onto the shore of the site from the Willamette River in October 2007. The contents of the drums were unknown, although one was labeled as containing acid salts. Clearwater moved these drums to the covered storage area and sampled the drums on December 17, 2007 to characterize the drums for disposal. Laboratory analytical results indicated that the contents were non-hazardous, and disposal is anticipated to take place in 2008.

Other miscellaneous maintenance activities that occurred during the reporting period include: placing new security chains and keyed locks on all perimeter gates,

placing lock boxes inside the southeast and northwest corner gate entrances, repair of monitoring well exterior covers, grouting of gaps in the ACB seams which had been observed during routine inspections, cutting stainless steel loops from the ACB that were exposed during low water, stapling exposed edges of turf reinforcement mat that were disturbed during heavy equipment operation, and replacing all monitoring well locks and coating them with a sealant to prevent rusting.

3 Summary

During the reporting period, sheen was regularly observed from approximately late June to October, but not observed during the remainder of the period. Two sampling events were performed in an effort to identify the source or release mechanism for the sheen. The site should be closely monitored in 2008 when river levels begin to drop to determine if the sheen occurrence is a seasonal event or the result of site conditions unique to 2007.

In general, sediment and soil cap inspection revealed little change or areas of concern. Sand cover remains over much of the shoreline, and there are significant amounts of large woody debris that have accumulated along the shoreline and create habitat for wildlife. Wildlife commonly seen at the site include Canada geese, blue heron, osprey, bald eagles, squirrels, and rabbits; also occasionally seen are sea lions and coyotes. Community members use the shoreline frequently for recreation, most commonly walking dogs, but a few instances of intentional destruction to the site (e.g., fence damage) and littering have occurred.

Site inspections and observation resulted in several non-routine maintenance activities in addition to routine activities. Non-routine activities included: fence repairs, OC mat installation, treated timber removal, grouting gaps in the ACB, cutting stainless steel ACB cable loops, repair of turf reinforcement mat, operating the irrigation system, repair of the overhead security light, placing additional rock armoring, and replacing monitoring well locks.

It is anticipated that site inspections and maintenance activities will continue as described in the Draft O&M Plan (DEQ 2007).

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4 References

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Figures

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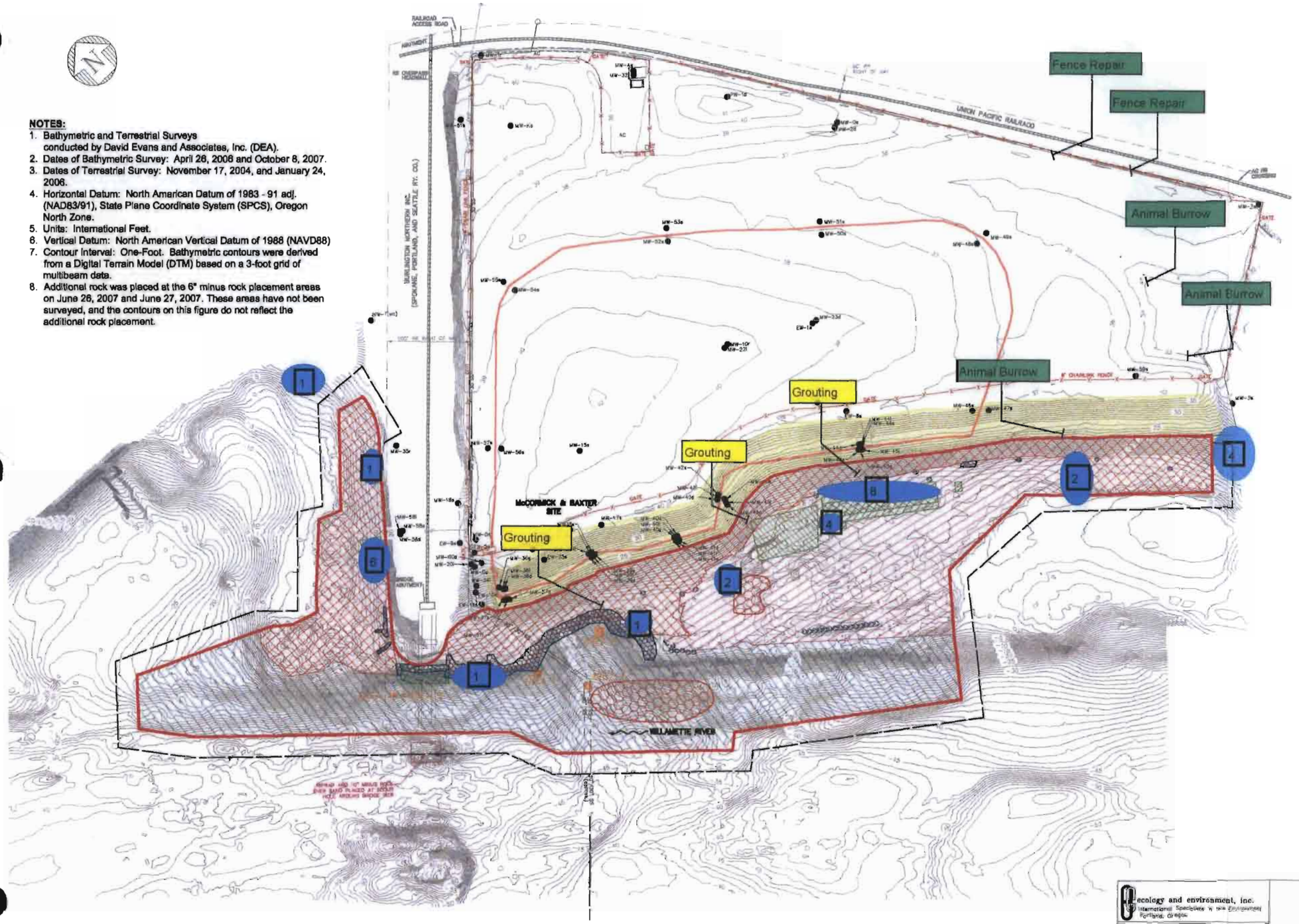
CAD ON SEANAS\Engineering Documents\McCORMICK & BAXTER\BASEMAP

NOTES:

1. Bathymetric and Terrestrial Surveys conducted by David Evans and Associates, Inc. (DEA).
2. Dates of Bathymetric Survey: April 26, 2006 and October 8, 2007.
3. Dates of Terrestrial Survey: November 17, 2004, and January 24, 2006.
4. Horizontal Datum: North American Datum of 1983 - 91 adj. (NAD83/91), State Plane Coordinate System (SPCS), Oregon North Zone.
5. Units: International Feet.
6. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
7. Contour Interval: One-Foot. Bathymetric contours were derived from a Digital Terrain Model (DTM) based on a 3-foot grid of multibeam data.
8. Additional rock was placed at the 6" minus rock placement areas on June 26, 2007 and June 27, 2007. These areas have not been surveyed, and the contours on this figure do not reflect the additional rock placement.



LEGEND:

- PROPERTY LINE
- DSL EASEMENT (#31530-EA)
- ELEVATION CONTOUR (FT. NAVD 88)
- SS — HIGH PRESSURE SEWER LINE
- STM — STORM SEWER
- FENCE
- GRAVEL ACCESS ROAD
- SUBSURFACE BARRIER WALL
- SEDIMENT CAP BOUNDARY
- BOULDER CLUSTERS/ROCK MOUND
- RIPRAP ARMOR
- ORGANOCLAY MAT (DOUBLE LAYER)
- ORGANOCLAY MAT (SINGLE LAYER)
- GRANULAR ORGANOCLAY
- HOT SPOT TREATMENT (THICKENED SAND LAYER)
- ARTICULATED CONCRETE BLOCK
- 6-INCH MINUS ROCK ARMOR
- 10-INCH MINUS ROCK ARMOR
- TURF REINFORCEMENT MAT PLACED OVER EARTHEN CAP
- ADDITIONAL 6-INCH MINUS ROCK PLACEMENT AREA
- 1 SHEEN OBSERVATIONS (NUMBER IN BOX REPRESENTS THE NUMBER OF OCCURRENCES OF SHEEN AT A GIVEN LOCATION.)

SCALE IN FEET: 1" = 120'
0 120 240 360

ecology and environment, inc.
International Specialists in the Environment
Portland, Oregon

DESIGNED BY: C. NANCARROW
CHECKED BY: E. WHITE
DRAWN BY: T. LEHN
APPROVED BY: A. WHITMAN

FIGURE 1-1
SITE OBSERVATION SUMMARY
Sitewide Record Drawings
McCormick & Baxter Superfund Site
Portland, Oregon

SCALE: NOTED | DATE ISSUED: 01-24-08 | DWG FILE NO: SitewideDrawings_CW130.dwg

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Not to Scale

McCORMICK AND BAXTER
CREOSOTING COMPANY SITE
Portland, Oregon

Figure 1-2
HABITAT ENHANCEMENT CONDITIONS
SEPTEMBER 14, 2007

Date:	Drawn by:	
3/6/08	AES	10:002688OY2809\fig 1-2

Tables

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Table 1-1
McCormick and Baxter Creosoting Company Superfund Site, Portland, Oregon
Site Activity Log 2007

Date	Time In	Time Out	Name	Name of Company, Agency, or Organization	Purpose of Visit
1/2/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
1/4/2007	11:45	14:30	Newt Linn	Clearwater Environmental Services	Pump and site maintenance
1/8/2007	12:30	14:30	Newt Linn	Clearwater Environmental Services	Purchase supplies to remove bailer from MW-37d
1/9/2007	9:30	15:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
1/10/2007	11:40	13:15	Newt Linn	Clearwater Environmental Services	Pump maintenance, supplies for bailer removal from MW-37d, locate skid steer for log removal.
1/11/2007	8:15	19:20	Newt Linn	Clearwater Environmental Services	Log removal with skid steer
1/15/2007	7:45	10:15	Bryan Ciecko	Ecology and Environment, Inc.	Bailer removal from MW-37d
1/15/2007	7:45	9:15	M. Shields	Locates Down Under	Bailer removal from MW-37d
1/15/2007	7:45	9:15	B. Rountree	Locates Down Under	Bailer removal from MW-37d
1/18/2007	7:30	15:30	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
1/24/2007	7:00	13:00	Newt Linn	Clearwater Environmental Services	Monthly site inspection meeting
1/24/2007	9:00	14:00	John Montgomery	Ecology and Environment, Inc.	Monthly site inspection meeting
1/24/2007	9:00	14:00	Kevin Parrett	Dept. Environmental Quality	Monthly site inspection meeting
1/24/2007	9:00	14:00	Steve Campbell	Dept. Environmental Quality	Monthly site inspection meeting
1/30/2007	13:23	15:13	Andy Uhrig	Ecology and Environment, Inc.	Install Transducer
2/3/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
2/3/2007	9:00	15:00	George Christie	Clearwater Environmental Services	Gauging and extraction activities
2/6/2007	7:00	16:00	Newt Linn	Clearwater Environmental Services	Site maintenance, drum consolidation
2/6/2007	8:30	11:30	George Lukert	Ecology and Environment, Inc.	Drum consolidation
2/8/2007	9:50	14:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
2/9/2007	7:00	14:30	Newt Linn	Clearwater Environmental Services	Kubota, pump, and pulse meter maintenance
2/13/2007	6:30	14:30	Newt Linn	Clearwater Environmental Services	Low tide groundwater gauging event, first quarter
2/13/2007	7:30	13:00	Andy Uhrig	Ecology and Environment, Inc.	Low tide groundwater gauging event, first quarter
2/13/2007	7:30	13:00	Lenna Cope	Ecology and Environment, Inc.	Low tide groundwater gauging event, first quarter
2/16/2007	8:30	14:30	Newt Linn	Clearwater Environmental Services	Extraction activities
2/20/2007	14:30	17:30	Newt Linn	Clearwater Environmental Services	Soil cap inspection
2/21/2007	7:00	13:00	Newt Linn	Clearwater Environmental Services	Sediment cap inspection, Monthly site inspection meeting
2/21/2007	9:00	15:15	John Montgomery	Ecology and Environment, Inc.	Monthly site inspection meeting
2/21/2007	9:00	14:30	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
2/21/2007	9:00	15:15	Kevin Parrett	Dept. Environmental Quality	Monthly site inspection meeting
2/21/2007	12:00	15:15	Steve Campbell	Dept. Environmental Quality	Monthly site inspection meeting
2/22/2007	9:30	14:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
2/23/2007	9:00	14:00	Newt Linn	Clearwater Environmental Services	Pump, meter, and site maintenance
2/28/2007	7:55	10:45	Bryan Ciecko	Ecology and Environment, Inc.	MW59 Sampling
2/28/2007	8:00	10:45	Lenna Cope	Ecology and Environment, Inc.	MW59 Sampling
3/1/2007	6:45	14:45	Newt Linn	Clearwater Environmental Services	Gauging, extraction, and irrigation system repair
3/2/2007	6:45	13:45	Newt Linn	Clearwater Environmental Services	Pump, shop, and Kubota maintenance
3/5/2007	7:00	13:30	Newt Linn	Clearwater Environmental Services	Gauging activities
3/6/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Pump and site maintenance
3/9/2007	13:15	15:15	Lenna Cope	Ecology and Environment, Inc.	Prepare for spring 2007 sampling
3/9/2007	17:00	17:15	Lenna Cope	Ecology and Environment, Inc.	Meet Test America courier to deliver sampling bottles
3/12/2007	7:30	17:07	Lenna Cope	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/12/2007	10:00	14:30	Newt Linn	Clearwater Environmental Services	Site maintenance, assist with sampling equipment
3/12/2007	10:12	16:08	Angela Bice	Oregon State University	Start push pull test on MW-62i
3/12/2007	7:30	18:08	Bryan Ciecko	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/13/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Gauging activities
3/13/2007	7:30	17:00	Lenna Cope	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/13/2007	7:30	17:00	Lucas Meek	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/14/2007	7:00	17:00	Lenna Cope	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/14/2007	7:05	17:12	Bryan Ciecko	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/14/2007	8:30	15:00	Newt Linn	Clearwater Environmental Services	Extraction activities
3/15/2007	7:00	10:30	Bryan Ciecko	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/15/2007	7:10	18:30	Lenna Cope	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/15/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Pick up site supplies, pump and pulse regulator maintenance
3/16/2007	7:00	17:45	Lenna Cope	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/16/2007	7:00	17:45	Lucas Meek	Ecology and Environment, Inc.	Spring 2007 surface, inter-armoring, sub-armoring water sampling
3/19/2007	8:11	10:47	Andy Uhrig	Ecology and Environment, Inc.	Prepare site inventory, engrave equipment with DEQ identification
3/19/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities, assist Angela Bice
3/19/2007	10:20	14:40	Angela Bice	Oregon State University	Start Push Pull MW-45S and sample MW-62i
3/20/2007	7:00	14:00	Newt Linn	Clearwater Environmental Services	Soil cap inspection, sediment cap inspection, compressor maintenance
3/21/2007	7:00	13:00	Newt Linn	Clearwater Environmental Services	Monthly site inspection meeting
3/21/2007	9:00	14:15	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
3/21/2007	9:00	14:15	John Montgomery	Ecology and Environment, Inc.	Monthly site inspection meeting
3/21/2007	9:00	14:15	George Lukert	Ecology and Environment, Inc.	Monthly site inspection meeting
3/21/2007	9:00	14:15	Kevin Parrett	Dept. Environmental Quality	Monthly site inspection meeting
3/22/2007	9:30	14:30	Newt Linn	Clearwater Environmental Services	Site maintenance, pick up supplies for site
3/24/2007	12:45	13:07	Angela Bice	Oregon State University	Sample wells MW-62i and MW-45s
3/26/2007	7:00	13:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
3/28/2007	8:45	14:00	Newt Linn	Clearwater Environmental Services	Install pressure reducer for irrigation system, site maintenance
4/2/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
4/4/2007	8:45	13:05	Newt Linn	Clearwater Environmental Services	Cut ACB cables, pump maintenance
4/4/2007	13:43	15:00	Lenna Cope	Ecology and Environment, Inc.	Site tour for Sienna Hill senior thesis project at University of Oregon
4/4/2007	13:43	15:00	David Cole	Dept. Environmental Quality	Site tour for Sienna Hill senior thesis project at University of Oregon
4/4/2007	13:43	15:00	Sienna Hill	University of Oregon	Site tour for senior thesis project
4/5/2007	13:30	15:00	Rick Shiga	University of Oregon	Site tour for senior thesis project
4/9/2007	7:00	15:00	Schultz Clearwater	Schultz Clearwater	Empty wastewater tank
4/9/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Meter maintenance, gauging and extraction activities
4/10/2007	9:15	14:15	Newt Linn	Clearwater Environmental Services	Pump and Kubota maintenance
4/10/2007	9:15	11:00	Kiara Smith	Portland State University	Sampling from wells, push-pull experiment regarding anaerobic degradation of PAHs
4/16/2007	8:30	13:30	Newt Linn	Clearwater Environmental Services	Soil cap inspection, sediment cap inspection
4/17/2007	7:00	12:20	Newt Linn	Clearwater Environmental Services	Monthly site inspection meeting
4/17/2007	8:35	12:15	John Montgomery	Ecology and Environment, Inc.	Monthly site inspection meeting
4/17/2007	8:50	16:12	George Lukert	Ecology and Environment, Inc.	Monthly site inspection meeting
4/17/2007	9:50	16:12	Kevin Parrett	Dept. Environmental Quality	Monthly site inspection meeting
4/17/2007	9:00	15:27	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
4/17/2007	12:30	16:15	Heidi Blischke	GSI Water Solutions, Inc	Monthly site inspection meeting
4/17/2007	12:30	16:15	S. Fleming	Ridolfi	Monthly site inspection meeting
4/18/2007	1:00	14:30	Angela Bice	Oregon State University	Sample wells MW-62i and MW-45s
4/19/2007	7:00	18:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
4/20/2007	7:00	17:50	Newt Linn	Clearwater Environmental Services	Prepare and freeze NAPL for water content calculations
4/23/2007	7:00	15:10	Newt Linn	Clearwater Environmental Services	Performed water content calculations
4/23/2007	8:45	10:15	Lenna Cope	Ecology and Environment, Inc.	Performed water content calculations, area light repair
4/23/2007	9:00	10:00		Ampere Electric	Area light repair
4/23/2007	9:00	10:00		Ampere Electric	Area light repair
4/24/2007	7:00	15:30	Newt Linn	Clearwater Environmental Services	Site maintenance, pump maintenance
4/25/2007	12:00	13:20	Angela Bice	Oregon State University	Sample wells MW-62i and MW-45s
4/25/2007	7:00	15:12	Newt Linn	Clearwater Environmental Services	Measure melted NAPL for water content calculations, cleaned supplies
4/26/2007	11:00	13:00	Newt Linn	Clearwater Environmental Services	Operations & Maintenance
4/30/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Gauging and extraction activities
4/30/2007	7:00	15:00	Ryan Munson	Clearwater Environmental Services	Gauging and extraction training
5/1/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Operations & Maintenance
5/1/2007	7:00	15:00	Ryan Munson	Clearwater Environmental Services	Operations & Maintenance
5/3/2007	11:30	15:00	Newt Linn	Clearwater Environmental Services	Operations & Maintenance

Table 1-1
McCormick and Baxter Creosoting Company Superfund Site, Portland, Oregon
Site Activity Log 2007

Date	Time In	Time Out	Name	Name of Company, Agency, or Organization	Purpose of Visit
5/7/2007	9:30	16:30	Newt Linn	Clearwater Environmental Services	Operations & Maintenance
5/7/2007	11:30	16:30	Ryan Munson	Clearwater Environmental Services	Operations & Maintenance
5/8/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Operations & Maintenance
5/8/2007	10:30	13:30	Lenna Cope	Ecology and Environment, Inc.	Create geese pathways over three areas of ACB
5/8/2007	10:30	13:30	Jonathan Russell	Ecology and Environment, Inc.	Create geese pathways over three areas of ACB
5/9/2007	9:30	11:00	Angela Bice	Oregon State University	Sample wells MW-62i and MW-45s
5/9/2007	11:30	13:35	Eric White	Ecology and Environment, Inc.	site walk and armor repair discussions
5/9/2007	11:30	13:35	John Montgomery	Ecology and Environment, Inc.	site walk and armor repair discussions
5/9/2007	11:30	12:20	Mike Johns	Advanced American Construction	site walk and armor repair discussions
5/9/2007	11:30	12:20	Jake Duyek	Advanced American Construction	site walk and armor repair discussions
5/9/2007	11:30	17:40	Kevin Parrett	Department of Environmental Quality	site walk and armor repair discussions
5/9/2007	11:30	12:30	Steve Campbell	Department of Environmental Quality	site walk and armor repair discussions
5/10/2007	13:30	15:00	Ryan Munson	Clearwater Environmental Services	Operations & Maintenance
5/10/2007	13:30	15:00	Newt Linn	Clearwater Environmental Services	Operations & Maintenance
5/14/2007	8:30		Ryan Munson	Clearwater Environmental Services	Operations & Maintenance
5/14/2007	8:00		Newt Linn	Clearwater Environmental Services	Operations & Maintenance
5/16/2007	8:45	14:30	Lenna Cope	Ecology and Environment, Inc.	Monthly site inspection meeting
5/16/2007	8:45	14:30	John Montgomery	Ecology and Environment, Inc.	Monthly site inspection meeting
5/16/2007	8:45	14:30	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
5/16/2007	8:45	14:30	Kevin Parrett	Department of Environmental Quality	Monthly site inspection meeting
5/16/2007	9:45	10:45	Kiara Smith	Portland State University	IGERT sampling
5/18/2007	8:30	13:30	Newt Linn	Clearwater Environmental Services	Operations & Maintenance
5/21/2007	10:30	15:30	Ryan Munson	Clearwater Environmental Services	NAPL gauging and extraction
5/21/2007	10:30	15:30	Newt Linn	Clearwater Environmental Services	Operations & Maintenance
5/22/2007	10:30	11:30	Angela Bice	Oregon State University	IGERT sampling
5/30/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	NAPL gauging and extraction
5/30/2007	7:00	14:30	Jim Schiller	City of Portland	Work on irrigation lines
5/30/2007	11:30	11:50	Richard Brown	City of Portland	Look for water meter to address possible water leak
5/31/2007	10:30	11:30	Lenna Cope	Ecology and Environment, Inc.	Site visit to address possible water leak
5/31/2007	10:30	10:35	Thomas Gogas	City of Portland	Site visit to address possible water leak
6/1/2007	12:00	14:30	Newt Linn	Clearwater Environmental Services	Operations & Maintenance, fix irrigation system, install visitor sign
6/4/2007	8:00	15:00	Newt Linn	Clearwater Environmental Services	NAPL gauging and extraction
6/8/2007	14:10	16:05	George Lukert	Ecology and Environment, Inc.	Site visit and orientation
6/8/2007	14:10	16:05	Tim Adair	Ecology and Environment, Inc.	Site orientation
6/11/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	NAPL gauging and extraction
6/15/2007	10:00	11:15	Ed Wilson	Ampere Electric	lower area light photocell
6/18/2007	7:30	15:00	Newt Linn	Clearwater Environmental Services	Site wide low-tide gauging, NAPL gauging and extraction
6/18/2007	8:52	13:52	Bryan Ciecko	Ecology and Environment, Inc.	Site wide low-tide gauging
6/18/2007	9:00	14:00	Lenna Cope	Ecology and Environment, Inc.	Site wide low-tide gauging
6/19/2007	8:00	15:30	Newt Linn	Clearwater Environmental Services	Operations &Maintenance
6/21/2007	12:55	16:45	George Lukert	Ecology and Environment, Inc.	Collect background turbidity samples and download transducers
6/21/2007	12:55	16:45	Lenna Cope	Ecology and Environment, Inc.	Collect background turbidity samples and download transducers
6/22/2007	16:00	17:30	Lenna Cope	Ecology and Environment, Inc.	Collect background turbidity samples
6/25/2007	7:00	15:30	Ryan Munson	Clearwater Environmental Services	Sediment and soil cap inspection
6/25/2007	7:00	15:30	Newt Linn	Clearwater Environmental Services	Sediment and soil cap inspection
6/26/2007	7:00	12:00	Newt Linn	Clearwater Environmental Services	Monthly site inspection meeting
6/26/2007	8:45	13:10	John Montgomery	Ecology and Environment, Inc.	Monthly site inspection meeting
6/26/2007	9:05	17:15	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
6/26/2007	8:45	16:15	Kevin Parrett	Department of Environmental Quality	Monthly site inspection meeting
6/26/2007	9:00	17:30	Lenna Cope	Ecology and Environment, Inc.	Monthly site inspection meeting; begin rock placement oversight
6/27/2007	7:00	16:17	Lenna Cope	Ecology and Environment, Inc.	Placement of additional rock armoring oversight
6/28/2007	7:00	15:15	Lenna Cope	Ecology and Environment, Inc.	Placement of additional rock armoring oversight
6/28/2007	10:00	12:30	Kevin Parrett	Department of Environmental Quality	Site visit
6/29/2007	6:00	7:20	Ryan Munson	Clearwater Environmental Services	Operations & Maintenance
6/29/2007	8:00	9:17	Lenna Cope	Ecology and Environment, Inc.	Beach inspection
6/29/2007	8:15	9:17	Eric White	Ecology and Environment, Inc.	Beach inspection
6/29/2007	8:25	14:00	Ryan Munson	Clearwater Environmental Services	Operations & Maintenance
7/2/2007	7:30	14:00	Newt Linn	Clearwater Environmental Services	NAPL gauging and extraction
7/3/2007	5:00	12:10	Lenna Cope	Ecology and Environment, Inc.	Placement of additional rock armoring oversight
7/5/2007	6:30	13:00	Lenna Cope	Ecology and Environment, Inc.	Placement of additional rock armoring oversight
7/6/2007	6:50	13:30	Lenna Cope	Ecology and Environment, Inc.	Placement of additional rock armoring oversight
7/6/2007	7:00	12:00	Kevin Parrett	Department of Environmental Quality	Site visit
7/6/2007	7:10	11:30	Eric White	Ecology and Environment, Inc.	Placement of additional rock armoring oversight
7/6/2007	11:00	13:00	Newt Linn	Clearwater Environmental Services	Operation and Maintenance
7/9/2007	12:00	15:15	Lenna Cope	Ecology and Environment, Inc.	Placement of additional rock armoring oversight
7/10/2007	10:00	17:00	Newt Linn	Clearwater Environmental Services	NAPL gauging and extraction
7/10/2007	14:00	17:13	Eric White	Ecology and Environment, Inc.	Diver survey oversight
7/11/2007	15:16	15:45	Lenna Cope	Ecology and Environment, Inc.	Demobilization of rock placement oversight
7/16/2007	15:00	16:15	Ryan Munson	Clearwater Environmental Services	Drum gauging
7/18/2007	8:00	16:00	Ryan Munson	Clearwater Environmental Services	NAPL gauging and extraction
7/19/2007	6:00	14:00	Ryan Munson	Clearwater Environmental Services	Operations & Maintenance
7/23/2007	7:30	14:30	Newt Linn	Clearwater Environmental Services	Site walk and beach inspection
7/23/2007	9:30	15:30	Ryan Munson	Clearwater Environmental Services	NAPL gauging and extraction
7/25/2007	9:00	12:00	Steve Campbell	Department of Environmental Quality	Monthly site inspection meeting
7/25/2007	9:00	16:00	Kevin Parrett	Department of Environmental Quality	Monthly site inspection meeting
7/25/2007	9:00	16:00	Lenna Cope	Ecology and Environment, Inc.	Monthly site inspection meeting
7/25/2007	9:00	16:00	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
7/31/2007	7:00	16:00	Newt Linn	Clearwater Environmental Services	NAPL gauging and extraction
8/2/2007	12:00	15:00	Newt Linn	Clearwater Environmental Services	Operation and Maintenance, paperwork
8/3/2007	6:15	7:50	Lenna Cope	Ecology and Environment, Inc.	Site walk to inspect shoreline for sheen
8/3/2007	6:15	7:50	Tim Adair	Ecology and Environment, Inc.	Site walk to inspect shoreline for sheen
8/3/2007	6:15	7:50	Heidi Blischke	GSI Water Solutions, Inc	Site walk to inspect shoreline for sheen
8/3/2007	6:15	7:50	Lucas Meek	Ecology and Environment, Inc.	Site walk to inspect animal burrows
8/6/2007	9:00	13:48	Newt Linn	Clearwater Environmental Services	NAPL gauging and extraction, site walk, irrigation inspection
8/6/2007	12:30	17:00	Lenna Cope	Ecology and Environment, Inc.	Site inspection for week ending 08/11/07.
8/7/2007	6:15	15:20	Ryan Munson	Clearwater Environmental Services	Operation and Maintenance, delivery of OC mat
8/15/2007	12:20	15:20	Ryan Munson	Clearwater Environmental Services	Site inspection for week ending 08/18/07.
8/17/2007	11:00	17:00	Heidi Blischke	GSI Water Solutions, Inc	Site inspection to assess river levels and sheen occurance
8/17/2007	11:00	17:00	David Cole	Department of Environmental Quality	Site inspection to assess river levels and sheen occurance
8/20/2007	7:00	16:20	Newt Linn	Clearwater Environmental Services	monthly site inspection; operation and maintenance
8/21/2007	8:00	12:00	Newt Linn	Clearwater Environmental Services	Monthly site inspection meeting
8/21/2007	9:00	13:15	Kevin Parrett	Department of Environmental Quality	Monthly site inspection meeting
8/21/2007	9:20	13:15	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
8/23/2007	8:30	9:15	Andy Uhrig	Ecology and Environment, Inc.	Coordinate Kubota repair drop-off
8/27/2007	7:00	13:00	Newt Linn	Clearwater Environmental Services	Operation and Maintenance; site meeting with Clearwater and E & E staff
8/27/2007	9:40	10:30	Eric White	Ecology and Environment, Inc.	Site meeting with Clearwater and E & E staff
8/27/2007	9:40	10:30	Tim Adair	Ecology and Environment, Inc.	Site meeting with Clearwater and E & E staff
9/5/2007	7:30	15:00	Newt Linn	Clearwater Environmental Services	Back flow test, operation and maintenance, Kubota maintenance
9/5/2007	9:15	9:45	Jeremy Tower	Womack Water Works	Back flow test
9/7/2007	9:00	16:00	Newt Linn	Clearwater Environmental Services	NAPL gauging and extraction
9/14/2007	7:30	15:30	Ryan Munson	Clearwater Environmental Services	NAPL gauging and extraction
9/14/2007	13:30	17:15	Lenna Cope	Ecology and Environment, Inc.	Fall 2007 sample preparation, beach inspection
9/17/2007	6:30	17:30	Lenna Cope	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling

Table 1-1
McCormick and Baxter Creosoting Company Superfund Site, Portland, Oregon
Site Activity Log 2007

Date	Time In	Time Out	Name	Name of Company, Agency, or Organization	Purpose of Visit
9/17/2007	6:45	17:30	Bryan Ciecko	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling
9/18/2007	7:45	16:30	Lenna Cope	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling
9/18/2007	7:45	16:15	Bryan Ciecko	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling
9/18/2007	7:50	15:15	David Cole	Department of Environmental Quality	Fall 2007 SW/IA/SA sampling
9/18/2007	7:30	13:00	Newt Linn	Clearwater Environmental Services	Monthly site inspection meeting
9/18/2007	9:00	15:30	Kevin Parrett	Department of Environmental Quality	Monthly site inspection meeting
9/18/2007	9:00	15:30	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
9/18/2007	9:00	11:45	Lynn Barlow	City of Portland	Monthly site inspection meeting
9/18/2007	9:00	11:45	Jim Schiller	City of Portland	Monthly site inspection meeting
9/18/2007	13:15	15:00	Debbie Silva	EOSM	Site visit
9/18/2007	13:15	15:00	Hank Stukey	Terra Hydra	Site visit
9/18/2007	13:15	15:00	Jena Gilman	ENSR	Site visit
9/18/2007	13:15	15:00	Derik Vowels	ENSR	Site visit
9/19/2007	7:15	18:08	Lenna Cope	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling
9/19/2007	7:15	18:00	Bryan Ciecko	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling
9/19/2007	9:30	16:30	Newt Linn	Clearwater Environmental Services	Site maintenance construction activities
9/20/2007	7:10	17:20	Bryan Ciecko	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling
9/20/2007	7:15	17:20	Lenna Cope	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling
9/20/2007	8:20	16:30	Ryan Munson	Clearwater Environmental Services	Site maintenance construction activities
9/20/2007	9:00	16:30	Newt Linn	Clearwater Environmental Services	Site maintenance construction activities
9/21/2007	7:50	16:55	Newt Linn	Clearwater Environmental Services	Site maintenance construction activities
9/21/2007	8:00	16:55	Bryan Ciecko	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling
9/21/2007	8:00	16:30	Ryan Munson	Clearwater Environmental Services	Site maintenance construction activities
9/21/2007	8:00	16:55	Lenna Cope	Ecology and Environment, Inc.	Fall 2007 SW/IA/SA sampling
9/24/2007	8:00	15:00	Newt Linn	Clearwater Environmental Services	Site maintenance construction activities
9/24/2007	16:15	18:36	Eric White	Ecology and Environment, Inc.	Mark location of wildlife paths, test time series sampling for sheen
9/24/2007	16:15	18:36	Lenna Cope	Ecology and Environment, Inc.	Mark location of wildlife paths, test time series sampling for sheen
9/25/2007	8:30	17:00	Newt Linn	Clearwater Environmental Services	Site maintenance construction activities
9/26/2007	7:00	15:00	Ryan Munson	Clearwater Environmental Services	Site maintenance construction activities
9/26/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Site maintenance construction activities
9/26/2007	12:00	19:00	Lenna Cope	Ecology and Environment, Inc.	Low tide groundwater gauging event, third quarter
9/26/2007	12:00	19:00	Jonathan Russell	Ecology and Environment, Inc.	Low tide groundwater gauging event, third quarter
9/27/2007	5:30	20:50	Lenna Cope	Ecology and Environment, Inc.	Time series surface water/sub-armoring water sampling
9/27/2007	6:10	20:50	Eric White	Ecology and Environment, Inc.	Time series surface water/sub-armoring water sampling
9/27/2007	7:13	15:30	David Cole	Department of Environmental Quality	Time series surface water/sub-armoring water sampling
9/27/2007	6:00	10:30	Heidi Blischke	GSI Water Solutions, Inc	Time series surface water/sub-armoring water sampling
9/27/2007	14:30	15:40	Kevin Parrett	Department of Environmental Quality	Time series surface water/sub-armoring water sampling
9/27/2007	7:00	15:30	Ryan Munson	Clearwater Environmental Services	Site maintenance construction activities
9/27/2007	7:00	15:30	Newt Linn	Clearwater Environmental Services	Site maintenance construction activities
9/28/2007	7:00	14:00	Ryan Munson	Clearwater Environmental Services	Site maintenance construction activities
9/28/2007	7:00	14:00	Newt Linn	Clearwater Environmental Services	Site maintenance construction activities
9/28/2007	10:00	10:30	Moen Representative	Moen Machinery	Pick up broken Kubota
9/28/2007	14:00	16:30	Lenna Cope	Ecology and Environment, Inc.	Demobilization of time series surface water/sub-armoring water samping
9/29/2007	10:30	13:30	Newt Linn	Clearwater Environmental Services	Operation and Maintenance
10/2/2007	9:00	17:30	Ryan Munson	Clearwater Environmental Services	Gauging and Extraction
10/2/2007	13:05	13:25	Jim Petersen	Ecology and Environment, Inc.	Pick-up seed for Nuway that was being stored at McCormick
10/3/2007	7:30	16:05	Lenna Cope	Ecology and Environment, Inc.	Complete fall sampling event
10/3/2007	11:00	15:30	Ryan Munson	Clearwater Environmental Services	Operations and Maintenance
10/3/2007	8:00	16:05	Bryan Ciecko	Ecology and Environment, Inc.	Complete fall sampling event
10/8/2007	9:20	13:30	Kevin Parrett	Department of Environmental Quality	Inspect River Shore
10/8/2007	10:10	13:00	Keith Johnson	Department of Environmental Quality	Inspect River Shore
10/8/2007	10:10	13:30	Nancy Harney	United States Environmental Protection Agency	Inspect River Shore
10/10/2007	10:45	12:00	Lenna Cope	Ecology and Environment, Inc.	Shoreline Inspection, Site documentation
10/10/2007	12:20	17:00	Newt Linn	Clearwater Environmental Services	Operations and Maintenance, administrative paperwork
10/15/2007	10:00	16:30	Newt Linn	Clearwater Environmental Services	Soil Cap and Sediment Cap site inspections
10/16/2007	6:30	11:30	Newt Linn	Clearwater Environmental Services	Monthly site inspection meeting
10/16/2007	9:00	12:48	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
10/16/2007	9:00	12:48	John Montgomery	Ecology and Environment, Inc.	Monthly site inspection meeting
10/16/2007	9:00	12:40	Keith Johnson	Department of Environmental Quality	Monthly site inspection meeting
10/16/2007	9:00	12:40	Steve Campbell	Department of Environmental Quality	Monthly site inspection meeting
10/16/2007	9:00	12:40	Kevin Parrett	Department of Environmental Quality	Monthly site inspection meeting
10/18/2007	17:30	18:10	Ryan Munson	Clearwater Environmental Services	Remove drum that washed up onto the shoreline
10/18/2007	17:30	18:10	Jerre Munson	Clearwater Environmental Services	Remove drum that washed up onto the shoreline
10/22/2007	6:25	14:15	Ryan Munson	Clearwater Environmental Services	Gauging and Extraction
10/23/2007	7:00	16:30	Ryan Munson	Clearwater Environmental Services	Operations and Maintenance
10/23/2007	7:00	16:30	Robert Auvil	Clearwater Environmental Services	Operations and Maintenance
10/26/2007	9:52	10:00	Jim Schiller	Bureau of Environmental Services	Check the site irrigation
11/1/2007	14:00	16:30	Newt Linn	Clearwater Environmental Services	Operations and Maintenance
11/5/2007	8:00	14:30	Newt Linn	Clearwater Environmental Services	Gauging and Extraction
11/7/2007	9:40	10:00	Ryan Munson	Clearwater Environmental Services	Administrative paperwork
11/12/2007	9:30	17:00	Newt Linn	Clearwater Environmental Services	Soil Cap and Sediment Cap site inspections
11/13/2007	8:00	12:00	Newt Linn	Clearwater Environmental Services	Monthly site inspection meeting
11/13/2007	9:00	12:30	Lenna Cope	Ecology and Environment, Inc.	Monthly site inspection meeting
11/13/2007	9:00	12:30	Eric White	Ecology and Environment, Inc.	Monthly site inspection meeting
11/13/2007	9:15	12:30	Keith Johnson	Department of Environmental Quality	Monthly site inspection meeting
11/13/2007	9:15	12:30	Scott Manzano	Department of Environmental Quality	Monthly site inspection meeting
11/13/2007	10:25	13:15	Ryan Munson	Clearwater Environmental Services	Gauging
11/14/2007	11:40	15:15	Ryan Munson	Clearwater Environmental Services	Extraction activities
11/20/2007	7:30	15:30	Ryan Munson	Clearwater Environmental Services	Operations and Maintenance
11/20/2007	8:30	15:30	Newt Linn	Clearwater Environmental Services	Operations and Maintenance
11/27/2007	7:00	12:00	Newt Linn	Clearwater Environmental Services	Drum disposal
11/27/2007	8:00	10:30	Lenna Cope	Ecology and Environment, Inc.	Drum disposal
12/3/2007	7:00	15:00	Newt Linn	Clearwater Environmental Services	Operations and Maintenance
12/4/2007	8:30	16:30	Ryan Munson	Clearwater Environmental Services	Gauging and Extraction activities
12/11/2007	10:30	13:30	Newt Linn	Clearwater Environmental Services	Operations and Maintenance
12/17/2007	6:45	14:00	Newt Linn	Clearwater Environmental Services	Low tide gauging event and monthly site walk
12/17/2007	7:00	14:55	Ryan Munson	Clearwater Environmental Services	Gauging and Extraction activities
12/17/2007	7:15	14:50	Lenna Cope	Ecology and Environment, Inc.	Low tide gauging event
12/17/2007	7:15	14:50	Jon Russell	Ecology and Environment, Inc.	Low tide gauging event
12/17/2007	7:35	14:45	Heidi Blischke	GSI Water Solutions, Inc	Low tide gauging event
12/17/2007	7:35	14:45	Tim Skrotzki	Hart Crowser	Low tide gauging event
12/18/2007	8:45	12:30	Heidi Blischke	GSI Water Solutions, Inc	Monthly meeting
12/18/2007	8:45	14:30	Scott Manzano	Department of Environmental Quality	Monthly meeting
12/18/2007	9:00	13:20	Lenna Cope	Ecology and Environment, Inc.	Monthly meeting
12/18/2007	9:00	13:20	Eric White	Ecology and Environment, Inc.	Monthly meeting
12/18/2007	9:00	14:30	Tim Skrotzki	Hart Crowser	Monthly meeting
12/18/2007	9:00	12:30	Rick Ernst	Hart Crowser	Monthly meeting
12/20/2007	7:00	15:00	Ryan Munson	Clearwater Environmental Services	Operations and Maintenance

A

Soil Cap Observations

Table 7.2
Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 3/20/07 Time:

Site Observations Form - Soil Cap
Monthly

tbl_site_observations

Category	Observation
Gate Conditions (daily)	TOP OPEN, ALL OTHERS CLOSED AND LOCKED
perimeter fence (weekly)	ALL SECURE
trespassers, entry point	NONE OBSERVED
High temp (daily)	50°
Low temp (daily)	40°
Wind (daily)	0 TO 30 MPH GUSTS
Precipitation (daily)	HEAVY RAIN FOR HALF [redacted] HOUR
Erosion	
Around Manholes	NONE
Headway retention pond	SOME AT MOUTH OF POND
Eastern edge of property	BACKFILLED, HOLDING STEADY
Spillway area	NONE
Outfall area	NONE
Animal burrows / disturbance	NONE
Manhole conditions	GOOD
Debris, flow, general condition	FLOW LOW AND STEADY, NO DEBRIS
Flow in collection piping	↓
Outfall and Spillway	↓
Note approx. flow volume	↓
Sprinkler System	SOME FREEZING DAMAGE; VEHICLE
Vegetation Conditions	FLOWERS, TREES, GRASS BEGINNING TO GROW, SPROUT
Wildlife	MOSTLY BIRDS
Daily activities	SITE WALK, DIM
Obsevations or notes	

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 5/14/07 Time:

Site Observations Form - Soil Cap
Monthly

Site observations

Category	Observation
Gate Conditions (daily)	TOP OPEN, ALL OTHERS CLOSED AND LOCKED
perimeter fence (weekly)	ALL SECURE
trespassers, entry point	NONE OBSERVED
High temp (daily)	60°
Low temp (daily)	54°
Wind (daily)	LIGHT WINDS FROM THE EAST
Precipitation (daily)	NONE
Erosion	
Around Manholes	NONE
Headway retention pond	SMALL AREA AT THE MOUTH
Eastern edge of property	NONE
Spillway area	
Outfall area	
Animal burrows / disturbance	SMALL ANIMAL BURROW AT SOUTHERN OF SITE. BACKFILLED
Manhole conditions	GOOD
Debris, flow, general condition	SMALL FLOW, NO DEBRIS
Flow in collection piping	
Outfall and Spillway	
Note approx. flow volume	
Sprinkler System	FREEZE DAMAGE
Vegetation Conditions	GOOD, LOTS OF GROWTH LAST COUPLE OF WEEKS
Wildlife	GOOD
Daily activities	SITE WALK
Observations or notes	
Follow Up Inspection	☑ Yes ☐ No Date: 5/16/07

Need to get locks taken care of on entrance gate. Meet with Jim about irrigation system and vegetation health. Maybe look at plantings in ACB. ACB. Hole in Fence Fabric ~ 80% down from support area. Als an area where a stick is holding bottom of fence up.

Date: 6/15/07 Time:

Site Observations Form - Soil Cap
Monthly

tbl_site_observations

Category	Observation
Gate Conditions (daily)	TOP OPEN, ALL OTHERS CLOSED & LOCKED
perimeter fence (weekly)	ALL SECURE, REPAIRED HOLE
trespassers, entry point	NONE OBSERVED
High temp (daily)	59°
Low temp (daily)	550
Wind (daily)	NONE
Precipitation (daily)	NONE
Erosion	NONE
Around Manholes	NONE
Headway retention pond	SMALL AREA AT THE MOUTH
Eastern edge of property	NONE
Spillway area	NONE
Outfall area	NONE
Animal burrows / disturbance	GROWS SQUIRREL HOLES
Manhole conditions	GOOD
Debris, flow, general condition	SMALL FLOW, NO DEBRIS, RAINING LAST NIGHT
Flow in collection piping	
Outfall and Spillway	
Note approx. flow volume	
Sprinkler System	GOOD, HAVE HAD VALVES STICK OPEN AT TIMES
Vegetation Conditions	GOOD, MORE GROWTH EACH DAY
Wildlife	GEESE, SQUIRRELS
Daily activities	SITE WALK, O&M
Obsevations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

. Animal burrow found near retention pond headway, near base of tree group, Animal burrow near retention pond spillway.

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 7/23/07 Time:

Site Observations Form - Soil Cap
Monthly

tbl_site_observations

Category	Observation
Gate Conditions (daily)	TOP UNLOCKED AND CLOSED, ALL OTHERS CLOSED AND LOCKED
perimeter fence (weekly)	ONE AREA, AND SOUTH END ENTRY POINT FOUND.
trespassers entry point	SAME AS ABOVE
High temp (daily)	68°
Low temp (daily)	64°
Wind (daily)	NONE
Precipitation (daily)	NONE
Erosion	
Around Manholes	
Headway retention pond	SMALL AREA AT MOUTH
Eastern edge of property	NONE
Spillway area	NONE
Outfall area	NONE
Animal burrows / disturbance	SMALL HOLE SE END OF POND
Manhole conditions	GOOD
Debris, flow, general condition	NO FLOW, NO DEBRIS
Flow in collection piping	
Outfall and Spillway	
Note approx. flow volume	
Sprinkler System	GOOD
Vegetation Conditions	GOOD
Wildlife	GEESE, HAWKS, SQUIRRELS
Daily activities	SITE WALK
Obsevations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 8-20-07 Time:

Site Observations Form - Soil Cap
Monthly

tbl_site_observations

Category	Observation
Gate Conditions (daily)	TOP UNLOCKED ALL OTHERS SECURE
perimeter fence (weekly)	GOOD, ALL REPAIRS HAVE BEEN MADE
trespassers, entry point	NONE OBSERVED
High temp (daily)	60°
Low temp (daily)	52°
Wind (daily)	LIGHT
Precipitation (daily)	HEAVY AT TIMES
Erosion	NONE OBSERVED
Around Manholes	
Headway retention pond	
Eastern edge of property	
Spillway area	
Outfall area	
Animal burrows / disturbance	SMALL HOLE SE END OF POND
Manhole conditions	GOOD
Debris, flow, general condition	
Flow in collection piping	NONE
Outfall and Spillway	GOOD
Note approx. flow volume	NONE
Sprinkler System	GOOD
Vegetation Conditions	GOOD
Wildlife	BIRDS
Daily activities	SITE WALK
Observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

Site Inspection Form
McCormick and Baxter Creosoting Company

001825

Date: 10/6/07 Time:

Site Observations Form - Soil Cap
Monthly

tbl_site_observations

Category	Observation
Gate Conditions (daily)	ALL GATES LOCKED AND SECURE
perimeter fence (weekly)	GOOD, NO BREACHES
trespassers, entry point	NONE OBSERVED
High temp (daily)	55°
Low temp (daily)	49°
Wind (daily)	MILD WINDS 10 TO 15 mph
Precipitation (daily)	RAIN ALL DAY
Erosion	NONE OBSERVED
Around Manholes	
Headway retention pond	
Eastern edge of property	
Spillway area	
Outfall area	
Animal burrows / disturbance	✓
Manhole conditions	GOOD
Debris, flow, general condition	NO FLOW
Flow in collection piping	
Outfall and Spillway	
Note approx. flow volume	✓
Sprinkler System	GOOD, SOME PIPE DAMAGE FROM CONSTRUCTION
Vegetation Conditions	GOOD
Wildlife	BIRDS
Daily activities	SITE WALK
Obsevations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

001825

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 11/14/07 Time:

Site Observations Form - Soil Cap
Monthly

tbl_site_observations

Category	Observation
Gate Conditions (daily)	ALL GATES LOCKED AND SECURE
perimeter fence (weekly)	GOOD
trespassers, entry point	NOT OBSERVED
High temp (daily)	48°
Low temp (daily)	44°
Wind (daily)	WINDY GUSTS UP TO 30mph
Precipitation (daily)	HEAVY RAIN ALL DAY
Erosion	NOT OBSERVED
Around Manholes	
Headway retention pond	
Eastern edge of property	
Spillway area	
Outfall area	
Animal burrows / disturbance	
Manhole conditions	GOOD
Debris, flow, general condition	NO FLOW
Flow in collection piping	
Outfall and Spillway	
Note approx. flow volume	
Sprinkler System	OFF FOR WINTER, SOME BROKEN AREAS
Vegetation Conditions	GOOD
Wildlife	ASSORTED BIRDS
Daily activities	SITE WALK
Observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

001848

Date: 12/17/07 Time:

Site Observations Form - Soil Cap
Monthly

tbl_site_observations

Category	Observation
Gate Conditions (daily)	ALL GATES LOCKED AND SECURE
perimeter fence (weekly)	GOOD
trespassers, entry point	NONE OBSERVED
High temp (daily)	50°
Low temp (daily)	41°
Wind (daily)	CALM 0-10mph
Precipitation (daily)	NONE
Erosion	NONE OBSERVED
Around Manholes	
Headway retention pond	
Eastern edge of property	
Spillway area	
Outfall area	
Animal burrows / disturbance	
Manhole conditions	GOOD
Debris, flow, general condition	SMALL FLOW
Flow in collection piping	
Outfall and Spillway	SMALL FLOW, GOOD
Note approx. flow volume	SMALL FLOW
Sprinkler System	WINTERIZED
Vegetation Conditions	GOOD
Wildlife	ABSENTEE BIRDS
Daily activities	SITE WALK, LOW TIDE EVENT
Obsevations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

B

Sediment Cap Observations

Table 7.1
Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 3/20/07 Time:

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (daily)	TOP OPEN, ALL OTHERS CLOSED & LOCKED
high temp (daily)	50°
low temp (daily)	40°
wind (daily)	0 TO 30 MPH GUSTS
precipitation (daily)	HEAVY RAIN FOR HALF HOUR
Sheen Observations (low tide)	NONE; HIGH TIDE
Size and Location	
Source (gas bubble, debris, etc.)	
ACB and Riprap Armoring	SOME SEPERATION; GAPS IN TFA. WILL KEEP MONITORING
Changes in Location	SAME LOCATIONS
Displaced blocks	ONE AREA IN FWDA, BACKWATER
Vandalism	NONE OBSERVED
River relative to top of ACB	20 TO 25 FT.
Organoclay Mats (extreme low water)	HIGH TIDE
Edges of mats visible?	
Overlying Armoring conditions	
Evidence of movement?	
WC OC/Seep Area	
TFA OC/Seep Area	
Wildlife	GEESE, HAWKS
Fish / Crayfish / clams	NONE OBSERVED
Other	LARGE SEAL IN FWDA
Warning Signs Condition	GOOD
Buoy Condition / Location	TWO REEF BUOYS NEED TO BE RE-LOCATED
cove shoreline (general)	LOTS OF DEBRIS AND GARBAGE
FWDA shoreline (general)	
bulkhead shoreline (general)	
TFA shoreline (general)	
Daily activities	SITE WALK, O&M
observations or notes	

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 5/14/07 Time:

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (daily)	TOP OPEN, ALL OTHERS CLOSED AND LOCKED
high temp (daily)	60°
low temp (daily)	540
wind (daily)	LIGHT WINDS FROM THE EAST
precipitation (daily)	NONE
Sheen Observations (low tide)	NONE OBSERVED
Size and Location	↓
Source (gas bubble, debris, etc.)	BUBBLES OBSERVED IN TFA
ACB and Riprap Armoring	BROKEN ACB BLOCKS IN FWDA, SOME ACB GAP; SEPARATION IN FWDA
Changes in Location	NO
Displaced blocks	DUE AREA IN FWDA, UNDERWATER
Vandalism	NONE OBSERVED
River relative to top of ACB	APPROX. 20 FT
Organoclay Mats (extremic low water)	COULD NOT OBSERVE
Edges of mats visible?	↓
Overlying Armoring conditions	
Evidence of movement?	
WC OC/Seep Area	
TFA OC/Seep Area	
Wildlife	BEO'S, HAWKS, OSPREY, UNITIMES, SQUIRRELS
Fish / Crayfish / clams	NONE OBSERVED
Other	↓
Warning Signs Condition	GOOD
Buoy Condition / Location	GOOD
cove shoreline (general)	WOOD DEBRIS GARBAGE
FWDA shoreline (general)	↓
bulkhead shoreline (general)	
TFA shoreline (general)	
Daily activities	SITE WALK
observations or notes	
Follow Up Inspection	☒ Yes ☐ No Date: 5/16/07

Met with James Parson about where Goosling were found approx. 2 weeks ago. Area where they were found is a large steep area of ACB that would be difficult to address without large amounts of material and equipment. Wait till summer and may build paths. ~2 weeks ago E&E placed sand in three areas to the NE end of the site where it appeared geese were using as paths. Maybe cut and remove creosote treated timber this summer if equipment is onsite already. Water to high to observe Willamette Cove. Dead fish noted in water in TFA area, too far out to identify.

Date: 6-25-07 Time:

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (daily)	TOP OPEN, ALL OTHERS CLOSED & LOCKED
high temp (daily)	59°
low temp (daily)	55°
wind (daily)	NONE
precipitation (daily)	NONE
Sheen Observations (low tide)	SHEEN OBSERVED FROM NORTH CPA TO SOUTH TFA
Size and Location	
Source (gas bubble, debris, etc.)	
ACB and Riprap Armoring	SOME SEPERATION, GAPS IN TFA
Changes in Location	NO
Displaced blocks	ONE SMALL AREA IN FWDA
Vandalism	NONE OBSERVED
River relative to top of ACB	50'
Organoclay Mats (extreme low water)	NOT VISIBLE
Edges of mats visible?	NOT VISIBLE
Overlying Armoring conditions	GOOD
Evidence of movement?	NO
WC OC/Seep Area	NO
TFA OC/Seep Area	NO
Wildlife	GEESE, OSPREY
Fish / Crayfish / clams	NONE OBSERVED
Other	↓
Warning Signs Condition	GOOD
Buoy Condition / Location	GOOD
cove shoreline (general)	GOOD, WOOD AND TRASH DEBRIS
FWDA shoreline (general)	GOOD, WOOD AND TRASH DEBRIS
bulkhead shoreline (general)	↓
TFA shoreline (general)	↓
Daily activities	SITEWALK, OSM
observations or notes	SMALL SHELTER; HOME BUILT ON TFA SHORELINE, LOTS OF SHEEN OBSERVED WITH ATTACHED DOOR (NAPL)
Follow Up Inspection	☐ Yes ☐ No Date:

- Sheen still present in small area on sand ~~at~~ below spillway. No odor or source observed. Sheen in on surface of sand only. South edge of ACB.
- Loops observed in southern most boulder cluster.
- Small amount of sheen west of organoclay sampling in WC. ~75' east of bridge abutment (SD04) 24 to B3 to D5 to 20ft east of D5.
- Dead fish in WC (Chad)
- Sheen observed at drain off N of organoclay.

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 7/23/07 Time:

Site Observations Form - Sediment Cap
Weekly / Monthly

(b) site observations

Category	Observation
gate conditions (daily)	Top unlocked and closed, all others closed & locked
high temp (daily)	68°
low temp (daily)	64°
wind (daily)	None
precipitation (daily)	None
Sheen Observations (low tide)	Two small areas NW end of cove 2" to 3" in size
Size and Location	↓
Source (gas bubble, debris, etc.)	Surface of water
ACB and Riprap Armoring	Some separation in TFA
Changes in Location	No
Displaced blocks	One area in FWDA, covered with sand
Vandalism	Fence clamps removed and fence wedged up south end
River relative to top of ACB	25' to 40'
Organoclay Mats (extreme low water)	None visible
Edges of mats visible?	None visible
Overlying Armoring conditions	Good
Evidence of movement?	No
WC OC/Seep Area	Good
TFA OC/Seep Area	Good
Wildlife	
Fish / Crayfish / clams	None observed
Other	Beaver
Warning Signs Condition	Good
Buoy Condition / Location	One has moved close to shore
cove shoreline (general)	Good
FWDA shoreline (general)	Good wood debris and trash
bulkhead shoreline (general)	Good
TFA shoreline (general)	Good
Daily activities	Site walk
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

(1) Sheen at ACB edge treatment in ACB blocks, surface only, no odor extends to southern most rock boulder cluster, heaviest at south end of site, but extends intermittently to just beyond Northern ACB edge treatment.
(2) Small (fist) size sheen. Only visible when shaded from sun.
(3) Puddle and/or water has sheet of sheen on surface.
(4) Small amount of sheen. Quarter ⇒ fist size.
(5) Spots of sheen.
(6) Quarter size near SD-04

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 8/06/07 Time: 1030 & 1230 AM/PM

Site Observations Form - Sediment Cap

(Weekly / Monthly)

tbl_site_observations

Category	Observation
gate conditions (daily)	ALL GATES LOCKED AND SECURE
high temp (daily)	70°
low temp (daily)	62°
wind (daily)	NONE
precipitation (daily)	NONE
Sheen Observations (low tide)	SHEEN OBSERVED, SEE ATTACHED MAP
Size and Location	" "
Source (gas bubble, debris, etc.)	UNKNOWN
ACB and Riprap Armoring	SOME SEPERATION, GAPS OBSERVED
Changes in Location	NO
Displaced blocks	ONE, UNDERWATER OR COVERED WITH SAND
Vandalism	SOUTH END OF FENCE, PRYED UP
River relative to top of ACB	40'
Organoclay Mats (extreme low water)	
Edges of mats visible?	NO
Overlying Armoring conditions	GOOD
Evidence of movement?	NO
WC OC/Seep Area	GOOD
TFA OC/Seep Area	GOOD
Wildlife	
Fish / Crayfish / clams	NO
Other	BERDS
Warning Signs Condition	GOOD
Buoy Condition / Location	ONE BUOY APPEARS TO BE CLOSE TO SHORE
cove shoreline (general)	GOOD
FWDA shoreline (general)	GOOD
bulkhead shoreline (general)	GOOD
TFA shoreline (general)	GOOD
Daily activities	NAPL GAGING / EXTRACTION, SITE WALK
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

Date: 8-15-07 Time: 1415

Site Observations Form - Sediment Cap
(Weekly) Monthly

tbl_site_observations

Category	Observation
gate conditions (daily)	All gates Locked and Secured
high temp (daily)	90°
low temp (daily)	70°
wind (daily)	None
precipitation (daily)	None
Sheen Observations (low tide)	None
Size and Location	NA
Source (gas bubble, debris, etc.)	NA
ACB and Riprap Armoring	Good & cracked block
Changes in Location	NO
Displaced blocks	NO
Vandalism	NO
River relative to top of ACB	45'
Organoclay Mats (extreme low water)	NA
Edges of mats visible?	NO
Overlying Armoring conditions	Good
Evidence of movement?	NO
WC OC/Seep Area	Good
TFA OC/Seep Area	Good
Wildlife	
Fish / Crayfish / clams	Fish
Other	Birds
Warning Signs Condition	Good
Buoy Condition / Location	
cove shoreline (general)	debris and garbage
FWDA shoreline (general)	Good
bulkhead shoreline (general)	Good
TFA shoreline (general)	Good
Daily activities:	Site Walk.
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 8-20-07 Time:

Site Observations Form - Sediment Cap
Weekly (Monthly)

tbl_site_observations

Category	Observation
gate conditions (daily)	TOP UNLOCKED, ALL OTHERS CLOSED & LOCKED
high temp (daily)	60°
low temp (daily)	52°
wind (daily)	LIGHT WIND
precipitation (daily)	HEAVY AT TIMES
Sheen Observations (low tide)	SEE MAP
Size and Location	
Source (gas bubble, debris, etc.)	SURFACE OF WATER AND POCKETS IN RIP RAP
ACB and Riprap Armoring	SOME SEPERATION IN TFA
Changes in Location	NO
Displaced blocks	COULD NOT OBSERVE
Vandalism	NONE
River relative to top of ACB	50' TO 65'
Organoclay Mats (extreme low water)	NONE OBSERVED
Edges of mats visible?	YES, FABRIC EDGES
Overlying Armoring conditions	GOOD
Evidence of movement?	NO
WC OC/Seep Area	GOOD
TFA OC/Seep Area	GOOD
Wildlife	BIRDS
Fish / Crayfish / clams	NO
Other	NO
Warning Signs Condition	GOOD
Buoy Condition / Location	ONE BUOY CLOSE TO SAND BAR
cove shoreline (general)	GOOD, LOTS OF DEBRIS AND TRASH
FWDA shoreline (general)	GOOD
bulkhead shoreline (general)	GOOD
TFA shoreline (general)	GOOD
Daily activities	SITE WALK
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

Date: 9/14/07 Time: 15:15 - 16:30
low tide @ 16:00

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (daily)	all gates secure and locked when arriving onsite
high temp (daily)	
low temp (daily)	
wind (daily)	5-10 mph from the North
precipitation (daily)	none
Sheen Observations (low tide)	sheen observed at three locations
Size and Location	Between granular : organoclay mats at water level,
Source (gas bubble, debris, etc.)	west edge of organoclay mats, west edge of ACB mats at south end of site. see attached Figure
ACB and Riprap Armoring	
Changes in Location	ACB mats at far east end of cove @ ~16 ft NAVD broken and
Displaced blocks	buckled.
Vandalism	
River relative to top of ACB	River level @ ~16 ft NAVD, top of ACB ~ 20 ft NAVD
Organoclay Mats (extreme low water)	
Edges of mats visible?	NO
Overlying Armoring conditions	Good
Evidence of movement?	none
WC OC/Seep Area	no sheen
TFA OC/Seep Area	sheen, see notes above
Wildlife	
Fish / Crayfish / clams	Fish, clams, birds, (pigeons, geese, heron, black crows)
Other	
Warning Signs Condition	Good
Buoy Condition / Location	Good
cove shoreline (general)	Trash, debris
FWDA shoreline (general)	Good
bulkhead shoreline (general)	Good
TFA shoreline (general)	Good
Daily activities	Prep for sampling, shoreline inspection
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

Site Inspection Form
McCormick and Baxter Creosoting Company

001824

Date: 10/15/07 Time:

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (daily)	ALL GATES LOCKED AND SECURE
high temp (daily)	55°
low temp (daily)	49°
wind (daily)	MILD WINDS 10° TO 15 mph
precipitation (daily)	RAIN ALL DAY
Sheen Observations (low tide)	NONE OBSERVED
Size and Location	
Source (gas bubble, debris, etc.)	
ACB and Riprap Armoring	GOOD
Changes in Location	
Displaced blocks	NO
Vandalism	NO
River relative to top of ACB	45'
Organoclay Mats (extreme low water)	NONE OBSERVED
Edges of mats visible?	NO
Overlying Armoring conditions	GOOD
Evidence of movement?	NO
WC OC/Seep Area	GOOD
TFA OC/Seep Area	GOOD
Wildlife	BEARS
Fish / Crayfish / clams	NO
Other	NO
Warning Signs Condition	GOOD
Buoy Condition / Location	GOOD
cove shoreline (general)	GOOD LOTS OF DEBRIS
FWDA shoreline (general)	
bulkhead shoreline (general)	
TFA shoreline (general)	
Daily activities	SITE WALK
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

001824

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 10/23/07 Time: 1400 - 1530

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (daily)	Locked / good
high temp (daily)	~72°F
low temp (daily)	~50°F
wind (daily)	5-10 mph
precipitation (daily)	Ø
Sheen Observations (low tide)	Organic sheen
Size and Location	Mostly by new organic mat
Source (gas bubble, debris, etc.)	X Lots of bubbling in the morning
ACB and Riprap Armoring	Good
Changes in Location	No
Displaced blocks	NO
Vandalism	on Docks in Cove (two teens) told to Leave
River relative to top of ACB	Not close
Organoclay Mats (extreme low water)	NA
Edges of mats visible?	No
Overlying Armoring conditions	Good
Evidence of movement?	NO
WC OC/Seep Area	Good
TFA OC/Seep Area	Good
Wildlife	Birds, Squirrels
Fish / Crayfish / clams	Dead birds on shore, Approx 6, one fresh seagull
Other	
Warning Signs Condition	Good
Buoy Condition / Location	Good
cove shoreline (general)	Lots of trash, more than I've ever seen (Boom)
FWDA shoreline (general)	"
bulkhead shoreline (general)	"
TFA shoreline (general)	"
Daily activities	O&M, Block on Mat underwater, Move 2nd drum to Storage
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

CESI
Ryan Munson
(503) 969-3314

001847

Site Inspection Form
McCormick and Baxter Creosoting Company

Date: 11/12/07 Time:

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (daily)	ALL GATES LOCKED AND SECURE
high temp (daily)	48°
low temp (daily)	44°
wind (daily)	WINDY WITH GUSTS UP TO 30 mph
precipitation (daily)	HEAVY RAIN ALL DAY
Sheen Observations (low tide)	NO SHEEN OBSERVED
Size and Location	
Source (gas bubble, debris, etc.)	
ACB and Riprap Armoring	GOOD
Changes in Location	NO
Displaced blocks	NO
Vandalism	NO
River relative to top of ACB	40' TO 80'
Organoclay Mats (extreme low water)	NONE OBSERVED
Edges of mats visible?	NO
Overlying Armoring conditions	GOOD
Evidence of movement?	NO
WC OC/Seep Area	GOOD
TFA OC/Seep Area	GOOD
Wildlife	VARIETY OF BIRDS
Fish / Crayfish / clams	
Other	
Warning Signs Condition	GOOD
Buoy Condition / Location	GOOD
cove shoreline (general)	GOOD, LOTS OF DEBRIS
FWDA shoreline (general)	
bulkhead shoreline (general)	
TFA shoreline (general)	
Daily activities	SITE WALK
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

001847

Date: 12/17/07 Time:

Site Observations Form - Sediment Cap
Weekly / Monthly

tbl_site_observations

Category	Observation
gate conditions (daily)	ALL GATES LOCKED AND SECURE
high temp (daily)	50°
low temp (daily)	41°
wind (daily)	NONE, CALM 0-10 mph
precipitation (daily)	NONE
Sheen Observations (low tide)	NONE OBSERVED
Size and Location	
Source (gas bubble, debris, etc.)	
ACB and Riprap Armoring	
Changes in Location	
Displaced blocks	
Vandalism	
River relative to top of ACB	40' TO 60'
Organoclay Mats (extreme low water)	NONE OBSERVED
Edges of mats visible?	NO
Overlying Armoring conditions	GOOD
Evidence of movement?	NO
WC OC/Seep Area	GOOD
TFA OC/Seep Area	GOOD
Wildlife	DEERS
Fish / Crayfish / clams	NONE
Other	NONE
Warning Signs Condition	GOOD
Buoy Condition / Location	[redacted] NEED TO BE RELOCATED
cove shoreline (general)	GOOD, DEBRIS
FWDA shoreline (general)	
bulkhead shoreline (general)	
TFA shoreline (general)	
Daily activities	SITEWALK, LOW-TIDE EVENT
observations or notes	
Follow Up Inspection	☐ Yes ☐ No Date:

C Monthly Meeting Minutes

McCormick & Baxter O & F Determination Period Monthly Progress Meeting		Wednesday 01/24/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203	
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	John Montgomery, E & E	Note Taker:	George Lukert, E & E
Attendees:	Kevin Parrett	Project Manager	ODEQ
	Steve Campbell	Contracting Officer	ODEQ
	John Montgomery	Project Manager	E & E
	George Lukert	Task Manager	E & E
	Newt Linn	Site Technician	Clearwater Environmental

Meeting called to order at 9:00 a.m.

Agenda

Site Walk

Group walked the upland perimeter of the site and the full length of the beach. According to Newt, moderate erosion is still present at the retention pond headwater. Recent attempts of unauthorized access to the site have been countered by placement of a security chain at the Van Houton gate, and bolts on all of the perimeter gates have been welded to prevent disassembling the gate. A mild sheen was observed emanating from a treated log that had floated onto the M&B shoreline near Triangle Park. Evidence of sheen was observed floating parallel with the shoreline for approximately 50 feet from the log. Other debris which have accumulated include logs, portions of a wooden dock, and several small "blobs" of a grease material. Newt will remove the grease material from the shoreline to prevent sheen. Group also noted minor separation of the ACB mats at a joint previously filled with concrete. Separation was less than 1-inch. The entire gap runs approximately 20 feet and is located in the vicinity of the old creosote dock. The gap will continue to be monitored and repaired in the summer. Two half ACB blocks were noted missing in the FWDA. The cause of this is unclear. Newt will replace the blocks from stockpiled ACB material. Kevin also noted that wells in the greenway are still yellow and recommended that these be painted green in the summer. This includes approximately 5 wells.

Action Items:	**Person Responsible**	**Deadline**
Determine availability/cost of more fabric siding for haz-waste storage area	Newt Linn	In progress
Spread additional rock to spillway	Newt Linn	2 weeks
Monitor head water erosion and notify E&E if scoured area deepens	Newt Linn	Ongoing
ACB Concrete repair	Newt Linn	Summer 2007
Paint wells	Newt Linn	Summer 2007

Remove grease material	Newt Linn	1 week
Replace ACB block	Newt Linn	1 week.

Budget Status

Discussion:

Budget Status: John Montgomery presented the current budget status and discussed overages. E & E will prepare a new BAP to cover projected budget over runs

Action Items:	**Person Responsible:**	**Deadline:**
Prepare and submit BAP	John Montgomery	February 13th

Site Activities / Miscellaneous Field Activities

Discussion:
Site Activities:

Topics from the meeting include:

- DEQ will evaluate how long well MW-59s is to be sampled as part of the quarterly monitoring event based on the first three rounds of sampling results. The third round of sampling will be conducted in February. A fourth event (June) has also been budgeted.
- E & E will continue to collect 4 liters of sample volume for the surface water sampling events in order to ensure reliable data. Four liters were being collected in case sample containers were lost or broken. E & E and DEQ will also meet with the subcontract lab to discuss analytical issues.
- DEQ will determine if dissolved metals analysis and total suspended solids analysis will continue to be conducted on upcoming surface water sampling events.
- E & E will update the draft fact sheet based on comments provided by the meeting group. It was also suggested that the University of Portland security be contacted to see if their office could be incorporated into providing emergency access to the site. Metro and local police will also be contacted to discuss access and security issues. E & E will coordinate having a representative from the local police attend the next monthly meeting to discuss these issues.
- E & E will prepare and inventory of DEQ office equipment currently maintained by E & E.

NAPL Extraction: Total liquid (NAPL and water) extracted for 4th quarter 2006 was 15.28 gallons from MW-20i, MW-Ds, and MW-Gs. E & E will use the corrected total (NAPL only) for the quarterly report.

Based on comments from Newt regarding NAPL drum gauging, Kevin suggested freezing collected NAPL as a method to separate the water content from pure NAPL. Potentially, ice which would accumulate in the drum can be removed by hand, and the NAPL then stored separately. E & E will evaluate this method under cold weather conditions. Based on these results, a freezer and smaller holding container may be purchased and this method included in the regular NAPL recovery routine.

MW-37d: E & E was successful in removing the bailer from MW-37d. E & E was assisted by Locates Down Under, which provided a down hole camera.

Armoring Repair: E & E revising the approach to the armoring repair. The revised SOW will include the biological opinion requirements, and will be competitively bid. Repairs will begin on July 8, 2007 to take advantage of high water conditions throughout the full duration of the construction work. Work should be completed by July 20, 2007 assuming a 2 week period.

Miscellaneous Field Items: E & E is continuing to procure a subcontractor to dispose of collected NAPL, purge water, and PPE.

Action Items:	**Person Responsible:**	**Deadline:**
MW-59s Sampling frequency	Kevin Parrett	March Monthly Meeting
Set up meeting with lab	George Lukert	2 weeks

Revise Fact sheet for site access info.	George Lukert	3 weeks
Set up meeting with local police	George Lukert	2 weeks
NAPL freezing evaluation	Newt Linn	1 month
Contact University of Portland and Metro	Kevin Parrett	3 weeks
Prepare office equipment inventory	Andy Uhrig	2 weeks
Revise Armor Inspection Report	Eric White	February 28, 2007

CSM and OC Report

Discussion:

- E & E will evaluate alternatives for side scan and bathymetric survey services.
- Record Drawings will be included in the O&M report.

Action Items:	**Person Responsible:**	**Deadline:**
Survey Alternatives	John Montgomery/Eric White	1 month

Ongoing Deliverables

Discussion:

- E & E will submit complete draft O&M report to DEQ on February 5, 2007.

Action Items:	**Person Responsible:**	**Deadline:**

Next Meeting

Date / Time	February 21, 2007	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting		Wednesday 02/21/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203	
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	John Montgomery, E & E	Note Taker:	George Lukert, E & E
Attendees:	Kevin Parrett	Project Manager	ODEQ
	Steve Campbell	Contracting Officer	ODEQ
	John Montgomery	Project Manager	E & E
	George Lukert	Task Manager	E & E
	Eric White	Site Engineer	E & E
	Newt Linn	Site Technician	Clearwater Environmental
	Ken Reynolds	Local Officer	Portland Police Bureau

Meeting called to order at 9:00 a.m.

Agenda

Site Walk

Group walked the upland perimeter of the site and the full length of the beach. During the beach walk, a gap in the ACB (4-5 inches) was observed in the TFA. Clearwater and E & E will continue to monitor this and other gaps and assess the need for repair in the summer. Debris on the beach included an empty drum in the FWDA. Warning buoys were also observed to be out of place (due to current/debris). E & E will contract with West Coast Marine to reposition the buoys. Two half ACB blocks are still missing in the FWDA, Newt will replace these. It was also agreed that during future inspections, we will review Newt's documentation / data sheets during the site walk. Newt also mentioned that he observed a coyote on 2/20/07.

E & E also provided DEQ with a cost estimate of approximately $162 to purchase additional fabric siding for the haz-waste storage area.

Action Items:	**Person Responsible**	**Deadline**
Monitor gaps observed in ACB during site walks	Newt Linn	Ongoing – repair in Summer 2007
Monitor head water erosion and notify E&E if scoured area deepens	Newt Linn	Ongoing
ACB Concrete repair	Newt Linn	Summer 2007
Paint wells	Newt Linn	Summer 2007
Reposition Buoys	George Lukert	3 weeks
Replace ACB block	Newt Linn	1 week

Budget Status

Discussion:

Budget Status: John Montgomery presented the current budget status and discussed overages. After reviewing the draft BAP, DEQ requested that E & E prepare 2 BAPs. The first one will address historical overages, and the second will address future costs

Action Items:	Person Responsible:	Deadline:
Prepare and submit BAP 1 Historical	John Montgomery	03/05/07
Prepare and submit BAP 2 Forward	John Montgomery	03/05/07

Site Activities / Miscellaneous Field Activities

Discussion:
Site Activities:

Topics from the meeting include:

- E & E will sample MW-59s in the first quarter and third quarter of 2007. This will provide sampling data from all four quarters. Spring sampling was conducted last year.
- DEQ and E & E will evaluate sample volume requirements for the surface water sampling event based on the 03/05/07 meeting with the laboratory to discuss analytical issues.
- Officer Ken Reynolds of the Portland Police Department attended the site inspection meeting to provide recommendations for maintaining security at the site. He suggested the following:

    1. Develop an inventory of equipment serial numbers and engrave other equipment that does not have serial numbers. The engraving will be "DEQ 1-800-452-4011". E & E will prepare this list over the next several weeks.
    2. Execute a trespass agreement with the Portland Police to allow them to more closely monitor and question transients on the property if necessary. Kevin Parrett is finalizing this agreement.
    3. E & E will finalize the fact sheet showing site access points and contact numbers. A copy of this will be provided to Officer Reynolds, who will in turn pass this on to the local fire department.

- E & E will prepare an inventory of DEQ office equipment currently maintained by E & E. DEQ requested that the video camera (which was stolen) be added to this list. Additionally, E & E will prepare an inventory of serial numbers.

NAPL Extraction: from MW-20i, MW-Ds, and MW-Gs. Quarterly gauging event will now be conducted at the end of the quarter. This will allow for late 4th quarter monitoring to be included in subsequent annual O&M reports.

E & E and Clearwater tested a method for separating water from NAPL by freezing extracted liquid. The results were promising, as ice (water) was able to be separated manually from the previous weeks' extraction. E & E and DEQ are still evaluating how to most efficiently utilize this method.

Armoring Repair: Based on comments received from DEQ, E & E is modifying the approach to the armoring repair to incorporate certain elements of the Biological Opinion. E & E has submitted a draft request to DEQ to conduct this work under sole-source procurement. DEQ requested that E & E finalize the sole source request. Once DEQ approves this approach, E & E will finalize the scope of work for the armor repair and establish a sub-contract with Advanced American to perform this work. Repairs are currently scheduled to begin on July 8, 2007 to take advantage of high water conditions throughout the full duration of the construction work. In-water work should be completed by July 20, 2007 assuming a 2-week work period.

Miscellaneous Field Items: E & E is continuing to procure a subcontractor to dispose of collected NAPL, purge water, and PPE. Costs received from Waste Management, verifying compliance.

Action Items:	Person Responsible:	Deadline:
Prepare serial number inventory	Newt Linn / Lenna Cope	3 weeks
Revise Fact sheet for site access info.	George Lukert	2 weeks
Determine SW Sample Volume	George Lukert / Kevin Parrett	03/05/07
Contact University of Portland and Metro	Kevin Parrett	3 weeks
Update office equipment inventory	George Lukert	2 weeks
Complete Sole-Source Request for Armor Repair	Eric White	03/09/07
Finalize Scope of Work for Armor Repair	Eric White	03/09/07
Establish Subcontract w/Advanced American	Eric White	3/31/07

CSM and OC Report

Discussion:

E & E to submit final annual O&M report the week of 3/5/07.

Action Items:	Person Responsible:	Deadline:
Submit Annual report	George Lukert / Lenna Cope	Week of 3/5/07

Ongoing Deliverables

Discussion:

Action Items:	Person Responsible:	Deadline:

Next Meeting

Date / Time	March 21, 2007	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting		Wednesday 03/21/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203	
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	John Montgomery, E & E	Note Taker:	George Lukert, E & E
Attendees:	Kevin Parrett	Project Manager	ODEQ
	Steve Campbell (via phone)	Contracting Officer	ODEQ
	John Montgomery	Project Manager	E & E
	George Lukert	Task Manager	E & E
	Eric White	Site Engineer	E & E
	Newt Linn	Site Technician	Clearwater Environmental
	Lenna Cope (via phone)	Engineer	E & E

Meeting called to order at 9:00 a.m.

Agenda

Site Walk

Group walked the upland perimeter of the site and the full length of the beach. During the beach walk, additional stainless steel cable loops were noted in the TFA and FWDA, which need to be cut. Newt will cut these remaining loops next week. As noted in previous inspections, two warning buoys were observed out of place, and one was damaged. E & E will contact West Coast Marine to relocate the buoys, and provide a replacement for the damaged one. As noted in previous inspections, some of the monitoring wells in the FWDA have smaller locks on them. Newt will replace these with larger locks, and add a lock to the air conditioning electrical box on the trailer. The facility light was not on during our inspection as it had been during previous inspections. Newt will come in early on Monday to see if the light is functioning when it is dark. If not, E & E will have the light repaired. During Newt's inspection on 3/20/07, he noted a previously unidentified gap in the ACB in the TFA. He will continue to monitor the gap and repair with others in the summer. Newt also observed a sea lion, near shore, in the FWDA. Freeze damage to the sprinkler system was also observed and shown to Jim Schiller of the city. The city has also done re-plantings of some vegetation. Numerous debris items were also observed on the shoreline.

E & E has identified a source for a contractor grade combination lock. Kevin Parrett approved purchasing one lock to make sure it fits on the gates. If the lock works, E & E will purchase two more. Combination locks will be placed at the entrance to the trailer compound, interior entrance to the site from the compound, and on the Van Houton site entrance gate. Combinations will be set to the existing code.

Action Items:	Person Responsible	Deadline
Monitor gaps observed in ACB during site walks	Newt Linn	Ongoing – repair in Summer 2007
Monitor head water erosion and notify E&E if scoured area deepens	Newt Linn	Ongoing
ACB Concrete repair	Newt Linn	Summer 2007
Paint wells	Newt Linn	Summer 2007
Reposition Buoys (including damaged one)	George Lukert	2 days
Cut remaining (accessible) S.S. loops	Newt Linn	1 week
Determine if facility light is functioning	Newt Linn	1 week
Replace small monitoring well locks	Newt Linn	1 week
Purchase combination lock	Bryan Ciecko	1 week
Replace ACB block	Newt Linn	When river levels allow

Budget Status

Discussion:

Budget Status: Briefly discussed current budget status and discussed documentation of DEQ approvals.

Action Items:	Person Responsible:	Deadline:
Prepare table of DEQ approvals for exceedences.	John Montgomery	COB 3/23/07
Discuss Draft BAPs	John Montgomery	Tentatively 3/27/07

Site Activities / Miscellaneous Field Activities

Discussion:

Site Activities:

Topics from the meeting include:

Kevin Parrett discussed the need to modify and add data sheets to the O&M routine. E & E will modify the existing site observation sheets to include a section for notes and observations from any follow on inspections. Typically this would be inspections by the entire group during a monthly meeting using Newt's initial observation sheet from the day(s) prior to the meeting.

E & E will develop a Field Activity Log to document all of the O&M activities taking place at the site. This form will be similar to the site sign-in sheet, but will include some additional notes for activities. A sign-in log will also be posted on the outside of the trailer so other subcontractors or agencies that don't typically enter the trailer can sign in (e.g., City vegetation maintenance staff). Information obtained on the sign-in sheet will be entered electronically onto the Field Activity Log for inclusion in the annual O&M report. Newt will fax the sign-in sheet 1 week before monthly meetings to be used as part of the discussion.

As follow up to our meeting in February with Officer Ken Reynolds, E & E completed the site access map and sent copies to Ken. DEQ has completed and submitted the trespass agreement supplied by officer Reynolds. E & E has completed a draft summary of DEQ equipment serial numbers, and engraved equipment, which did not have serial numbers. Newt will review this table for missing items.

DEQ and E & E also met with Test America Laboratories on 3/05/07 to discuss sample volume issues. Test America may be able to reduce the sample volume required, but is still completing standard runs for the analytical method. SW sampling was completed the week of 3/12/07. Reduced sample volume may be used during the next SW sampling event in September 2007 depending on the results of Test Americas standard runs. During the surface water sampling event, targeted surveys of the armoring protection were completed in the areas of sample location 10 and 20 beneath the BNRR bridge. The results of this survey identified two locations, approximately 8 to 10 feet in diameter, with reduced armoring. In these locations, armoring consisted of about a 6-inch thick layer of what the divers described as 4-inch minus material. These areas do not appear to need additional armoring, however E & E will contact the divers to better understand the size of the material encountered. If warranted, these areas will be further inspected and repaired during the embayment armoring repair activities scheduled for early July.

NAPL Extraction: Newt will utilize the NAPL freezing method for each of the current NAPL recovery wells (MW-20i, MW-Ds, and MW-Gs). He will conduct this test one time on each well and work with E & E to calculate the percentage of water within the NAPL from individual recovery wells. This percentage will be used to determine total NAPL volumes. The tests may be run again in the fall to evaluate whether there are seasonal variations in water content. E & E will summarize the results in a brief tech memo, which includes a table showing water percentages.

Armoring Repair: E & E has submitted a draft request to DEQ to conduct armor repair work under sole-source procurement. E & E will submit a revised request to DEQ by March 22, 2007. E & E plans to modify the approach to the armoring repair to incorporate elements of the Biological Opinion, and to address comments received from DEQ regarding the draft scope and specifications previously submitted. E & E also plans to incorporate enough flexibility into the scope to allow additional rock armor placement in the event that additional areas of deficient armor are discovered. Upon DEQ authorization to proceed, E & E will finalize the scope of work for the armor repair and establish a sub-contract with Advanced American to perform this work. Repairs are currently scheduled to begin early July 2007 to take advantage of high water conditions throughout the full duration of the construction work. In-water work should be completed by July 20, 2007 assuming a 2-week work period. E & E proposed extending the time period for work order 28 past July 1, 2007, solely for the purpose of covering subcontractor costs associated with the armor repair, to avoid the need to split costs between multiple work orders. DEQ was open to the suggestion and will consider this request.

Miscellaneous Field Items: E & E is continuing to procure a subcontractor to dispose of collected NAPL, purge water, and PPE. Waste Management's subcontractor Clean Harbors (Aragonite, UT) facility is not acceptable due to existing violations. E & E is reviewing an alternative disposal facility. If this facility is acceptable, E & E will execute a subcontract with Waste Management. If not, E & E will execute a subcontract with Waste Management for the disposal of PPE and purge water only at their Chem-waste facility in Arlington, OR. NAPL disposal options will then reevaluate costs received from Waste Management.

Action Items:	**Person Responsible:**	**Deadline:**
Review serial number inventory	Newt Linn	2 weeks
Revise Fact sheet for site access info.	George Lukert	Completed
Submit Trespass Agreement to North Portland Police Bureau	Kevin Parrett	Completed

Determine SW Sample Volume	George Lukert / Kevin Parrett	Completed
Provide access map to University of Portland and Metro	Kevin Parrett	Completed
Contact divers	Lenna Cope	1 week
Update office equipment inventory	George Lukert	Completed
Waste disposal subcontract	George Lukert	3 weeks
Prepare NAPL/water percentage Tech Memo	George Lukert	2 weeks after NAPL measurement
Complete Sole-Source Request for Armor Repair	Eric White	3/22/07
Finalize Scope of Work for Armor Repair	Eric White	Upon authorization to proceed from DEQ – expected completion date 3/30/07
Establish Subcontract w/Advanced American or Evaluate Need to Competitively Procure Work	Eric White	5/1/07

CSM and OC Report

Discussion: Kevin requested that E & E provide an additional 5 CDs of the O&M report.

Action Items:	**Person Responsible:**	**Deadline:**
Submit Annual report	George Lukert / Lenna Cope	Completed
Provide and additional 5 CDs of the O&M report.	George Lukert	1 week

Ongoing Deliverables

Discussion:

Action Items:	**Person Responsible:**	**Deadline:**

Next Meeting

Date / Time	To be determined	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting		Wednesday 04/17/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203	
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	John Montgomery, E & E	Note Taker:	George Lukert, E & E
Attendees:	Kevin Parrett	Project Manager	ODEQ
	John Montgomery	Project Manager	E & E
	George Lukert	Task Manager	E & E
	Eric White	Site Engineer	E & E
	Newt Linn	Site Technician	Clearwater Environmental

Meeting called to order at 9:00 a.m.

Agenda

Site Walk

Group walked the upland perimeter of the site and the full length of the beach. During the beach walk, observed numerous debris, including treated wood debris. A dead goose was also noted on the beach (TFA), and two broken ACB blocks in the FWDA. These appear to have been broken by large debris. Several of the fence gates do not secure properly (e.g. the latch can be forced open). E & E will add security chain to these gates.

Kevin Parrett approved purchasing contractor grade combination locks for all gates. E & E will attempt to purchase ones with longer shanks so they will fit better in the gate. Combinations will be set to the existing code. Kevin also approved repair costs for the facility light.

Action Items:	**Person Responsible**	**Deadline**
Monitor gaps observed in ACB during site walks	Newt Linn	Ongoing – repair in Summer 2007
Monitor head water erosion and notify E&E if scoured area deepens	Newt Linn	Ongoing
ACB Concrete repair – grouting of gaps	Newt Linn	Summer 2007
Paint wells	Newt Linn	Summer 2007
Cut remaining (accessible) S.S. loops	Newt Linn	Ongoing
Repair facility light	Lenna Cope	Schedule work by 4/20/07
Purchase additional combination locks	Bryan Ciecko	2 weeks
Replace ACB block - FWDA	Newt Linn	When river levels allow

Budget Status

Discussion:

Budget Status: Briefly discussed current budget status; in process of revising cost status report. Current budget projecting slight surplus ($400).

Action Items:	Person Responsible:	Deadline:
Prepare revised cost status table.	John Montgomery	April 27

Site Activities / Miscellaneous Field Activities

Discussion:
Site Activities:
Topics from the meeting include:

E & E will develop a Field Activity Log to document all of the O&M activities taking place at the site. This form will be similar to the site sign-in sheet, but will include some additional notes for activities. A sign-in log will also be posted on the outside of the trailer so other subcontractors or agencies that don't typically enter the trailer can sign in (e.g., City vegetation maintenance staff). Information obtained on the sign-in sheet will be entered electronically onto the Field Activity Log for inclusion in the annual O&M report.

E & E has updated the office equipment inventory and the serial number inventory for site equipment. This information will be included in the O&M Manual.

DEQ and E & E have met with Test America Laboratories to discuss sample volume requirements for the surface water sampling events. Test America was unable run detection limit tests for a reduced sample volume before the Spring 2007 sampling event. E & E will continue to request this information so that a determination to reduce sample volume can be made by the Fall Sampling event.

NAPL Extraction: Newt has collected and frozen NAPL from MW-20i and is in the process of collecting sufficient NAPL from MW-Ds, which should be completed the week of 4/20/07. E & E will then calculate the percentage of water within the NAPL from individual recovery wells. This percentage will be used to determine total NAPL volumes. E & E will summarize the results in a brief tech memo, which includes a table showing water percentages.

Armoring Repair: E & E submitted a request to DEQ to pursue conducting armor repair work under sole-source procurement to AAC, and DEQ approved the request on 3/26/07. E & E modified the draft scope of work and specifications for armor repair to incorporate elements of the Biological Opinion, to address comments received from DEQ regarding the draft scope and specifications previously submitted, and to add two additional locations for armor placement located near the BNRR bridge. E & E contacted the divers who noted these two locations and confirmed that only gravel was observed, not rock greater than 1-inch diameter. E & E also incorporated enough flexibility into the scope to allow additional rock armor placement in the event that additional areas of deficient armor are discovered. AAC is currently evaluating the revised scope and will provide a cost estimate by April 30, 2007. Repairs are currently scheduled to begin early July 2007 to take advantage of high water conditions throughout the full duration of the construction work. In-water work should be completed by July 20, 2007 assuming a 2-week work period. Based on discussions during the annual meeting on April 18, 2007, DEQ may submit a request to NMFS to extend the opening of the fish window forward to latter June to take advantage of higher water conditions which would allow better placement techniques for armor repair.

Miscellaneous Field Items: E & E is in the process of completing a subcontract with Waste Management for the removal of NAPL. E & E will set a schedule with WM by April 27, 2007.

Action Items:	Person Responsible:	Deadline:
Review serial number inventory	Newt Linn	Completed
Prepare activity log	Lenna Cope	4/27/07
Determine SW Sample Volume	George Lukert	Ongoing
Waste disposal subcontract	George Lukert	Schedule by 4/27/07
Prepare NAPL/water percentage Tech Memo	George Lukert	4/27/07
DEA Subcontract for Differencing Images	John Montgomery	ASAP (need images in time to alter armor repair scope, if need be)
Get cost from Advanced American to perform Armor Repair	Eric White	4/30/07
Provide Recommendation to DEQ to Subcontract w/Advanced American or Evaluate Need to Competitively Procure Work	Eric White	5/1/07

O&M Manual

Discussion: E & E will prepare the draft O&M Manual for DEQ to be submitted by mid May (next monthly meeting). 5 year cost estimate will be updated week of 4/23/07.

Action Items:	Person Responsible:	Deadline:
Prepare Draft O&M Manual	George Lukert/Lenna Cope	5/16/07

Ongoing Deliverables

Discussion:

Action Items:	Person Responsible:	Deadline:
Provide an additional 5 CDs of the O&M report.	George Lukert	4/20/07

Next Meeting

Date / Time	5/16/07	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting		Wednesday 05/16/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203	
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	John Montgomery, E & E	Note Taker:	Lenna Cope, E & E
Attendees:	Kevin Parrett	Project Manager	ODEQ
	John Montgomery	Project Manager	E & E
	Eric White	Site Engineer	E & E
	Lenna Cope	Staff Engineer	E & E
	James Parsons	Community Member	Attend portion of bank walk.

Meeting called to order at 9:00 a.m.

Agenda

Site Walk

Group walked the upland perimeter of the site and the full length of the beach. During the site walk new combination locks with short shackles were tested on a gate with safety chain, the shackles are too short to connect the ends of the chain. Newt will research having the shackles on the combination locks extended. If they cannot be extended keyed locks with extended shackles will be used in sequence with the combination locks. This will enable the site to be accessed without needing keys. Combinations will be set to the existing code. Approval for purchasing contractor-grade combination locks was previously approved by Kevin Parrett. The safety chain and lock from southwest entrance needs to be moved to the perimeter gate in northeast corner of the property because the gate does not secure properly, this will be an interim measure until the new locks can be obtained.

During the beach walk, observed numerous debris items, including treated wood debris. DEQ requested the timbers be removed this summer while heavy equipment is mobilized to the site for other repair work. While developing a plan for removing timbers we need to consider access and wood chips and/or shaving that would result from cutting them into smaller sections. James Parsons, a community member who walks along the beach frequently, joined a portion of the beach walk to discuss goslings potentially getting trapped in the ACB voids. On May 8, 2007 he found two goslings that were trapped in the ACB voids. After Mr. Parsons reported the incident to DEQ, Kevin directed E & E to inspect the shoreline and identify goose travel paths between upland areas and the river that could potentially cross ACB voids. At that time, E & E addressed three goose routes (as evidenced by the presence of footprints) by placing additional sand in the ACB voids to create more level pathways. The area where Mr. Parsons saw the goslings was in a wider area of exposed ACB that was not practical to address at the time. It was determined today that additional travel paths will be created this summer using heavy equipment and gravel.

The amount of ebullition (i.e., gas bubbling) occurring in the embayment by the TFA has substantially increased from previous months, but no sheen has been observed. As noted in the previous meeting, there are two broken ACB blocks in the FWDA which may have been broken by large debris.

There is a small hole in the fence fabric along the western edge of the property, approximately 300 feet from the south end of the property. There is also a location near the hole where the bottom of the fence fabric has been propped up by a piece of wood. Newt will inspect and make necessary repairs.

Painting monitoring wells this summer was removed from the action items list since the City is re-evaluating its regulations for the paint color of monitoring wells within the Willamette River Greenway.

Action Items:	Person Responsible	Deadline
Monitor gaps observed in ACB during site walks	Newt Linn	Ongoing – repair in Summer 2007
Monitor head water erosion and notify E&E if scoured area deepens	Newt Linn	Ongoing
ACB Concrete repair – grouting of gaps	Newt Linn	Summer 2007
Have longer combination lock shackles installed	Newt Linn	June 1, 2007
Repair western edge of fence	Newt Linn	May 25, 2007
Cut remaining (accessible) S.S. loops	Newt Linn	Ongoing
Remove treated timber from shore	Newt Linn	Summer 2007
Build paths over ACB for wildlife	Newt Linn	Summer 2007
Repair facility light	Lenna Cope	completed
Purchase additional combination locks	Bryan Ciecko	Completed (3 purchased; need 8 more)
Replace broken ACB block - FWDA	Newt Linn	When river levels allow

Budget Status

Discussion:

E & E presented the revised cost tracking table to DEQ. As of week ending May 5, 2007, E & E forecasts a surplus of approximately $8,000 at the end of the task order period. E & E and DEQ discussed two options for extending work order OY28: either through the end of July to cover armor repair activities or through end of September 2007 to also encompass other summer maintenance. Kevin Parrett will discuss options with Steve Campbell. E & E will begin preparing a BAP amendment for OY28 to cover armor repair cost and current out-of-scope items prior to preparing a BAP amendment to extend OY28 through September. This will allow the work for armor repair to proceed quickly. Eric White will send an email request for authorization to proceed with out-of-scope items.

Action Items:	Person Responsible:	Deadline:
Decision regarding extending OY28	Kevin Parrett/Steve Campbell	May 21, 2007
Out-of-scope authorization request	Eric White	May 17, 2007
Submit amended BAP for armor repair work	John Montgomery	May 30, 2007
Submit amendment to extend or new BAP for continuation through Sept 2007	John Montgomery	June 13, 2007

Site Activities / Miscellaneous Field Activities

Discussion:

E & E has developed a Field Activity Log to document all of the O&M activities taking place at the site. The form is similar to the site sign-in sheet, but includes some additional notes for activities. A sign-in station has been installed near the base of the stairs so other subcontractors or agencies that don't typically enter the trailer can sign in (e.g., City vegetation maintenance staff). Newt Linn is having a placard made to place on the outside of the station directing all visitors to sign-in. Information obtained on the sign-in sheet will be entered

electronically onto the Field Activity Log for inclusion in the annual O&M report. Lenna Cope will email the current version of the Field Activity Log to anyone listed in the log that may need to add additional site visits that were not previously documented or provide more detail regarding their site visit. A reminder to use the sign-in sheet and its purpose for tracking site activities will be included in the email. A copy of the Field Activity Log will be brought to future monthly site meetings.

NAPL Extraction:
E & E has calculated the percentage of water within the liquids collected from MW-20i and MW-Ds: the average percentage of water is 51%. This calculation will also be performed for MW-Gs once sufficient volume is collected. These calculations will be repeated each quarter. The calculated percentage of water will be used to estimate the amount of NAPL extracted since January 2007 and for future NAPL collection. A brief technical memorandum was prepared and submitted to DEQ describing the procedure used to determine the percentage of water, this tech memo will be included in the O&M Manual and O&M Annual Report.

Armoring Repair: E & E has received a cost estimate from AAC for armor placement and will begin contract negotiations. Once a final cost estimate is reached, E & E will request from DEQ an approval to enter into a subcontract with AAC. Once the work order is amended to cover the subcontract cost, E & E will finalize the subcontract agreement.

E & E is preparing fish count graphs to assist DEQ in requesting an extended fish window from NMFS. The graphs include fish counts for the last four years and will be completed later today (5/16/2007). Once DEQ has the graphs they will proceed with requesting the fish window extension.

E & E will prepare the necessary erosion control plan by June 8th for DEQ to review, assuming this is authorized by DEQ. E & E will review plans prepared for the 2005 sediment cap installation and use them as models for preparing plans for the 2007 armor repair.

Repairs are currently scheduled to begin in the last week or weeks of June 2007 to take advantage of higher water conditions than expected later in the summer. Deeper water will allow the use of better placement techniques and minimize the potential for disturbance to surrounding areas of the cap during rock placement. E & E plans to submit an amended BAP to DEQ by 5/30/2007.

Miscellaneous Field Items:
Waste Management is unwilling to negotiate a subcontract with E & E for removal of NAPL from the site. E & E will pursue other waste haulers to perform the disposal.

E & E and DEA will be signing a subcontract for preparing Differencing Images of bathymetry to evaluate the sediment cap surface. The work is expected to be completed by June 1, 2007. Depending on the results of the Differencing Images, E & E will consult with DEQ and may schedule additional diver inspections to determine if the work being performed by AAC needs to be expanded into any other areas of the cap.

Signs warning site visitors to not drink water from any spigot on the site need to be attached or posted on doors near any water source. This is necessary because there is not a back flow prevention device on the irrigation system.

Action Items:	**Person Responsible:**	**Deadline:**
E-mail activity log to site visitors	Lenna Cope	May 23, 2007
Post "Do not drink the water" signs	Newt Linn	May 25, 2007
Determine SW Sample Volume	George Lukert	Ongoing
Waste disposal subcontract	George Lukert	Ongoing
Prepare NAPL/water percentage Tech Memo	George Lukert	completed

DEA Subcontract for Differencing Images	John Montgomery	Work completed by June 1, 2007
Get revised cost from AAC to perform Armor Repair	Eric White	completed
Prepare erosion control and spill prevention plans for armor repair work	Eric White	June 8, 2007
Request to extend fish window	Kevin Parrett	May 18, 2007
Negotiate subcontract with AAC and Request approval from DEQ to enter into subcontract with AAC	Eric White	June 8, 2007
Finalize subcontract with AAC	Eric White	June 17, 2007
Fish count graphs	Eric White	May 16, 2007

O&M Manual

Discussion:

E & E will submit the draft O&M Manual to DEQ on May 21, 2007. For the draft E & E will prepare one hard copy, for the final E & E will prepare 5 hard copies, each containing a CD, and 5 additional CDs. DEQ will obtain the additional sections from other organizations once they have received the draft and will make them available to E & E in electronic form.

DEQ has reviewed the 5 year cost estimate. E & E will schedule a time to meet with DEQ to discuss in early June.

Action Items:	**Person Responsible:**	**Deadline:**
Prepare Draft O&M Manual	George Lukert/Lenna Cope	5/21/07
Discuss 5 year cost estimate	George Lukert	Early June

Ongoing Deliverables

Discussion:

Action Items:	**Person Responsible:**	**Deadline:**
Provide an additional 5 CDs of the O&M report.	George Lukert	completed

Next Meeting

Date / Time	Tentatively 6/20/07	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting		Wednesday 06/26/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203	
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	John Montgomery, E & E	Note Taker:	Lenna Cope, E & E
Attendees:	Kevin Parrett	Project Manager	ODEQ
	John Montgomery	Project Manager	E & E
	Eric White	Site Engineer	E & E
	Lenna Cope	Staff Engineer	E & E
	Newt Linn	Site Technician	Clearwater Environmental

Meeting called to order at 9:00 a.m. June 26, 2007

Agenda

Site Walk – Upland

Group walked the upland perimeter of the site and the full length of the beach. During the upland site walk two new animal burrows were observed near the retention pond; one at the east side of the headway and one on the west side of the spillway. DEQ asked that the burrows be monitored but not filled at this time. No demarcation fabric or contaminated soil was observed to be present in the dirt removed to create the burrows. The results of the investigation will help determine what type of action will be taken with future animal burrows within the cap boundary.

Combination locks previously purchased for the site perimeter gates have been failing, therefore they were returned to the locksmith. During the site meeting DEQ, E&E, and Clearwater discussed possible alternatives to combination locks and decided to return to heavy duty keyed locks which have previously been reliable at the site. Heavy duty keyed locks with extended shackles, and safety chain if necessary, will be installed on all infrequently used perimeter gates. The main entrance gate (support area) will continue to be accessed using a combination lock unless a security key box, similar to what realtors use, can be affixed outside the gate. If a security key box can be used the main entrance gate will also be accessed using a keyed lock and the key will be stored in the security key box. Previously noted holes in fence along eastern edge of site have not yet been repaired. Newt plans on purchasing a new section of fence fabric and weaving it into the existing fabric.

With DEQ approval, Clearwater purchased a weed trimmer to clear heavy vegetation growth around monitoring wells to allow clear access for gauging and monitoring efforts.

Site Walk - Shoreline

During the initial shoreline inspection performed by Newt, one day prior to the site inspection meeting, sheen was observed along the beach from the TFA to the southern end of the site. During the shoreline inspection several areas of sheen were also observed and documented on a site figure. These areas are at the south end of the site at the ACB edge treatment, along the eastern edge of the organoclay mats in the TFA, and in Willamette Cove between the October 2006 organoclay core sample locations SD-04 and D5.

At the organoclay mats the sheen had collected in water puddles left by low water at four locations. At the south end of the site and in Willamette Cove the sheen ranged in size from the size of a quarter to the size of a fist. No source for the sheen could be identified during the site walk, there was no associated odor, and the sheen was observed only on the surface of the sediment, not in underlying soils. Two days later a release appeared to be originating down river of Willamette Cove and not related to the M&B site; the source of this release may have been the source of the sheen observed earlier.

To evaluate the nature of the sheen, water samples were collected from four areas of sheen in the TFA, along the eastern side of the organoclay mat, and from four areas on the western (river-ward) side of the organoclay mat

that did not exhibit signs of sheen. The samples were labeled A through H and sent to the DEQ contract laboratory for analysis. Sample locations were documented on a site map along with photographs. Daily beach inspections will be performed as part of the construction oversight for additional rock placement. Following completion of armor repair activities, weekly shoreline inspections will start one month earlier than planned (in July rather than August) to more closely monitor sheen at the site.

There continues to be a large amount of woody debris along the shoreline, including some treated timbers. Removal of treated timbers, the construction of geese paths, and grouting of ACB seam gaps has been tentatively scheduled for mid-September.

During the shoreline inspection, discussions were held with a boat owner who had been staying anchored in Willamette Cove for the previous few weeks. He reported that there are frequent gatherings at the beach in the evenings that result in discarded garbage along the shore.

A shelter has been constructed by trespassers among some of the larger debris and logs; blankets, pillows, clothing, and magazines were observed within the shelter. No one has been observed occupying the shelter.

Action Items:	Person Responsible	Deadline
Monitor gaps observed in ACB during site walks	Newt Linn	Ongoing – repair in Summer 2007
Monitor head water erosion and notify E&E if scoured area deepens	Newt Linn	Ongoing
ACB Concrete repair – grouting of gaps	Newt Linn	Mid-September 2007
Have keyed locks w/longer shackles installed	Newt Linn	July 6, 2007
Repair eastern edge of fence	Newt Linn	July 6, 2007
Cut remaining (accessible) S.S. loops	Newt Linn	Ongoing
Remove treated timber from shore	Newt Linn	Mid-September 2007
Build paths over ACB for wildlife	Newt Linn	Mid-September 2007
Replace broken ACB block - FWDA	Newt Linn	When river levels allow

Budget Status

Discussion:

Budget status was available, but due to time constraints of starting additional rock placement and sampling sheen it was not discussed during the monthly meeting. Currently, E & E is preparing a BAP amendment request to extend the task order through September 2007.

Action Items:	Person Responsible:	Deadline:
Submit BAP amendment four to continue through September 2007	John Montgomery	July 2, 2007
Decision regarding extending OY28	Kevin Parrett/Steve Campbell	Completed
Out-of-scope authorization request	Eric White	Completed
Submit amended BAP for armor repair work	John Montgomery	Completed

Site Activities / Miscellaneous Field Activities

NAPL Extraction:

NAPL extraction continues at the site, primarily from MW-Ds and MW-20i. MW-Gs periodically requires extraction. Roughly 0.5 to 2.5 gallons is extracted from wells (water and NAPL) each week.

Armoring Repair: Armor repair construction was scheduled to begin the day of the site inspection meeting (6/26/2007). AAC was delayed from starting activities earlier in the week due to scheduling delivery of the material and making repairs to their crane barge spuds. AAC arrived onsite at approximately 14:00 and began work. Details of the armor repair will be documented during construction oversight and included in the annual O& M Report for 2007. AAC planned to begin rock placement in the deep river areas (area one through five) and then move into the embayment (area 6) later in the week.

Differencing Image:
Difference image analysis has been completed by DEA. Three areas of interest were identified, and E & E asked AAC to utilize their divers to inspect additional areas in the course of armor repair, if time allows.

Action Items:	Person Responsible:	Deadline:
Determine SW Sample Volume	Eric White	Ongoing
Waste disposal subcontract	Eric White	Ongoing
Post "Do not drink water" signs	Newt Linn	Completed
E-mail activity log to site visitors	Lenna Cope	Completed
DEA Subcontract for Differencing Images	John Montgomery	Completed
Prepare erosion control and spill prevention plans for armor repair work	Eric White	Completed
Request to extend fish window	Kevin Parrett	Completed
Negotiate subcontract with AAC and Request approval from DEQ to enter into subcontract with AAC	Eric White	Completed
Finalize subcontract with AAC	Eric White	Completed
Fish count graphs	Eric White	Completed

Deliverables

O&M Manual: E & E submitted the Draft O&M Manual on May 21, 2007 and is awaiting comments from DEQ.

5 Year Cost Estimate:
E & E previously met with DEQ regarding the 5 year cost estimate and is working on incorporating comments.

Action Items:	Person Responsible:	Deadline:
Prepare Draft O&M Manual	George Lukert/Lenna Cope	Completed
Discuss 5 year cost estimate	George Lukert	Completed
Finalize 5 Year Cost Estimate	Eric White/Lenna Cope	July 2007

Next Meeting

Date / Time	Tentatively 7/25/07	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting	Wednesday 07/25/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203		
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	Eric White, E & E	Note Taker:	Lenna Cope, E & E
Attendees:	Kevin Parrett	Project Manager	ODEQ
	Steve Campbell	Contract Specialist	ODEQ
	Eric White	Project Manager	E & E
	Lenna Cope	Staff Engineer	E & E

Meeting called to order at 9:00 a.m. July 25, 2007

Agenda

Site Walk – Upland

Group walked the upland perimeter of the site and the full length of the beach. During the upland site walk animal burrows discovered during the June inspection were observed. They did not appear to be any larger, however fresh tracks could be seen around the entrances. No demarcation fabric or contaminated soil was observed to be present in the dirt removed by the animal while creating the burrows. DEQ requested E & E research typical animal burrowing depths for ground squirrels and rabbits, the two most likely animals. Burrows will be excavated during the week of September 17-21 to determine if they extend into contaminated soil. The results of the investigation will help determine what type of action will be taken with future animal burrows within the cap boundary.

The hole in the eastern edge of the fence is not yet repaired, the fence fabric and staples have been purchased and the repairs will occur next week. At another location along the eastern edge of the fence, the hardware that secures the fence to the post has been removed, this will also be repaired next week. During the initial site inspection performed by Newt two days prior to the site inspection meeting it was discovered that someone had pried open the southern entrance by bending the "U" gate fastener. Newt bent the gate fastener back into place and plans to install safety chain around the gate once keyed locks with extended shackles are ready. The locksmith providing the locks and extended shackles had to order more shackles, they should be ready next week. Once the locks are ready all perimeter gates, except for the main entrance gate, will have keyed locks and safety chain if necessary. During the site meeting DEQ requested that E & E use chain and multiple combination locks in an attempt to secure the southern gate while waiting for keyed locks. This was completed following the meeting.

Gravel from the access road in the southwest corner of the site has begun to slough off and fill the culverts crossing under the road. Newt will clean out gravel and ensure the culverts are clear before the heavy rain season starts.

Site Walk – Shoreline

During the initial shoreline inspection performed by Newt, one day prior to the site inspection meeting, sheen was observed only at two small (fist size) spots at the north end of Willamette Cove. During the shoreline inspection sheen was observed at five locations. Location one was at the southern end of the site and extended intermittently along the shore to the organoclay mats in the TFA, the size varied from quarter size to stringers/bands of sheen. Location two was along the eastern edge of the organoclay mats in puddles that were formed by low water, and corresponded to the locations sampled in June (samples A, C, E, G). The size varied from quarter size to small sheets of sheen on the surface of one puddle. Location three was observed near the test organoclay patch in the TFA, and consisted of several quarter size spots of sheen. Location four was observed at the outer northern edge of the embayment and consisted of multiple quarter to fist sized spots of sheen. Location five was observed in Willamette Cove along the shoreline near October 2006 organoclay core sample location B2. The areas are noted in the attached figure. In all cases the sheens appeared to be highly

weathered as indicated by a waxy texture and no discernible odor. Additionally, the source of sheen could not be identified and may be distant from where the sheens were discovered (i.e., the sheens may have floated away from the source). Although an off-site source cannot be ruled out, the current evidence, including analytical results from water samples collected in June, indicate the likely presence of an on-site source(s) of sheen release.

There continues to be a large amount of woody debris along the shoreline, including some treated timbers. Removal of treated timbers, the construction of geese paths, and grouting of ACB-seam gaps has been tentatively scheduled for the week of September 17-21, to allow time for DEQ to communicate with the NMFS (Nancy Munn) regarding the planned activities.

The shelter observed during the previous site meeting near the 'REEF' sign along the shore has new items in it and no longer appears to be abandoned. The police will be notified to see what can be done about having it removed.

Action Items:	**Person Responsible**	**Deadline**
Coordinate with NMFS regarding wildlife paths and other corrective measures planned for mid-September 2007.	Kevin Parrett	August
Animal burrow excavation	Newt Linn	Week of Sep. 17-21
Notify police of transient shelter	Lenna Cope	August 3, 2007
Remove gravel from culverts	Newt Linn	Prior to rainy season
Monitor gaps observed in ACB during site walks	Newt Linn	Ongoing
Monitor head water erosion and notify E&E if scoured area deepens	Newt Linn	Ongoing
ACB Concrete repair – grouting of gaps	Newt Linn	Week of Sep. 17-21
Have longer keyed lock shackles installed	Newt Linn	August 3, 2007
Repair eastern edge of fence	Newt Linn	August 3, 2007
Cut remaining (accessible) S.S. loops	Newt Linn	Ongoing
Remove treated timber from shore	Newt Linn	Week of Sep. 17-21
Build paths over ACB for wildlife	Newt Linn	Week of Sep. 17-21
Replace broken ACB block - FWDA	Newt Linn	When river levels allow

Budget

Budget Status: The budget status as of July 14, 2007 was presented to DEQ. The status update was prepared looking at projected costs through September, even though the BAP to extend through September had not been approved yet. Due to performing pre-authorized but unfunded activities the task 1 budget has been exceeded by approximately $400. Previous notice of the potential to exceed was given to DEQ. E & E also estimates that the budget for task 3 will be exceeded prior to getting a new BAP approved, notification was given to DEQ. As of 7/14/2007 $215,701 remained in the Task Order and a projected need of $88, 450 was estimated to continue support through September. While discussing the budget status DEQ requested the table be reformatted to display the surplus/shortfall explanations on a separate page.

BAPs: Concurrently with reviewing the budget status, DEQ provided E & E with comments on draft BAP for amendment 4 (which will now be amendment 5, considering the no-cost extension issued in amendment 4). DEQ decided to extend task order OY28 through January 31, 2008 rather than September 30, 2007. E & E will modify the BAP and resubmit it to DEQ early next week. As part of extending the task order E & E will request approval from DEQ to extend the subcontracts for Clearwater Environmental, Global Diving; and DEA.

Invoices: The E & E invoice that covers costs incurred in the month of September, 2007 will need to be prepared to cover all expenses incurred through September 30, 2007 to correlate with the EPA fiscal year end.

Action Items:	Person Responsible:	Deadline:
Submit revised draft BAP for amendment 5 to continue through January 2008	Eric White	COB July 30, 2007
Reformat budget status table	Lenna Cope	July 27, 2007

Site Activities / Miscellaneous Field Activities

NAPL Extraction: NAPL extraction continues at the site primarily from MW-Ds and MW-20i, over the last month MW-Gs has required more frequent weekly extractions. Anywhere from 0.5 to 2.5 gallons are estimated to be extracted from each of the wells each week. The NAPL extraction total for April through June is 11.7 gallons. This total was calculated by taking the total amount of liquid extracted and applying a correction factor of 51% water in order to determine the total pure NAPL extracted. Using a 51% correction factor was discussed in the May 2007 meeting notes. The oil-interface meter used for gauging will need to be sent in for routine cleaning in the next couple of weeks.

New Locks for Gates and Wells: New locks for the gates were discussed under the Site Walk – Upland portion of the meeting notes. Locks currently on the 79 monitoring wells that are gauged on a quarterly basis have become rusted and are difficult to open and close. E & E has purchased a test lock that is marine grade, made of brass, for testing on the various types of lock closures to determine if it will fit. Newt will test and determine how many locks should be purchased; alternative locks may be needed for select monitoring wells with unique closures. Prior to the locks being installed they will be sprayed with a lock lubricant to inhibit rusting. Locks will be replaced during the third quarter groundwater monitoring event since locks will need to be removed to access monitoring wells as part of the monitoring.

New Organoclay Mat: A new organoclay mat was delivered to the site on Monday July 23, 2007. Half of the organoclay mat will be taken to the Nuway Oil site in Northeast Portland, the other half will remain onsite for future use. The cost will be split by DEQ between the two projects.

Armoring Repair: Additional Rock Placement was completed on July 10, 2007, at six areas within the sediment cap. Diver inspections in areas one through five confirmed that the design thickness of 12-inches was achieved. Probing and diver inspections confirmed in area six that the design thickness of 15-inches was achieved, coverage at the south end of area six was estimated to be heavier than at the north end. DEQ requested that E &
E draft a letter of appreciation to be sent to AAC for the work that was performed.

Diver Findings: In addition to the work performed as part of the Additional Rock Placement, AAC divers inspected three areas of concern within the sediment cap on July 10, 2007. The areas were identified as a result of bathymetric difference analysis performed by DEA that showed areas where deepening had occurred between June 2004 and Spring 2006. Inspections were performed to determine if there were any visible signs of scouring and whether rock armor was present at these locations. At two of the three locations, diver inspection indicated no visible signs of scouring and sufficient rock armor coverage of the sand cap. At one location, a small 'bench' of exposed sand was observed immediately beneath riprap armoring. It was not clear whether this was an area of sand accumulation, or whether this was a result of insufficient armor placement. This area should be monitored during future bathymetric surveys to determine if further deepening is taking place. Bathymetric difference analysis between November 2005 and Spring 2006 did not show significant deepening in this location.

Differencing Image Revision: There are minor editorial changes to be made to the differencing images prepared by DEA. DEQ will provide their comments and E & E will coordinate with DEA to make the changes.

Waste Disposal Contract: E & E will be sending DEQ a summary of recommendation for contracting with NRC for the disposal of waste from the site. Once approval has been received E & E will begin setting up a subcontract with NRC and schedule the waste disposal.

Miscellaneous: DEQ requested that E & E look into City rates for the water provided to McCormick and Baxter. If rates for water used only for irrigation are significantly lower than the current combination irrigation and potable water rate, DEQ may choose to change the classification of water at the site.

DEQ inquired about having E & E personnel onsite during the University of Portland's Labor Day community service event. Students would perform a beach clean-up. E & E will let DEQ know if anyone is available after speaking with staff.

A focus meeting will be held on August 7-8, 2007. For E & E the meeting will be attended by Eric White, Stephanie Pingree, and Lenna Cope. A pre-focus meeting between DEQ and E & E will be attended by the previously listed meeting attendees and John Montgomery on August 2, 2007.

Action Items:	Person Responsible:	Deadline:
Determine SW Sample Volume	Eric White	Ongoing
Waste disposal subcontract	Eric White	Ongoing
Water rates for site	Lenna Cope	August 3, 2007
Replace monitoring well locks	Newt Linn/Lenna Cope	September 10, 2007

Deliverables

O&M Manual: DEQ has reviewed approximately half of the Draft O&M Manual and has minimal comments. Due to summer activities and meetings DEQ expects to have the remainder of the Draft O&M Manual comments available in September.

5 Year Cost Estimate: Comments from DEQ have been incorporated by George Lukert and Lenna Cope. Project manager Eric White will review the final 5 Year Cost Estimate and then submit to DEQ by the end of the week. Potential additional surface water sampling (suggested by EPA) may be performed starting in the Spring of 2008, however this has not been finalized and therefore will not be included in the 5 Year Cost estimate at this time.

CSM Figure Revision: E & E plans to revise figures from previous document for inclusion in the CSM. E & E expects to receive minor figure modifications from Groundwater Solutions, Inc. (GSI) in the next two to three weeks. Once these modifications are received, E & E expects to complete the revisions in approximately one week, assuming that no new figure development is required.

Environmental Monitoring Report (EMR): E & E is preparing an EMR for submittal to NMFS regarding the additional rock placement at the site. The report will be available for review by DEQ early next week. The final report is due to NMFS by August 10, 2007, 30 days after the completion of the construction activity.

O&M Report 2007: DEQ and E & E began discussing the preparation of the annual O&M Report for calendar year 2007. Due to DEQ administrative requirements and the upcoming end of E & E's contract with DEQ in January 2008, the 2007 report will cover the time period from January 1, 2007 through September 30, 2007. This will allow the report to be finalized by December 15, 2007 prior to the end of the current E & E contract with DEQ. Reporting of data associated with the time period from October 1, 2007 through December 31, 2008 will be included in the annual O&M report for 2008. Data from October 1, 2007 through December 31, 2007 will be collected and prepared in a format such that it can be readily incorporated into the 2008 report.

The 2007 O & M report will consist of a brief (approximately 5- to 7-page) summary and corresponding attachments, similar to the previous report. Once funding is approved for this task by DEQ, E & E will prepare a Table of Contents for DEQ and initiate preparation of the attachment sections for which data are already available. As attachments are prepared, they will be sent to DEQ for review. E & E plans to submit to DEQ the attachments by November 1, 2007 (except for the SW/IA/SA water sampling). A complete draft report will be submitted to DEQ by December 1, 2007. E & E anticipates receiving DEQ comments within one week, and will then finalize the report by December 15, 2007.

DEQ requested that the Environmental Monitoring Report Plan (EMRP) and EMR be included as appendices to the armor repair attachment to the O & M Report.

Record Drawings: Updated record drawings will be completed to include survey results of the embayment area. A note will be added to the record drawings stating that the additional rock placement in areas one through

five are not reflected in the drawings, but will be reflected once a new multibeam survey of the entire sediment cap is performed, as indicated in the O&M Plan. DEQ also requested that the notes page prepared for the CSR be re-incorporated into the record drawings.

AWA Tech Memo: E & E will prepare an area weight average (AWA) tech memo in September or October to correspond to the AWA calculations performed as part of the SW/IA/SA Water Sampling Assessment prepared in 2006.

Action Items:	**Person Responsible:**	**Deadline:**
Review Draft O&M Manual	Kevin Parrett	September 2007
Provide comments on DEA Imagery	Kevin Parrett	August 2007
CSM Figure Revision	Chad Nancarrow/Eric White	Approx. one week after receiving mark-ups.
Draft EMR report to DEQ	Lenna Cope	August 1, 2007
Draft O&M Report	E & E	December 1, 2007
AWA tech memo	Jenny Gnanendran	September 2007
Finalize 5 Year Cost Estimate	Eric White	July 27, 2007
Next Meeting		
Date / Time	Tentatively 8/21/07; Tuesday	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting		Wednesday 08/21/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203	
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	Eric White, E & E	Note Taker:	Eric White, E & E
Attendees:	Kevin Parrett	Project Officer	ODEQ
	Eric White	Task Order Manager	E & E
	Newt Linn	Site Technician	Clearwater Environmental

Agenda

Site Walk – Shoreline

During the initial shoreline inspection performed by E & E's subcontractor (Newt Linn of Clearwater Environmental), one day prior to the site inspection meeting, sheen was observed in Willamette cove and at a number of locations along the central and southernmost portion of the shoreline, as well as the shoreline on the adjacent property south of the site. During the group shoreline inspection on August 21, 2007, sheen was observed at similar locations. Sheen ranged in size from coin-sized patches to bands of sheen several feet wide. Similar to sheen observed previously at the site this summer, the sheens appeared to be highly weathered as indicated by a waxy texture and no discernible odor. At one location near the southern end of the shoreline, ebullition was observed that appeared to include one bubble that released a small sheen (1-inch diameter) when it reached the surface; the sheen reformed a contiguous shape when touched (as opposed to the blocky characteristics of the sheen predominantly observed at the site, which remains broken into pieces when disturbed), but immediately dissipated and disappeared as it reached the shoreline. This ebullition resulting in a sheen release was not observed again at this location, despite continued observation; nor was it observed elsewhere at the site. Some creosote odor was noted along the shoreline, immediately south of the organoclay mat (wind was light from the west).

A number of live clams (approximately a dozen) were observed in the southern-most area of the cap, in an area of sand-filled ACB. Bird tracks in the area and clam shells were also observed here. One dead crayfish was also observed in this vicinity.

There continues to be a large amount of woody debris along the shoreline, including some treated timbers. Removal of treated timbers, the construction of wildlife paths, and grouting of ACB-seam gaps has been scheduled for the week of September 17-21. E & E plans to meet with NMFS at the site on August 28 to discuss planned activities prior to implementation.

The shelter observed during the previous site meeting near the 'REEF' sign along the shore was not inhabited during the site walk, but no longer appears to be abandoned. The police were notified but would not take action unless we observe someone actually using it.

Site Walk – Upland

Animal burrows discovered during the June inspection appeared to be stable. Some tracks were observed in the vicinity (including cat tracks; most likely hunting the inhabitant), and rabbits continue to be observed in the area. No demarcation fabric or contaminated soil was observed to be present in the dirt removed by the animal(s) while creating the burrows. Burrows will be excavated during the week of September 17-21 to determine if they extend into contaminated soil. The results of the investigation will help determine what type of action will be taken with future animal burrows within the cap boundary.

Fence repairs have been completed along the eastern boundary, including patch placement in areas where panels

had been cut and re-stringing of barbed wire that had been removed or fallen. The locks on the perimeter gates appear secure and have not been disturbed; there were no signs of attempted forced entry. At the upper gate at the entrance from Edgewater Road, the M&B site lock had been cut; Clearwater replaced it with a new lock.

Clearwater had cleared out the culverts crossing under the road at the southwest corner of the fenced area, removing gravel that had sloughed or accumulated inside the pipes.

Action Items:	Person Responsible	Deadline
Fence repair	Newt Linn	Complete
Clear out rock/gravel accumulation in drainage culvert from drainage basin	Newt Linn	Complete
Monitor head water erosion and notify E&E if scoured area deepens	Newt Linn	Stable
Notify police of transient shelter	Lenna Cope	Complete
Evaluate tracks at animal burrows	Lucas Meek	September 17, 2007
Cut remaining (accessible) S.S. loops	Newt Linn	Complete
Excavate animal burrows to determine depth	Lucas Meek/Newt Linn	Sept 17-21, 2007
ACB Concrete repair – grouting of gaps	Newt Linn	Sept 17-21, 2007
Remove treated timber from shore	Newt Linn	Sept 17-21, 2007
Build paths over ACB for wildlife	Newt Linn	Sept 17-21, 2007
Replace broken ACB block - FWDA	Newt Linn	Sept 17-21, 2007
Meet with NMFS regarding wildlife paths and other corrective measures planned for mid-September 2007.	Eric White	August 28, 2007

Budget

Budget Status: The budget status as of August 11, 2007 was presented to DEQ. The status update was prepared looking at projected costs through January 2008, even though the BAP to extend through January 2008 had not been approved yet. E & E had previously notified DEQ that subtasks 1 and 3 would exceed authorized budgets but that the overall task order budget was sufficient to cover project costs until a task order amendment is issued. E & E anticipates that additional funds will be required to complete the CSM figures, based on the number of historical figures that will need to be included. As of 8/11/2007, $57,323 remained in the Task Order. The table was reformatted, as requested by DEQ, to be more readable.

BAPs: E & E is preparing a BAP for amendment 5 to extend task order OY28 through January 31, 2008. As part of extending the task order E & E will request approval from DEQ to extend the subcontracts for Clearwater Environmental, Global Diving; and DEA.

Action Items:	Person Responsible:	Deadline:
Submit revised draft BAP for amendment 5 to continue through January 2008	Eric White	August 28, 2007
Reformat budget status table	Lenna Cope	Complete

Site Activities / Miscellaneous Field Activities

Sheen Evaluation: To further evaluate the sheen observed at the site intermittently over the past two months, GSI and E & E have made additional observations at low tide to determine if it is evident where the sheen is emanating, and whether signs of contamination are evident below the surface in sediments along the shore. E & E will continue to evaluate potential analytical approaches for characterizing the sheen and provide recommendations regarding additional surface water and/or sediment sampling if sheen continues to be observed at the site.

NAPL Extraction: NAPL extraction did not take place during the previous two weeks due to the need to service the oil-interface meter used for gauging wells. Prior to that, extraction rates were consistent with previous extraction. Clearwater will be evaluating the ratio of percent NAPL to percent water by September 17 to compare with previous measurements and to calculate the total volume of NAPL collected (compared with the

total volume of liquid collected).

New Locks for Wells: E & E will purchase new brass locks for monitoring wells. Prior to the locks being installed they will be sprayed with a lock lubricant to inhibit rusting. Locks will be replaced during the third quarter groundwater monitoring event, since locks will need to be removed to access monitoring wells as part of the monitoring. Clearwater will obtain two lock boxes to allow key for exterior gates to be obtained using combination inside the fenced operations area. One box will be placed in the trailer area and one near the NW corner of the site, inside the fence.

Armoring Repair: The Environmental Monitoring Report describing the monitoring conducted during rock placement in June and July was submitted to NMFS on August 9, 2007.

Differencing Image Revision: E & E provided comments from DEQ to DEA for final images and anticipates receiving revised images by August 31, 2007.

Waste Disposal Contract: E & E plans to dispose of waste currently accumulated at the site by the end of September.

Miscellaneous: DEQ inquired about having E & E personnel onsite during the University of Portland's Labor Day community service event. Students would perform a beach clean-up. E & E will let DEQ know if anyone is available after speaking with staff.

E & E was approached by a neighbor, Jeff Gourly, upon entry to the gate at Edgewood prior to the monthly meeting. According to Mr. Gourly, the residents above Willamette Cove are concerned about illicit activities taking place in the Cove, including dumping of construction debris and general refuse. The neighborhood association plans to request additional inspection/surveillance by police to discourage further unauthorized activities.

A focus meeting to discuss EPA, NOAA, and other stakeholder comments regarding the 2006 O&M Report and O&M Plan was held on August 7-8, 2007. E & E is compiling a meeting summary in the form of response to comments.

Annual testing of the backflow prevention device for water service is due. E & E will have this work conducted.

Action Items:	Person Responsible:	Deadline:
Determine SW Sample Volume	Eric White	Complete (2 containers will be used per sample)
Waste disposal	Eric White	September, 2007
Test backflow prevention	Eric White	September, 2007
Replace monitoring well locks	Newt Linn/Lenna Cope	September, 2007

Deliverables

Comment Response Tech Memo on O&M Report and Plan: E & E is preparing responses to comment on these documents as discussed at the August 7-8 focus meeting. E & E expects the draft response memo will be provided to DEQ by September 10.

O&M Manual: DEQ has reviewed a portion of the Draft O&M Manual and has minimal comments. Due to summer activities and meetings DEQ expects to have the remainder of the Draft O&M Manual comments available in September.

5 Year Cost Estimate: Revised 5-Year Cost estimate submitted to DEQ for review on August 1, 2007. Although the discussions at the focus meeting held August 7-8 will result in some modifications to O&M activities, the cost implications are not currently considered large enough to warrant revision to the 5-Year Cost Estimate at this time.

CSM Figure Revision: E & E is revising figures from previous document for inclusion in the CSM. E & E received figure modifications from Groundwater Solutions, Inc. (GSI) on August 9, and is working with Papadopolus and Associates to integrate model results into some figures. E & E expects the revisions to be complete by August 31, 2007.

Environmental Monitoring Report (EMR): E & E submitted an EMR to NMFS regarding the additional rock placement at the site on August 9, 2007.

Action Items:	Person Responsible:	Deadline:
Comment Response Tech Memo	Eric White	September 10, 2007
Provide comments on DEA Imagery	Kevin Parrett	Completed
CSM Figure Revision	Chad Nancarrow/Eric White	August 31, 2007
EMR report to NMFS	Lenna Cope	Completed
Draft O&M Report	E & E	December 1, 2007
AWA tech memo	Jenny Gnanendran	September 2007
Finalize 5 Year Cost Estimate	Eric White	Completed

Next Meeting

Date / Time	Tentatively 9/18/07; Tuesday	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting	Tuesday 09/18/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203		
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	Eric White, E & E	Note Taker:	Eric White, E & E
Attendees:	Kevin Parrett	Project Officer	ODEQ
	Eric White	Task Order Manager	E & E
	Lynn Barlow	Project Manager	City of Portland BES
	Jim Schiller	Site Manager	City of Portland BES
	Newt Linn	Site Technician	Clearwater Environmental

Agenda

Site Walk – Shoreline

During the initial shoreline inspection performed by E & E's subcontractor (Newt Linn of Clearwater Environmental), one day prior to the site inspection meeting, no sheen was observed along the shoreline. At the time of the group inspection, no sheen was observed. Water levels were relatively low.

Subsequent to the meeting but prior to completion of the meeting notes, a sheen release was observed, at a bubble ebullition pathway immediately west of the edge of the organoclay mat, near the northern end of the mat. At the direction of DEQ project officer Kevin Parrett, a 15' by 20'portion of organoclay mat was installed over the area and covered with sand and rock on September 21, 2007. Additional rock armor will need to be placed to anchor the mat in place. Clearwater is preparing to conduct long-planned site maintenance activities including grouting gaps in ACB, removing creosote-treated woody debris, and constructing animal paths on exposed ACB in the next two weeks.

Site Walk – Upland

Representatives of the City discussed status of vegetation efforts. Different portions of the cap and the riparian area were inspected. DEQ and City discussed the scope and schedule for performing the annual (2007) assessment of vegetation survival. This assessment will be included in the 2007 annual O&M report.

To evaluate whether animal burrows observed at the site may be sufficiently deep to threaten the integrity of the soil cap, an assessment was performed to attempt to identify the residents of the burrows and to determine the burrow size and depth. Two of the larger burrows were excavated by shovel. The largest burrow was determined to be approximately 9 feet in length. Burrows extended to a depth of up to 18 to 24 inches below the ground surface at the deepest point. No inhabitants were observed. Relatively small tracks had been observed near the largest burrow entrance. Considering the depth of the burrows to date, it does not appear that they threaten the soil cap or would decrease its effectiveness.

DEQ directed E & E to install a chain at the central western gate because of the gap in the gate opening and ease with which someone could force the gate open.

Action Items:	Person Responsible	Deadline
Anchor with rock the newly placed organoclay mat	Newt Linn	Mid-October 2007
Place chain on western gate	Newt Linn	Mid-October 2007
Replace broken ACB block - FWDA	Newt Linn	Sept 30, 2007

ACB Concrete repair – grouting of gaps	Newt Linn	Sept 30, 2007
Remove treated timber from shore	Newt Linn	Sept 30, 2007
Build paths over ACB for wildlife	Newt Linn	Sept 30, 2007
Evaluate tracks at animal burrows	Lucas Meek	Complete
Excavate animal burrows to determine depth	Lucas Meek/Newt Linn	Complete
Meet with NMFS regarding wildlife paths and other corrective measures planned for mid-September 2007.	Eric White	Complete
Cut remaining (accessible) steel loops on ACB	Newt Linn	As Needed

Budget

Budget Status: The budget status as of September 8, 2007 was presented to DEQ. E & E anticipates that additional funds will be required to complete the sheen assessment to cover the development of a sampling approach and to cover field sampling activities. Much of this effort is being conducted under the technical assistance subtask (Task 10) but additional funds will be required. As of 9/8/2007, $233,950 remained in Task Order 28.

BAPs: E & E will prepare a BAP for amendment 6 to Task Order 28 for additional efforts related to the sheen assessment. E & E will also submit a BAP for Task Order 29 for Soil Cap O&M Activities to extend the project through January 31, 2008.

Action Items:	Person Responsible:	Deadline:
Submit revised draft BAP for amendment 5 to continue through January 2008	Eric White	Completed
Submit BAP - amendment to Task Order 29	Eric White	September 21, 2007
Submit BAP – amendment 6 to Task Order 28	Eric White	October 2007

Site Activities / Miscellaneous Field Activities

Sheen Evaluation: To further evaluate the sheen observed at the site intermittently over the past two months, E & E worked with DEQ and GSI to develop an assessment and sampling approach. Pore water and surface water samples will be collected in the vicinity of the observed sheen at multiple times from the same location throughout a tidal cycle. This assessment is intended to evaluate any changes to pore water and surface water concentrations as groundwater levels and river levels progressed through the tidal cycle. Sheen sample collection is also planned, but recent sheen amounts have been insufficient to allow collection of a representative sample of primarily NAPL sheen for analysis. Initial results from this assessment are anticipated in mid-October.

NAPL Extraction: Clearwater will be evaluating the ratio of percent NAPL to percent water to compare with previous measurements and to calculate the total volume of NAPL collected (compared with the total volume of liquid collected).

New Locks for Wells: E & E purchased and installed new brass locks for monitoring wells. Prior to the locks being installed they were sprayed with a lubricant to inhibit rusting. Clearwater will obtain two lock boxes to allow key for exterior gates to be obtained using combination inside the fenced operations area. One box will be placed in the trailer area and one near the NW corner of the site, inside the fence.

Differencing Image Revision: DEA submitted final images. No further changes are anticipated.

Waste Disposal Contract: E & E plans to dispose of waste currently accumulated at the site by the end of October.

Miscellaneous: A focus meeting to discuss EPA, NOAA, and other stakeholder comments regarding the 2006 O&M Report and O&M Plan was held on August 7-8, 2007. E & E is compiling a meeting summary in the form of response to comments.

Annual testing of the backflow prevention device for water service is due. E & E will have this work conducted.

Action Items:	Person Responsible:	Deadline:
Waste disposal	Eric White	October, 2007
Test backflow prevention	Eric White	Completed
Develop Sheen Sampling Plan	Eric White/Heidi Blischke	Completed
Replace monitoring well locks	Newt Linn/Lenna Cope	Completed

Deliverables

Comment Response Tech Memo on O&M Report and Plan: E & E is preparing final responses to comment on these documents as discussed at the August 7-8 focus meeting after receiving revisions from DEQ and GSI.

O&M Manual: DEQ has reviewed a portion of the Draft O&M Manual and has minimal comments. Due to summer activities and meetings DEQ expects to have the remainder of the Draft O&M Manual comments available in October.

5 Year O&M Cost Estimate: Final 5-Year O&M Cost estimate was submitted to DEQ.

CSM Figure Revision: E & E is revising figures for the CSM and expects to complete activities by mid-October.

Action Items:	Person Responsible:	Deadline:
Comment Response Tech Memo	Eric White	October 11, 2007
DEA Imagery	Eric White	Completed
CSM Figure Revision	Chad Nancarrow/Eric White	October 12, 2007
Draft O&M Report	E & E	December 1, 2007
AWA tech memo	Jenny Gnanendran	October 2007
Finalize 5 Year Cost Estimate	Eric White	Completed

Next Meeting

Date / Time	Tentatively 10/16/07; Tuesday	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting		Tuesday 010/16/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203	
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	Eric White, E & E	Note Taker:	Eric White, E & E
Attendees:	Steve Campbell	Contract Officer	DEQ
	Kevin Parrett	Project Officer	DEQ
	Keith Johnson	Manager	DEQ
	John Montgomery	Program Mgr	E & E
	Eric White	Task Order Mgr	E & E
	Newt Linn	Site Technician	Clearwater Environmental

Agenda

Site Walk – Shoreline

During the initial shoreline inspection performed by E & E's subcontractor (Newt Linn of Clearwater Environmental), one day prior to the site inspection meeting, no sheen was observed along the shoreline. At the time of the group inspection, no sheen was observed. Water levels have begun to rise in the past one to two weeks due to precipitation. Intermittent rain during the shoreline inspection restricted visibility somewhat. A plastic 55-gallon drum was observed to have washed up on the shore; labeled as an acid salt. DEQ directed E & E and Clearwater to move the drum to the drum storage area and arrange for disposal along with remaining waste drums at the site.

During site activities in September, heavy equipment including a track hoe and loader were used to remove large woody creosote-treated debris from the shoreline and to construct wildlife pathways in the exposed ACB. The tracks of the equipment caused some damage to the turf reinforcement mat (TRM) in three places at the top of the bank. The mat was observed to be frayed and torn at these locations. In two locations, the damage was relatively minor; DEQ requested that staples be placed to better secure the mat at these locations. However, at one location (above the northernmost of the new wildlife paths) a portion of the TRM was ripped and displaced. DEQ therefore directed E & E and Clearwater to procure a new roll of TRM, trim the loose, damaged portions of the mat, and staple a section of new mat over the area to provide more stability at the location to better sustain potential future damage during flood events.

DEQ expressed concern about the anchoring of the new section of organoclay mat installed in September, as the portions of the mat furthest from shore were not sufficiently covered by rock armoring. DEQ instructed E & E / Clearwater to place 9" thick ACB, from the excess supply stockpiled at the site, in locations of the mat (particularly over the corners furthest from shore) to better secure the mat in place.

Site Walk – Upland

During well gauging in September, E & E noted that the steel cap on the outer casing of one well could not be properly closed, as the inner casing had shifted over time and interfered with the cap. E & E directed Clearwater to weld or replace the cap to properly secure the well.

DEQ requested that the roll of organoclay mat that is currently located in the exposed parking area be moved to the shop building.

Action Items:	Person Responsible	Deadline
Complete anchoring with rock the newly placed organoclay mat	Newt Linn	October 2007
Move plastic drum from shore to drum storage area	Newt Linn	ASAP (mid-October 2007)
Repair or replace well cap to allow proper closure of well	Newt Linn	November 2007
Place new TRM over damaged area	Newt Linn	November 2007
Move roll of OC mat inside shop bldg	Newt Linn	November 2007
Place chain on western gate	Newt Linn	Completed
ACB Concrete repair – grouting of remaining gaps	Newt Linn	As water levels allow (may have to wait until next summer season)
Remove treated timber from shore	Newt Linn	Completed
Build paths over ACB for wildlife	Newt Linn	Completed
Cut remaining (accessible) steel loops on ACB	Newt Linn	As Needed

Budget

Budget Status: The budget status as of October 6, 2007 was presented to DEQ. E & E anticipates that additional funds will be required for the project administration task (Task 1), potentially the CSM support task (Task 7), the O&M Report task (Task 9), and the technical assistance task (Task 10). DEQ also asked E & E to prepare estimates for the level of effort required to transition the project to a new DEQ PM (Kevin Parrett, current Project Officer, will be leaving DEQ October 19, 2007) and to a new contractor under a new subtask (Task 11). E & E's current contract expires in January 2008 and will not be renewed, so the project will be assigned to one of DEQ's new contractors in the next few weeks.

BAPs: E & E will prepare a BAP for amendment 6 to Task Order 28 for additional efforts related to the sheen assessment, additional effort needed to revise historic figures and tables for the O&M Report, project management costs, and for costs associated with project transition to new management. Task Order 29 for Soil Cap O&M Activities has been amended to extend that component of the project through January 31, 2008.

Action Items:	Person Responsible:	Deadline:
Submit BAP for amendment 6 to Task Order 28	Eric White	Oct 26, 2007
Submit BAP - amendment to Task Order 29	Eric White	Completed

Site Activities / Miscellaneous Field Activities

Sheen Evaluation: Initial analytical results from the September sheen assessment are anticipated in mid-October.

NAPL Extraction: Clearwater will be evaluating the ratio of percent NAPL to percent water to compare with previous measurements and to calculate the total volume of NAPL collected (compared with the total volume of liquid collected).

Embayment Survey: DEA conducted a topographic survey of a portion of the embayment area to document the placement of rock armor. Survey documents are expected to be completed by mid-November 2007.

Waste Disposal Contract: E & E plans to dispose of waste currently accumulated at the site by the end of October. An additional drum that washed up along the shore will also be disposed at the time if possible.

Action Items:	Person Responsible:	Deadline:
Waste disposal	Eric White	October, 2007
Contact City to Coordinate Irrigation System Shutoff	Eric White	October 2007

Deliverables

Comment Response Tech Memo on O&M Report and Plan: E & E is preparing final responses to comment on these documents as discussed at the August 7-8 focus meeting after receiving revisions from DEQ and GSI. E & E is also finalizing figures/tables for the Spring 2007 surface and pore water sampling event and will be providing that data (with reference criteria adjusted for pH and hardness, as appropriate) to DEQ concurrently with the response to comments for distribution.

O&M Manual: DEQ has provided E & E with comments on the Draft O&M Manual. E & E will finalize the document and submit to DEQ for distribution.

CSM Figure Revision: E & E is revising figures for the CSM and expects to complete activities by October 19, 2007.

Transition Documents: E & E, in preparation of transition of the project to a new contractor, will prepare a list of software/programs currently used for site databases/files. E & E will also prepare an index of hard copy files and electronic files that are currently in E & E's possession as well as prepare a list of infrastructure issues and contacts, including current subcontractors and vendors for the site. DEQ will provide an example of the format used by DEQ for file inventory.

Action Items:	Person Responsible:	Deadline:
Comment Response Tech Memo	Eric White	October 19, 2007
DEA Embayment Survey	Eric White	November 2007
CSM Figure Revision	Chad Nancarrow/Eric White	October 19, 2007
Draft O&M Report - Armor Repair and Sheen Assessment Sections	Eric White	November 15, 2007
Draft O&M Report - Remaining Sections	Eric White	December 1, 2007
AWA tech memo	Jenny Gnanendran	October 2007
Provide E & E with example inventory form	Keith Johnson	October 19, 2007
List of Software/Programs	Eric White	October 19, 2007
Inventory of Files	Eric White	October 26, 2007 (initial list)

Next Meeting

Date / Time	Tentatively 11/13/07; Tuesday	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter O & F Determination Period Monthly Progress Meeting	Tuesday 011/13/07 9:00 a.m. 6900 N. Edgewater Street Portland, OR 97203		
Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	Eric White, E & E	Note Taker:	Eric White, E & E
Attendees:	Keith Johnson	Manager	DEQ
	Scott Manzano	Project Officer	DEQ
	Eric White	Task Order Mgr	E & E
	Lenna Cope	Staff Engineer	E & E
	Newt Linn	Site Technician	Clearwater Environmental

Agenda

Site Walk – Shoreline

During the initial shoreline inspection performed by E & E's subcontractor (Newt Linn of Clearwater Environmental), one day prior to the site inspection meeting, no sheen was observed along the shoreline. At the time of the group inspection, no sheen was observed. Water levels continued to be at season-low levels earlier in November but appear to be rising with precipitation.

As discussed in the notes from the October meeting, the tracks of heavy equipment used for site work in September caused some damage to the turf reinforcement mat (TRM) in three places at the top of the bank. The mat was observed to be frayed and torn at these locations. During the November walk, it was observed that vegetation had re-established in these areas and at two of the locations, no further action is needed. At one location (above the northernmost vehicle path) vegetation had re-established, but some portions of the TRM protruded above the ground surface. It was agreed that there is no need to place new TRM at this location, but the protruding portion will be cut back flush with the ground and the edges of remaining mat will be secured with staples. DEQ requested that E & E include discussion in the O&M Manual regarding steps that would be taken during future site work to protect the TRM and minimize inadvertent damage during heavy equipment movement.

Clearwater has completed the placement of additional rock armor and ACB in the area of the new organoclay mat to better anchor the mat in place. As noted in the October meeting notes, a drum was observed along the bank that had washed onto the shore…when Clearwater was asked to move the drum to the storage area, they discovered a second drum as well. Both have been moved to the drum storage area at the site for characterization to determine appropriate disposal.

A piece of dock with numerous nails protruding from it was observed along the shoreline, apparently having washed up onto the bank. DEQ requested that E & E consider removing the dock from the shore for disposal because of the safety hazard it presents.

Clamshells were observed along the shoreline, indicating that clams are present in sediments at the site.

Site Walk – Upland

E & E directed Clearwater to weld or replace the lid cover on the outer casing to properly secure a well which could not be properly closed (as noted in the October meeting notes).

Action Items:	Person Responsible	Deadline
Complete anchoring with rock the newly placed organoclay mat	Newt Linn	Completed
Move two drums from shore to drum storage area	Newt Linn	Completed
Repair or replace well cap to allow proper closure of well	Newt Linn	November 2007
Trim and secure TRM over damaged area	Newt Linn	November 2007
Move roll of OC mat inside shop bldg	Newt Linn	Completed
ACB Concrete repair – grouting of remaining gaps	Newt Linn	As water levels allow (may have to wait until next summer season)
Cut remaining (accessible) steel loops on ACB	Newt Linn	As Needed

Budget

Budget Status: The budget status as of November 3, 2007 was presented to DEQ. For Task Order 28 (Sediment Cap O&F), E & E anticipates that additional funds will be required for the project administration task (Task 1), the CSM support task (Task 7), the O&M Report task (Task 9), the technical assistance task (Task 10), and a new task (Task 11) for transition efforts to a new Contractor and new DEQ Project Officer. Task Order 29, related to the soil cap O&M, is projected to be completed within budget.

BAPs: E & E submitted a Budget and Assumptions Proposal (BAP) to DEQ on November 6, 2007 requesting amendment to Task Order 28 to provide funding for the efforts described above. DEQ's new Project Officer, Scott Manzano, will be taking on management of the site in early December, 2007; E & E was directed to send project-related correspondence to both Scott and Keith (and to Steve, as appropriate).

Action Items:	Person Responsible:	Deadline:
Submit BAP for amendment 6 to Task Order 28	Eric White	Completed

Site Activities / Miscellaneous Field Activities

Sheen Evaluation: Analytical results have been received and E & E is currently preparing the section of the O&M report summarizing the sheen assessment.

NAPL Extraction: Approximately 7 gallons of NAPL were collected in the 3rd Quarter of 2007. Clearwater has begun evaluating the ratio of percent NAPL to percent water to compare with previous measurements and to calculate the total volume of NAPL collected (compared with the total volume of liquid collected).

Embayment Survey: DEA conducted a topographic survey of a portion of the embayment area to document the placement of rock armor. Final survey documents were provided to E & E on November 13, 2007. Topographic data will be presented in a revised record drawing for the sediment cap that will be included in the 2007 O&M Report.

Waste Disposal Contract: E & E plans to dispose of waste currently accumulated at the site in the next three weeks. Two additional drums that washed up along the shore will also be disposed at the time if possible. Clearwater has been tasked with characterizing the drums for determining appropriate disposal.

Irrigation System: The City has turned off the water supply for the irrigation system and plans to winterize the system in November (i.e., open valves at low point in the system to drain water, minimizing potential for freeze damage during the winter). Two areas of exposed pipe located along a vehicle pathway will be placed in sleeves and covered with soil to minimize potential future damage from vehicle traffic.

Action Items:	Person Responsible:	Deadline:
Waste disposal	Eric White	December 7, 2007
Determine percent NAPL vs aqueous phase	Newt Linn	November 2007

Winterize irrigation system	Jim Schiller, City of Portland	December 7, 2007
Contact City to Coordinate Irrigation System Shutoff	Eric White	Completed

Deliverables

Comment Response Tech Memo on O&M Report and Plan: E & E is preparing final responses to comment on these documents as discussed at the August 7-8 focus meeting after receiving revisions from DEQ and GSI. E & E is also finalizing figures/tables for the Spring 2007 and Fall 2007 surface and pore water sampling event and will be providing that data (with reference criteria adjusted for pH and hardness, as appropriate) to DEQ concurrently with the response to comments for distribution.

O&M Manual: DEQ has provided E & E with comments on the Draft O&M Manual. E & E will finalize the document and submit to DEQ for distribution.

CSM Figure Revision: E & E has completed revising figures for the CSM and GSI has finalized the CSM report.

Transition Documents: E & E, in preparation of transition of the project to a new contractor, will prepare a list of software/programs currently used for site databases/files. E & E will also prepare an index of hard copy files and electronic files that are currently in E & E's possession as well as prepare a list of infrastructure issues and contacts, including current subcontractors and vendors for the site. DEQ will provide an example of the format used by DEQ for file inventory.

Action Items:	Person Responsible:	Deadline:
Comment Response Tech Memo	Eric White	November 21, 2007
DEA Embayment Survey	Eric White	Completed
CSM Figure Revision	Chad Nancarrow/Eric White	Completed
Draft O&M Report - Armor Repair and Sheen Assessment Sections	Eric White	November 16, 2007
Draft O&M Report - Remaining Sections	Eric White	December 3, 2007
AWA tech memo	Jenny Gnanendran	December 3, 2007
List of Software/Programs	Eric White	Completed
Inventory of Files	Eric White	November 30, 2007
Final O&M Manual	Eric White	December 7, 2007

Next Meeting

Date / Time	Tentatively 12/18/07; Tuesday	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

McCormick & Baxter
O & F Determination Period
Monthly Progress Meeting

Tuesday 12/18/07
9:00 a.m.
6900 N. Edgewater Street
Portland, OR 97203

Meeting called by:	ODEQ	Type of Meeting:	Monthly Progress Meeting
Facilitator:	Eric White, E & E	Note Taker:	Lenna Cope, E & E
Attendees:	Scott Manzano	Project Officer	DEQ
	Eric White	Task Order Mgr	E & E
	Lenna Cope	Staff Engineer	E & E
	Newt Linn	Site Technician	Clearwater Environmental
	Heidi Blischke	Hydrogeologist	GSI
	Rick Ernst	Task Order Mgr	Hart Crowser
	Tim Skrotzki	Site Manager	Hart Crowser
	Ken Thiessen	Project Officer (WC)	DEQ

Agenda

Site Walk – Shoreline

Representatives from GSI and Hart Crowser participated in the site walk to become familiar with the site in preparation for project handover from E & E in February 2008.

During the initial shoreline inspection performed by E & E's subcontractor (Newt Linn of Clearwater Environmental), one day prior to the site inspection meeting, no sheen was observed along the shoreline. At the time of the group inspection, no sheen was observed. Water levels have risen since the previous month. Warning buoys in the river have been disturbed by flow and/or debris in the river and are not currently at their original locations. DEQ directed E & E to have the buoys re-positioned.

A creosote-treated pole was observed along the shore, and appears to have been washed onto the site recently. Creosote odor was noted upon close inspection. DEQ directed E & E to move the pole and the piece of dock noted in the previous monthly inspection report to an area further up the shore, where other wood debris had been stockpiled to clear access routes, pending disposal. Disposal will most likely wait until next summer/fall, at which time it is expected that other treated wood that has washed onto the shore in the coming months will be collected for off-site disposal.

Site Walk – Upland

The perimeter signs at the site were observed to have several phone numbers posted, including the E & E office number. With the pending handover of site management to Hart Crowser, it was agreed that the signs should be changed to reflect the new number. E & E also confirmed that the other phone numbers posted for DEQ and EPA were still valid.

Clearwater also reported that they had a replacement well cap for well 1s (the cap no longer completely closes on the outer casing) and plan to replace it next week (some welding is required, and a gauge on the welding cylinder had to be replaced first). They have also sought to find steel staples for securing the turf reinforcement mat (TRM) discussed in the previous month's notes.

Action Items:	Person Responsible	Deadline
Characterize contents of two drums moved from shore to drum storage area in previous reporting period	Newt Linn	Sampling completed - December 31, 2007 for data
Repair or replace well cap to allow proper closure of well	Newt Linn	December 31, 2007
Trim and secure TRM over damaged area	Newt Linn	December 31, 2007
ACB Concrete repair – grouting of remaining gaps	Newt Linn	(Will have to wait until next summer season – water levels too high)
Move dock platform and creosote-coated pole from shoreline to stockpile area	Newt Linn	January 4, 2008
Re-locate buoys in river	Lenna Cope	January 4, 2008
Update site perimeter signs with new phone number.	Lenna Cope	January 11, 2008
Cut remaining (accessible) steel loops on ACB	Newt Linn	As Needed

Site Activities / Miscellaneous Field Activities

Waste Disposal: E & E disposed of waste accumulated at the site, with the exception of two drums that washed up on the shore and were moved to the drum storage area. DEQ directed E & E to provide documentation for waste disposal to Hart Crowser when it becomes available. Clearwater has been tasked with characterizing the two drums that washed up on the shore for determining appropriate disposal. Samples have been collected from each drum and data should be available by the end of December. Depending on the results of that data, a decision will be made whether to dispose of the drums immediately or wait until the next scheduled waste disposal activity for purge water and collected NAPL accumulated at the site. If disposal is necessary in the next month, E & E will also order additional solid waste totes for PPE; the company that disposes of waste also provides empty containers (thus reducing overall transportation costs). In the future, it was agreed that waste disposal should be scheduled on a semi-annual basis.

Irrigation System: The City has winterized the system. Prior to the system being restarted in the spring, two areas of exposed pipe located along a vehicle pathway will need to be repaired: placed in sleeves and covered with soil to minimize potential future damage from vehicle traffic. Since Clearwater will have equipment on the site in the coming weeks to remove the creosote-treated pole and dock from the shoreline, they will attempt to schedule repair of the irrigation system with the City at the same time, as the equipment will be available.

Transition: To promote a smooth transition of contractors for this project, E & E has provided Hart Crowser with a tour of site facilities (trailers, shop building, vaults) and has demonstrated techniques for transducer data logging and monitoring well gauging. E & E and Hart Crowser plan to meet again to discuss subcontract efforts and site contacts for day-to-day operations (in Portland 12/21/07) as well as to go over GIS/database/CAD files (in Seattle 1/15/08). At the next monthly meeting in January E & E, Hart Crowser, and DEQ plan to discuss potential future changes to O&M operations at the site, suggestions for improvement, and lessons learned.

Action Items:	Person Responsible:	Deadline:
Disposal of collected NAPL, purge water, and IDW from site	Eric White	Completed
Characterize contents of two drums moved from shore to drum storage area	Newt Linn	Sampling done – Dec31, 2007 for data
Determine percent NAPL vs aqueous phase	Newt Linn	Completed
Winterize irrigation system	Jim Schiller, City of Portland	Completed
Develop agenda for Seattle meeting HC/E&E	Heidi Blischke	January 11, 2008
Provide HC with subcontractor info	Lenna Cope	January 21, 2008
Confirm ownership of pump/controller	Lenna Cope	Completed (belongs to DEQ)
Repair irrigation piping	Newt Linn	January 4, 2008

Deliverables

Comment Response Tech Memo on O&M Report and Plan: E & E prepared final responses to comment on these documents as discussed at the August 7-8 focus meeting after receiving revisions from DEQ and GSI. Comments will be provided to Working Group members at the time they are provided with a copy of the 2007 O&M Report.

O&M Manual: DEQ has provided E & E with comments on the Draft O&M Manual. E & E will finalize the document and submit to DEQ for distribution by December 31, 2007.

O&M Report: DEQ has provided E & E with comments from GSI on the sheen assessment section of the Draft O&M Report. E & E will revise that section and complete drafts of remaining sections and submit to DEQ for review by December 20, 2007. E & E will provide two copies of the draft report to GSI and one copy to DEQ.

O&M Plan: It was agreed that it would be useful for E & E to provide DEQ with a written summary of potential changes to the O&M Plan that may be warranted based on actions taken over the past year and current site conditions. No substantive changes are expected, but some potential minor revisions have been noted in the course of preparing the 2007 O&M Report that should be taken into account at such future time when it is decided to finalize the plan.

Transition Documents: E & E, in preparation of transition of the project to a new contractor, prepared a list of software/programs currently used for site databases/files. E & E is also preparing an index of hard copy files and electronic files that are currently in E & E's possession as well as a list of infrastructure issues and contacts, including current subcontractors and vendors for the site.

Action Items:	Person Responsible:	Deadline:
Comment Response Tech Memo	Eric White	Completed
Draft O&M Report - Armor Repair and Sheen Assessment Sections	Eric White	Completed
Draft O&M Report - Remaining Sections	Eric White	December 20, 2007
Inventory of Files	Eric White	January 11, 2008
Final O&M Manual	Eric White	December 31, 2007
Follow-up with Kevin regarding status of restricted navigation in river	Scott Manzano	January 2008

Budget

Budget Status:

E & E provided DEQ with a status of the project budget for both Task Orders 28 and 29. While both task orders are anticipated to be completed well under budget, E & E does expect that costs for two subtasks will exceed the current subtask budgets. For the 2007 O&M Report and the Transition Task, E & E expects that additional efforts will be required. E & E has submitted a request to exceed those subtask budgets, while staying within the overall project budget.

Action Items:	Person Responsible:	Deadline:
Request authorization to exceed subtask budgets for 2007 O&M Report and Transition Task	Eric White	Completed

Next Meeting

Date / Time	Tentatively 1/9/08; Wednesday	9:00 a.m.
Location	McCormick & Baxter	Site Trailer

D

Photo Documentation

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 1 Sheet of sheen shoreward of the 300'x60' OC mats.

Direction: Southeast	*Date: 8/6/2007*	*Time: NA*	*Photographed by: NL*

Photo 2 Sheen shoreward of the 300'x60' OC mats.

Direction: Down	*Date: 8/6/2007*	*Time: NA*	*Photographed by: NL*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 3 Sheet of sheen shoreward of the 300'x60' OC mats.

Direction: Southeast	*Date: 8/20/2007*	*Time: NA*	*Photographed by: NL*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 4 Sheen in ACB blocks at south end of the site.

Direction: Down	*Date: 8/20/2007*	*Time: NA*	*Photographed by: NL*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

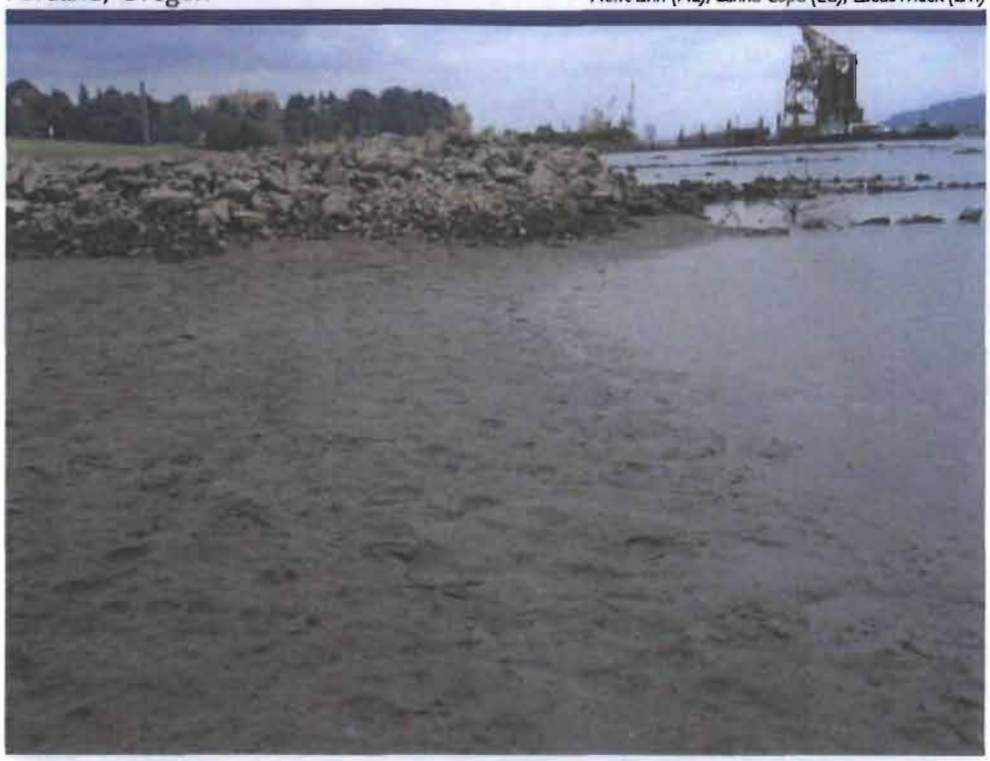

Photo 5 Area sheen in photo 6 was observed, north end of OC mats.

Direction: South	*Date: 9/14/2007*	*Time: 15:41*	*Photographed by: LC*

Photo 6 Sheen at north end of OC mats.

Direction: Down	*Date: 9/14/2007*	*Time: 15:42*	*Photographed by: LC*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

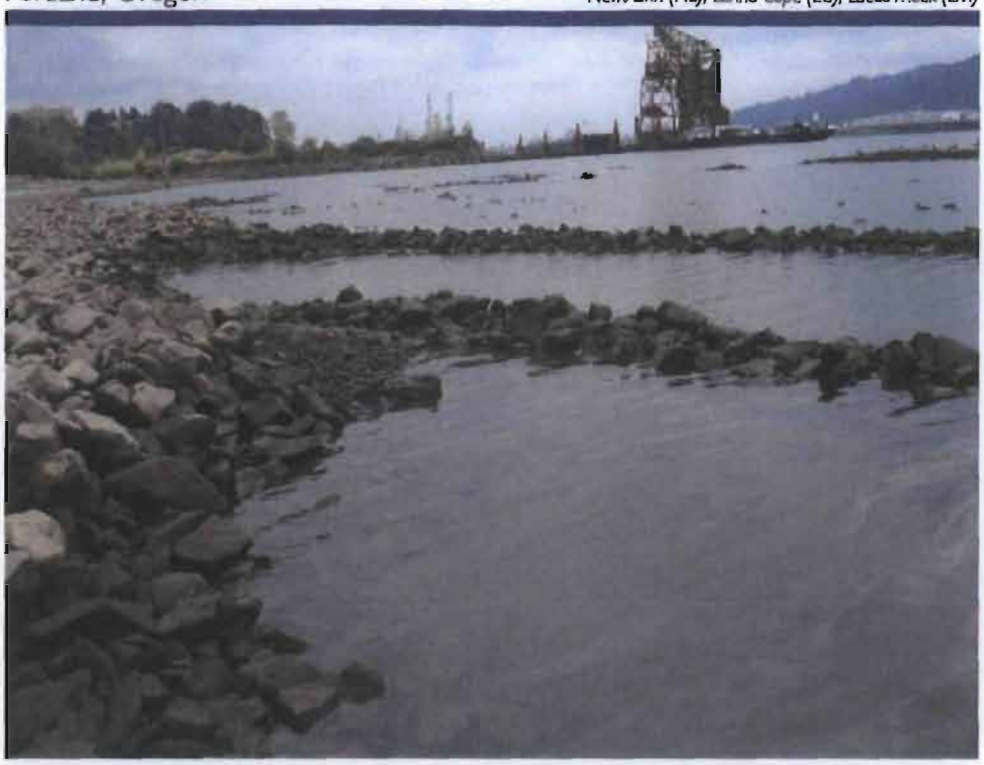

Photo 7 Area sheen in photo 7 was observed, riverward of OC mats.

Direction: South	*Date: 9/14/2007*	*Time: 15:46*	*Photographed by: LC*

Photo 8 Sheen at riverward edge of OC mats.

Direction: Down	*Date: 9/14/2007*	*Time: 15:47*	*Photographed by: LC*

Photo 9 View of sand cover at the site and sand accumulation on rock reef.

Direction: South	*Date: 9/14/2007*	*Time: 15:14*	*Photographed by: LC*

Photo 10 Sand cover and boulder clusters at north end of the embayment.

Direction: South	*Date: 9/14/2007*	*Time: 15:22*	*Photographed by: LC*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

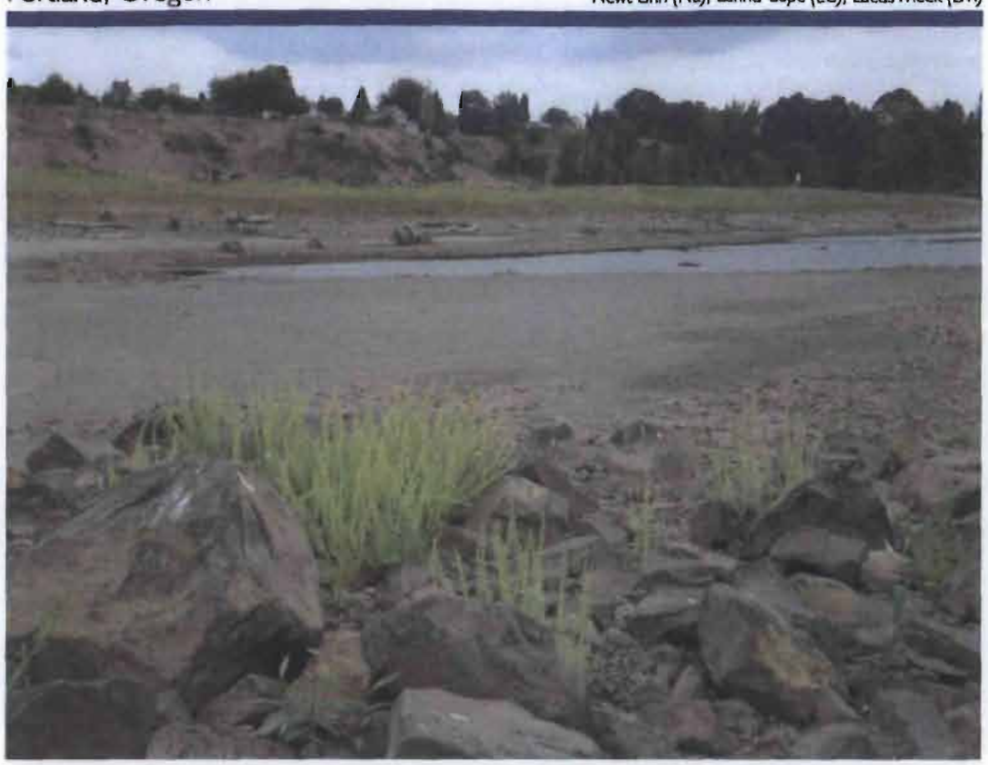

Photo 11 View of plant growth on reef and sand cover on shore.

Direction: East	*Date: 9/14/2007*	*Time: 15:25*	*Photographed by: LC*

Photo 12 Large woody debris accumulation at south end of site.

Direction: North	*Date: 9/14/2007*	*Time: 15:58*	*Photographed by: LC*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

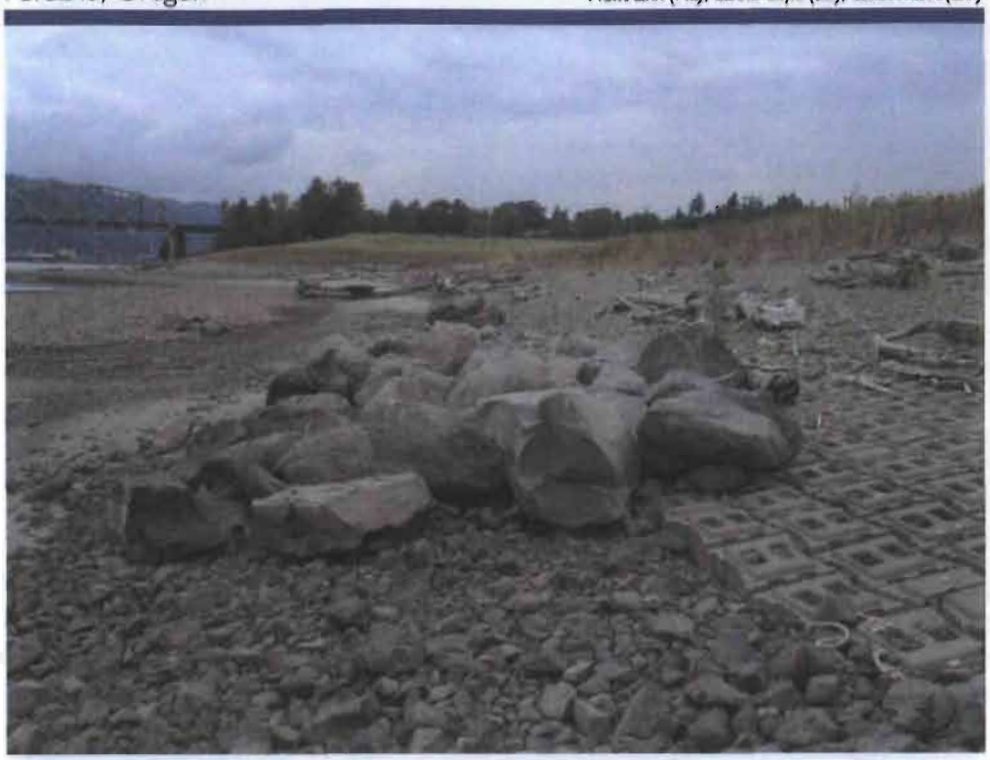

Photo 13 Boulder cluster.

Direction: North	*Date: 9/14/2007*	*Time: 16:09*	*Photographed by: LC*

Photo 14 Construction of wildlife path.

Direction: Northeast	*Date: 9/27/2007*	*Time: 12:10*	*Photographed by: LC*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 15 Coyote print near animal burrow.

Direction: Down	*Date: 8/3/07*	*Time: NA*	*Photographed by: LM*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

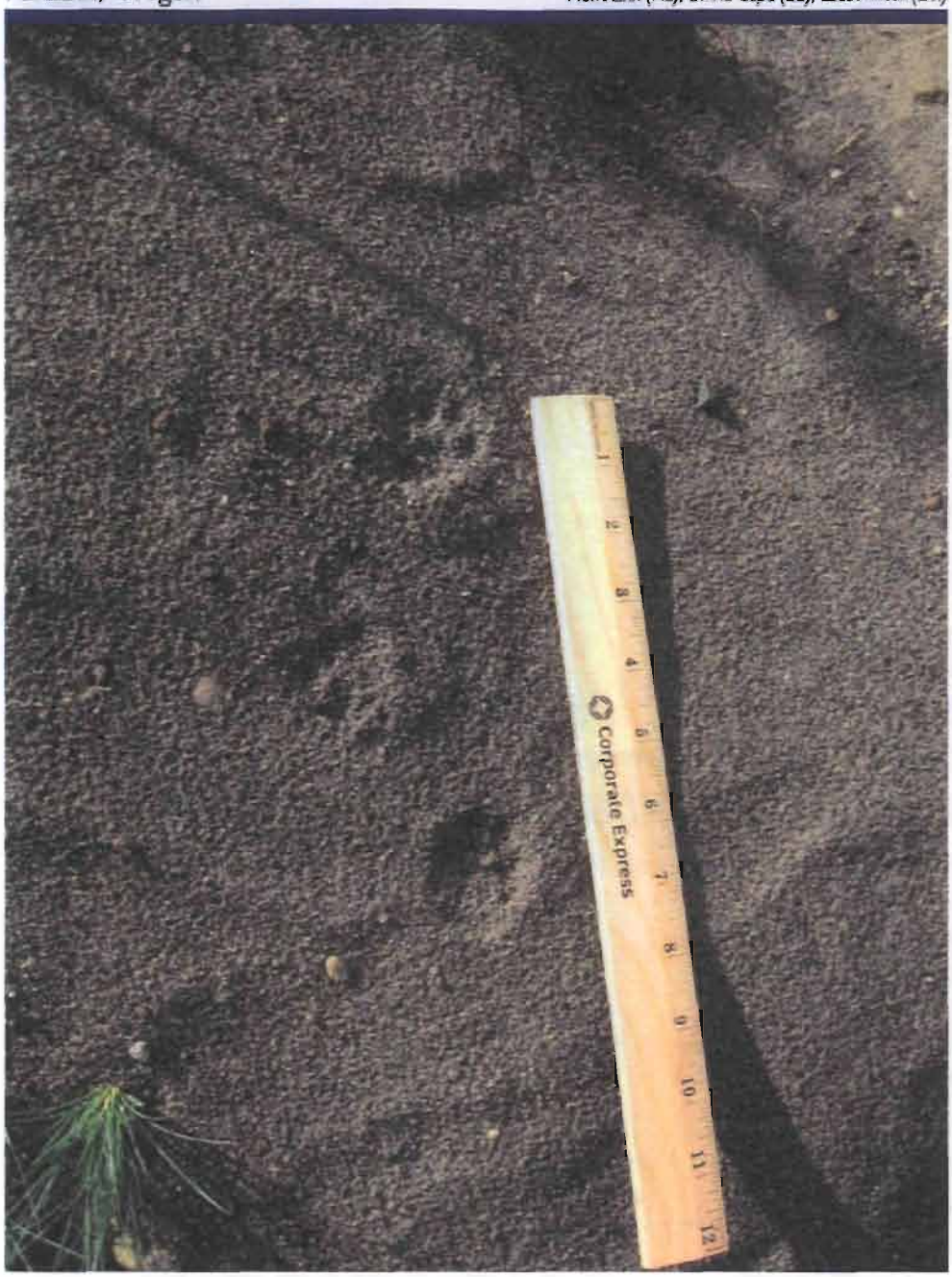

Photo 16 Cat prints near animal burrow.

Direction: Down	*Date: 8/24/03*	*Time: NA*	*Photographed by: LM*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 17 Bait station near animal burrow.

Direction: Down	Date: 8/25/03	Time: NA	Photographed by: LM

Photo 18 Burrow in the south corner of retention pond.

Direction: South	Date: 8/25/03	Time: NA	Photographed by: LM

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 19 South burrow excavated to its maximum depth.

Direction: South	*Date: 9/19/07*	*Time: NA*	*Photographed by: LM*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 20 South burrow excavated to its furthest point.

Direction: South	*Date: 9/19/07*	*Time: NA*	*Photographed by: LM*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 21 South burrow excavation complete.

Direction: South	*Date: 9/19/07*	*Time: NA*	*Photographed by: LM*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 22 North burrow.

Direction: North	*Date: 9/19/07*	*Time: NA*	*Photographed by: LM*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 23 Example of burrow at top of ACB.

Direction: East	*Date: 9/19/07*	*Time: NA*	*Photographed by: LM*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 24 Burrow at top of ACB that was re-excavated by animal.

Direction: East	*Date: 9/19/07*	*Time: NA*	*Photographed by: LM*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 25 Depth of re-excavated burrow.

Direction: East	*Date: 9/19/07*	*Time: NA*	*Photographed by: LM*

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 26 Treated timbers that washed ashore and were removed by Clearwater.

Direction: North	*Date: 9/14/07*	*Time: 16:12*	*Photographed by: LC*

Photo 27 Visible creosote dripping from treated timbers.

Direction: North	*Date: 9/14/07*	*Time: 16:13*	*Photographed by: LC*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Newt Linn (NL), Lenna Cope (LC), Lucas Meek (LM)

Photo 28 Example of grouting performed at the site.

Direction: North	*Date: 9/27/07*	*Time: 18:32*	*Photographed by: LC*

E

Waste Disposal Documentation

(Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	ORD009020603	1	(877) 910-0097	000127917 VES

5. Generator's Name and Mailing Address

MCCORMICK & BAXTER SUPERFUND
6900 N EDGEWATER
PORTLAND, OR 97203

Generator's Site Address (if different than mailing address)

SAME

Generator's Phone: 206 546-7176

6. Transporter 1 Company Name: NRC ENVIRONMENTAL — U.S. EPA ID Number: CAR000030114

7. Transporter 2 Company Name: VEOLIA ES TECHNICAL SOLUTIONS — U.S. EPA ID Number: NJD080631369

8. Designated Facility Name and Site Address: CHEM WASTE MGT OF NORTHWEST, 17629 CEDAR SPRINGS LANE, ARLINGTON, OR 97812 — U.S. EPA ID Number: ORD089452353

Facility's Phone: 541 454-2643

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. RQ, HAZARDOUS WASTE, SOLID, n.o.s., (F032,F034,F035), 9, NA3077, III	0008	CF	0550	P	F032 F034	F035	
X	2. RQ, HAZARDOUS WASTE, SOLID, n.o.s., (F032,F034,F035), 9, NA3077, III				P	F032 F034	F035	
	3.							
	4.							

14. Special Handling Instructions and Additional Information

Service Contracted by VESTS

1) ERG:171 W:23751 A:ARL OR100396 2) ERG:171 W:23751 A:ARL OR100396 +- ER

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Lenna Cope on Behalf of DEQ — Signature: Lenna Cope — Month 11 Day 27 Year 07

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: B RAMAN BAKER — Signature: [signature] — Month 11 Day 27 Year 07

Transporter 2 Printed/Typed Name: Robert Knox — Signature: [signature] — Month 11 Day 27 Year 07

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name — Signature — Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

...ed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

...ARDOUS ... MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
ORD009020603	2	(877) 818-0087	000127918 VES

5. Generator's Name and Mailing Address
MCCORMICK & BAXTER SUPERFUND
6900 N EDGEWATER
PORTLAND, OR 97203

Generator's Site Address (if different than mailing address)
SAME

Generator's Phone: 206 546-7176

6. Transporter 1 Company Name: NRC ENVIRONMENTAL — U.S. EPA ID Number: CAR000030114

7. Transporter 2 Company Name: VEOLIA ES TECHNICAL SOLUTIONS — U.S. EPA ID Number: NJD080631369

8. Designated Facility Name and Site Address
VEOLIA ES TECHNICAL SOLUTIONS, L.L.C.
9131 EAST 96TH AVE.
HENDERSON, CO 80640

Facility's Phone: 303 289-4827

U.S. EPA ID Number: COD980591184

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. RQ, HAZARDOUS WASTE, LIQUID, n.o.s., (F034,F035), 9, NA3082, III, (F032,F034)	0013	DM	0650	G	F032	F035	
						F034		
X	2. RQ, HAZARDOUS WASTE, LIQUID, n.o.s., (F032,F034,F035), 9, NA3082, III	0011	DM	0550	G	F032	F035	
						F034		
	3.							
	4.							

14. Special Handling Instructions and Additional Information
Service Contracted by VESTS
1) ERG:171 W:23845 A:HENPTA023845 2) ERG:171 W:23825 A:HENPTA023825 -|- ER

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Lenna Cope on behalf of DEQ — Signature: Lenna Cope — Month 11 Day 27 Year 07

INT'L
16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER
17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: BRANDON BAKER — Signature: [signature] — Month 11 Day 27 Year 07
Transporter 2 Printed/Typed Name: Robert Knox — Signature: [signature] — Month 11 Day 27 Year 07

DESIGNATED FACILITY
16. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) — Month Day Year
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

...for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

...OUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page	23. Manifest Tracking Number
	ORD009020603	2	000127918VES

24. Generator's Name McCormick & Baxter SUPERFUND

25. Transporter 3 Company Name SAVANNAH TRANSPORT — U.S. EPA ID Number KS0000336891

26. Transporter _____ Company Name — U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

GENERATOR

33. Transporter 3 Acknowledgment of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

34. Transporter _____ Acknowledgment of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

TRANSPORTER

35. Discrepancy

...NATED FACILITY

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

303058

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: [illegible]
2. Page 1 of
3. Emergency Response Phone
4. Manifest Tracking Number: 000127917 **VES**

5. Generator's Name and Mailing Address
MCCORMICK & BAXTER SUPERFUND
6900 N ELIGEWATER
PORTLAND, OR 97203

Generator's Site Address (if different than mailing address): SAME

Generator's Phone: 503 [illegible]

6. Transporter 1 Company Name: MRC ENVIRONMENTAL — U.S. EPA ID Number: [illegible]

7. Transporter 2 Company Name: VECOLIA ES TECHNICAL SOLUTIONS — U.S. EPA ID Number: [illegible]

8. Designated Facility Name and Site Address
CHEM WASTE MGT OF NORTHWEST
17629 CEDAR SPRINGS LANE
ARLINGTON, OR 97812

Facility's Phone: 541 464-2040 — U.S. EPA ID Number: [illegible]

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. RQ, HAZARDOUS WASTE, SOLID, n.o.s., (F032,F034,F035) 6, NA3077, III	0008	CF	0550	P	F032 F035 F034
X	2. RQ, HAZARDOUS WASTE, SOLID, n.o.s., (F032,F034,F035) 6, NA3077, III				P	F032 F035 F034
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1) E863171 W:23751 A:A00 UP103306 2) E863171 W:23751 A:ARL UP103306 4) CR
Service Contracted by VESTIS

MMCRD, 1650P, BST

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Lenna Cope on Behalf of DEQ — Signature: [signature] — Month 11 Day 27 Year 07

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Brandon Baker — Signature: [signature] — Month 11 Day 27 Year 07

Transporter 2 Printed/Typed Name: Robert Knox — Signature: [signature] — Month 11 Day 27 Year 07

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1. H112 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: James Strand — Signature: [signature] — Month 11 Day 30 Year 07

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

WASTE MANAGEMENT

CHEMICAL WASTE MANAGEMENT OF THE NW
17629 Cedar Springs Lane
Arlington, OR 97812
(541) 454-2643
(541) 454-3290 Fax

MCCORMICK & BAXTER CREOSOTING
ORD009020603
6900 N EDGEWATER AVE
PORTLAND, OR 97203-5012

CERTIFICATE OF DISPOSAL

Chemical Waste Management of the Northwest, Inc., ORD089452353, has received the following waste material:

GENERATOR:	MCCORMICK & BAXTER CREOSOTING
MANIFEST #:	000127917VES
LINE ITEM:	9b.1
PROFILE #:	OR100396
CWM TRACKING ID:	393058-01
RECEIVED DATE:	11/30/07
QUANTITY:	8 CF
DISPOSAL PROCESS(ES):	MACROENCAPSULATION FOLLOWED BY LANDFILL
FINAL DISPOSAL LOCATION:	DISPOSAL DATE:
LANDFILL 14	12/04/07

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste material was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

Becky Sumner

CWMNW RECORDS DEPARTMENT
Date 1/16/08

From everyday collection to environmental protection, Think Green.® Think Waste Management.

Printed on 100% post consumer recycled paper.

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: ORD009020603
2. Page 1 of: 2
3. Emergency Response Phone: (877) 818-0087
4. Manifest Tracking Number: 000127918 VES

5. Generator's Name and Mailing Address
MCCORMICK & BAXTER SUPERFUND
6900 N EDGEWATER
PORTLAND, OR 97203
Generator's Phone: 206 546-7176

Generator's Site Address (if different than mailing address): SAME

6. Transporter 1 Company Name: NRC ENVIRONMENTAL
U.S. EPA ID Number: CAR000030114

7. Transporter 2 Company Name: VEOLIA ES TECHNICAL SOLUTIONS
U.S. EPA ID Number: NJD080631369

8. Designated Facility Name and Site Address
VEOLIA ES TECHNICAL SOLUTIONS, L.L.C.
9131 EAST 96TH AVE.
HENDERSON, CO 80640
Facility's Phone: 303 289-4827
U.S. EPA ID Number: COD980591184

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. RQ, HAZARDOUS WASTE, LIQUID, n.o.s., (F034,F035), 9, NA3082, III, (F032,F034)	0013	DM	0650	G	F032	F035	
						F034		
X	2. RQ, HAZARDOUS WASTE, LIQUID, n.o.s., (F032,F034,F035), 9, NA3082, III	0011	DM	0550	G	F032	F035	
						F034		
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1) ERG:171 W:23845 A:HENPTA023845 2) ERG:171 W:23825 A:HENPTA023825 -|- ER
Service Contracted by VESTS

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable International and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Lenna Cope on behalf of DEQ
Signature: Lenna Cope
Month 11 Day 27 Year 07

GENERATOR

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: BRANDON BAKER
Signature:
Month 11 Day 27 Year 07
Transporter 2 Printed/Typed Name: Robert Knox
Signature:
Month 11 Day 27 Year 07

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H141 2. H141 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Marlene Alvarez
Signature:
Month 12 Day 3 Year 07

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator ID Number: ORD059020603

22. Page: 2

23. Manifest Tracking Number: 000127918VES

24. Generator's Name: McCormick & Baxter Superfund

25. Transporter 3 Company Name: Savannah Transport — U.S. EPA ID Number: KS0000336891

26. Transporter _____ Company Name — U.S. EPA ID Number:

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes		

32. Special Handling Instructions and Additional Information

GENERATOR

33. Transporter 3 Acknowledgment of Receipt of Materials

Printed/Typed Name: Larry Lehmons — Signature: [signature] — Month 11 Day 30 Year 07

34. Transporter _____ Acknowledgment of Receipt of Materials

Printed/Typed Name — Signature — Month — Day — Year

TRANSPORTER

35. Discrepancy

DESIGNATED FACILITY

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Land Disposal Restriction Notification Form

Generator Name MCCORMICK & BAXTER SUPERFUND

EPA ID Number ORD009020603 Manifest 000127918VES

This notice is being provided in accordance with 40 CFR 268.7 to inform you that this shipment contains waste restricted from land disposal by the USEPA under the land disposal restriction program. Identified below for each container is the designation of the waste as a wastewater or non-wastewater, the Clean Water Act (CWA) permit status associated with the treatment/disposal facility, applicable waste codes and any corresponding subcategories, list of any F001-F005 solvent constituents that are present in the waste, and any underlying hazardous constituents (UHC) that are present.

Container Number: DG-0876813999-002 (1/ 1)

WIP / Approval Code:	023845 / HENPTA023845
Form Designation / CWA Status:	Non-Wastewater / Non-CWA
Waste Codes (Subcategories):	F032, F034, F035
Constituents (F001 - F005):	None
UHCs Present:	Not Applicable
Treatment Requirements:	Restricted waste requires treatment to applicable standards.
Additional Notices:	

Container Number: DG-0876813999-001 (1/ 2)

WIP / Approval Code:	023825 / HENPTA023825
Form Designation / CWA Status:	Non-Wastewater / Non-CWA
Waste Codes (Subcategories):	F032, F034, F035
Constituents (F001 - F005):	None
UHCs Present:	Not Applicable
Treatment Requirements:	Restricted waste requires treatment to applicable standards.
Additional Notices:	

I hearby certify that all information in this and associated land disposal restriction documents is complete and accurate to the best of my knowledge and information.

Signature Lenna Cope on behalf of DEQ

Title Site rep. Date 11/27/07

QUOTATION WORKSHEET

No. Q205004077

Page 01

VEOLIA ENVIRONMENTAL SERVICES

MANIFEST FROM:	RETURN MANIFEST TO:	CERTIFICATE TO:
MCCORMICK & BAXTER SUPERF 6900 N EDGEWATER PORTLAND, OR 97203	*** Same Address ***	*** Same Address ***

CONTACT:	JIM BOONE/NRC ENVIRON	QUOTE DATE:	11/21/2007	TERRITORY:	OR1
PHONE:	(206) 546-7176	FAX:	(206) 289-1035	SALES REP:	ERIC FEIST

Line	Service	Description	Quantity	Price	Unit	Extension
	Waste Stream:	SOLID WITH PPE CONTAMINATED WITH NAPL	8.00	266.00	EA	$2128.00
	Technology:	Landfill or surface impoundmnt				
	Facility:	CHEM WASTE MGT OF NORTHWEST				
	UOM/Container:	CUBIC YARD BOX				
					Line Total	$2128.00
	Waste Stream:	SOLID WITH PPE CONTAMINATED WITH NAPL	1.00	220.00	EA	$220.00
	Technology:	Landfill or surface impoundmnt				
	Facility:	CHEM WASTE MGT OF NORTHWEST				
	UOM/Container:	55 gal dm				
					Line Total	$220.00
	Waste Stream:	PURGE WATER	12.00	210.00	EA	$2520.00
	Technology:	Incineration-thermal destruct.				
	Facility:	VEOLIA ES TECHNICAL SOLUTIONS				
	UOM/Container:	55 gal dm				
					Line Total	$2520.00
	Waste Stream:	NON-AQUEOUS PHASE LIQUID (NAPL)	13.00	340.00	EA	$4420.00
	Technology:	Incineration-thermal destruct.				
	Facility:	VEOLIA ES TECHNICAL SOLUTIONS				
	UOM/Container:	55 gal dm				
					Line Total	$4420.00
	Miscellaneous:	CERTIFICATES OF DESTRUCTION	2.00	75.00	EACH	$150.00
					Line Total	$150.00
		ENERGY & SECURITY SURCHARGE	9438.00	0.08	PERCNT	$755.04
					Line Total	$755.04
All terms and conditions described in the previous pages will apply.					Quote Total	$10193.04

MCCORMICK & BAXTER SUPERFUND
6900 N EDGEWATER
PORTLAND OR 97203

ATTN : JIM BOONE/NRC ENVIRONMENTAL

JOB SITE :
MCCORMICK & BAXTER SUPERFUND
6900 N EDGEWATER
PORTLAND OR 97203

EPA ID # : ORD009020603
Veolia Territory: OR1

THIS IS PROVIDED BY VEOLIA ES TECHNICAL SOLUTIONS TO TRACK THE FOLLOWING WASTE MATERIALS ON MANIFEST NUMBER 000127917VES REMOVED FROM YOUR FACILITY ON 11/26/07 .

THE WASTE CONSISTED OF :
1 RQ, HAZARDOUS WASTE, SOLID, n.o.s., (F032,F034,F035), 9, NA3077, III 8 CF

TRANSPORTER : NRC ENVIRONMENTAL
1605 FERRY PT
ALAMEDA CA 94501
EPA ID # : CAR000030114

MATERIALS WERE TRANSPORTED TO CHEM WASTE MGT OF NORTHWEST ARLINGTON, OREGON, ORD089452353.

LINE	CONTAINER#	EPA ID/SITE/TECH	DATE	MANIFEST/LN
1	DG-0876813000-001-01-0	ORD089452353 CHEM WASTE MGT OF NORTHWEST ARLINGTON OR	11/26/07	000127917VES 1
1	DG-0876813000-001-02-0	ORD089452353 CHEM WASTE MGT OF NORTHWEST ARLINGTON OR	11/26/07	000127917VES 1
1	DG-0876813000-001-03-0	ORD089452353 CHEM WASTE MGT OF NORTHWEST ARLINGTON OR	11/26/07	000127917VES 1
1	DG-0876813000-001-04-0	ORD089452353 CHEM WASTE MGT OF NORTHWEST ARLINGTON OR	11/26/07	000127917VES 1
1	DG-0876813000-001-05-0	ORD089452353 CHEM WASTE MGT OF NORTHWEST ARLINGTON OR	11/26/07	000127917VES 1

MANIFEST NUMBER: 000127917VES

LINE	CONTAINER#	EPA ID/SITE/TECH	DATE	MANIFEST/LN
1	DG-0876813000-001-06-0	ORD089452353 CHEM WASTE MGT OF NORTHWEST ARLINGTON OR	11/26/07	000127917VES 1
1	DG-0876813000-001-07-0	ORD089452353 CHEM WASTE MGT OF NORTHWEST ARLINGTON OR	11/26/07	000127917VES 1
1	DG-0876813000-001-08-0	ORD089452353 CHEM WASTE MGT OF NORTHWEST ARLINGTON OR	11/26/07	000127917VES 1

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MCCORMICK & BAXTER SUPERFUND
6900 N EDGEWATER
PORTLAND OR 97203

ATTN : JIM BOONE/NRC ENVIRONMENTAL

JOB SITE :
MCCORMICK & BAXTER SUPERFUND
6900 N EDGEWATER
PORTLAND OR 97203

EPA ID # : ORD009020603
Veolia Territory: OR1

THIS IS PROVIDED BY VEOLIA ES TECHNICAL SOLUTIONS TO TRACK THE FOLLOWING WASTE MATERIALS ON MANIFEST NUMBER 000127918VES REMOVED FROM YOUR FACILITY ON 11/26/07 .

THE WASTE CONSISTED OF :

1	RQ, HAZARDOUS WASTE, LIQUID, n.o.s., (F034,F035), 9, NA3082, III, (F032,F034)	13	DM
1	RQ, HAZARDOUS WASTE, LIQUID, n.o.s., (F032,F034,F035), 9, NA3082, III	11	DM

TRANSPORTER : NRC ENVIRONMENTAL
1605 FERRY PT
ALAMEDA CA 94501

EPA ID # : CAR000030114

MATERIALS WERE TRANSPORTED TO VEOLIA ES TECHNICAL SOLUTIONS, HENDERSON, COLORADO, COD980591184.

LINE	CONTAINER#	EPA ID/SITE/TECH	DATE	MANIFEST/LN
1	DG-0876813999-002-01-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-02-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-03-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-04-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2

MANIFEST NUMBER: 000127918VES

LINE	CONTAINER#	EPA ID/SITE/TECH	DATE	MANIFEST/LN
1	DG-0876813999-002-05-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-06-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-07-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-08-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-09-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-10-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-11-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-12-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-002-13-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-001-01-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-001-02-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-001-03-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-001-04-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2

MANIFEST NUMBER: 000127918VES

NE	CONTAINER#	EPA ID/SITE/TECH	DATE	MANIFEST/LN
	DG-0876813999-001-05-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-001-06-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-001-07-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
1	DG-0876813999-001-08-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2
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1	DG-0876813999-001-11-0	TXD000838896 VEOLIA ES TECHNICAL SOLUTIONS PORT ARTHUR TX	12/16/07	000028774VES 2

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Attachment C

002688.OY28

Sheen Investigation Summary

McCormick & Baxter Creosoting Company Site Portland, Oregon

Contract No.
Task Order No. 71-03-28

May 2008

Prepared for:

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
Northwest Region
2020 SW Fourth Avenue
Portland, Oregon 97201-4987

Prepared by:

ECOLOGY AND ENVIRONMENT, INC.

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List of Abbreviations and Acronyms

Clearwater	Clearwater Environmental Services
DEA	David Evans and Associates
DEQ	Oregon Department of Environmental Quality
DNAPL	dense nonaqueous phase liquid
E & E	Ecology and Environment, Inc.
EPA	United States Environmental Protection Agency
GSI	GSI Water Solutions, Inc.
LNAPL	light nonaqueous phase liquid
mg/L	milligrams per liter
mS/cm	millisiemen per centimeter
The Site	McCormick & Baxter Creosoting Company
NAPL	nonaqueous phase liquid
NAVD88	North America Vertical Datum, 1988
OC	Organoclay
O&M	Operation and Maintenance
PAHs	polynuclear aromatic hydrocarbons
PCP	pentachlorophenol
SIM	selective ion monitoring
Site	McCormick & Baxter Creosoting Company
µg/L	micrograms per liter

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1 Introduction

Ecology and Environment, Inc. (E & E), under contract with the Oregon Department of Environmental Quality (DEQ) (Task Order 71-03-28) has prepared this Sheen Investigation Summary for the McCormick & Baxter Creosoting Company Superfund (Site) located in Portland, Oregon. This report summarizes the sampling activities and analytical results for surface water and sub-armoring water samples collected during the June 26, 2007 and September 27, 2007 sampling events. The site, a former wood-treating facility, is located along the Willamette River at 6900 North Edgewater Street. These sampling events were a joint effort between DEQ, E & E, and GSI Water Solutions, Inc. (GSI). This assessment is being prepared as Attachment C to the Operation and Maintenance (O&M) Report (January 2007 through December 2007).

In 2004, a sediment cap was installed at the McCormick & Baxter site as part of the sediment remedy. As discussed in the Second Five-Year Review (DEQ 2006), the Remedial Action Objectives for the sediment cap were:

- Prevent humans and aquatic organisms from direct contact with contaminated sediments; and
- Minimize releases of contaminants from sediment that might result in contamination of the Willamette River in excess of Federal and State ambient water quality standards.

DEQ directed E & E and GSI to perform this investigation to assess sheen observed along a portion of the Willamette River shoreline of the site in summer 2007. The objectives of this assessment were to:

- evaluate the potential origin of observed sheen;
- identify the mechanism(s) responsible for the sheen occurrences; and
- determine whether there were surface water impacts in the vicinity of the observed sheen.

The focus area at the site for this assessment is the 300 feet x 60 feet area of organoclay (OC) mats (described as Mat 2) located southeast of the granual organoclay along a portion of the shoreline downgradient from the former Tank Farm

Area (TFA). Organoclay, also known as organophyllic clay, is an oil adsorptive material. Mat 2 was installed in 2005 adjacent to granular OC placed during initial cap construction in 2004.

This assessment contains background information regarding sediment cap construction, sheen observations, historic nonaqueous phase liquids (NAPL) at the focus area, and potential mechanisms for sheen occurrence; a discussion of sampling activities; a discussion of sampling results; and a brief summary. Also included are photographic documentation, a PowerPoint presentation of the June 26, 2007 sampling event, and the E & E data quality assurance memoranda evaluating the laboratory data for the sampling events, as Appendices A through C, respectively. Attachment B of this O&M Report contains site inspection notes that provide additional details of sheen observations.

2 Background

This section presents background information regarding the sediment cap construction, sheen observations along the shoreline near the TFA, previous NAPL investigation in the focus area, and potential mechanisms for sheen occurrence.

2.1 Sediment Cap

As specified in the Record of Decision (EPA 1996) for this site, a sediment cap was selected by DEQ and the United States Environmental Protection Agency (EPA) to prevent humans and aquatic organisms from direct contact with contaminated sediments and to minimize releases of contaminants from the sediment that might result in contamination of the Willamette River in excess of Federal and State ambient water quality criteria. Construction of the sediment cap was initiated in 2004 and consisted primarily of an armored sand cap placed over approximately 23 acres of contaminated sediment. Construction occurred during the summers of 2004 and 2005. In addition to the sand layer, granular OC was placed in two potential creosote seep areas. To protect the cap from erosion, the sand and OC layers were armored with a combination of rock and articulated concrete blocks.

In 2005, OC mats were installed in four locations where ebullition during low Willamette River levels in the late summer and fall created pathways of migration for otherwise non-mobile (residual) creosote. These OC mat areas are described as Mat 1 through Mat 4 on Figure 2-1. Gas (primarily methane and carbon dioxide) is produced from the degradation of organic materials in the subsurface. Ebullition occurs as a result in a drop in pressure as the Willamette River level decreases, allowing the dissolved gas to come out of solution and produce bubble pathways through the overlying sediment. Ebullition occurs continuously at the Site during low river levels in the late summer and fall; typically no oily sheen is observed with the ebullition. However, sheen has been observed in areas where the gas bubbles encounter residual creosote as they pass through contaminated sediment, resulting in a film of creosote that coats the gas bubbles and is released as a sheen "burst" as the gas bubble encounters the water's surface.

The organoclay mats were installed in 2005 to adsorb the creosote film associated with ebullition that results in sheen on the water surface. Three of the four mats are located in the embayment area riverward from the TFA, and one of the mats is located beneath the Burlington Northern Railroad Bridge.

A detailed discussion of sediment cap construction activities is provided in the documents titled *Remedial Action Construction Summary Report Sediment Cap (June 2004 through November 2004)* (E & E 2006a) and *Remedial Action Construction Summary Report Sediment Cap Completion (August 2005 through October 2005*) (E & E 2006b), both issued by E & E in May 2006.

Since 2005, two additional organoclay mats (Mats 5 and 6 on Figure 2-1) were installed at the site. Mat 5 (10 feet x 10 feet) was installed in 2006 to cover a bubble pathway where periodic creosote in the form of globules were observed migrating to the surface near Mat 1 along the northwestern edge of the TFA embayment. Details of the installation are provided in the document titled *Organoclay Cap Performance Evaluation – Field Study* included as Attachment E of the *Operations and Maintenance Report (October 2005 through December 2006)* issued by E & E in March 2007 (E & E 2007). Mat 6 (20 feet x 15 feet) was installed in October 2007 to intercept ebullition-induced sheen observed this summer along the riverward side of Mat 2. Details of the October 2007 organoclay mat installation are provided in the document titled *Site Observations and Activity Summary,* included as Attachment B of this O&M Report. The sampling events discussed in this Summary took place prior to installing Mat 6.

Figure 2-1 shows the locations of the five organoclay mats near the focus area. The locations of all six organoclay mats, including the one beneath the Burlington Northern Railroad Bridge are shown on the updated record drawings included in this O&M report as Attachment I.

2.2 Sheen Observations at the Focus Area

NAPL sheens were observed between June and September 2007. Sheen was first observed at the site on June 25, 2007, during a shoreline sediment cap inspection performed by Clearwater Environmental Services (Clearwater). That day, sheen bands were observed along the shore line and on near-shore surface water from the TFA to the southern end of the Site. During the monthly meeting on June 26, 2007, several areas of sheen were also observed during the shoreline inspection, but the sheen was not as extensive as the previous day. Areas where sheen was observed on June 26, 2007, are shown on Figure 2-2. To evaluate the nature and potential origin of the sheen observed in the focus area, water samples were collected from the four areas of sheen along the shoreward edge of Mat 2 and from four areas on the riverward side of Mat 2. This sampling event is the June 26, 2007, event discussed subsequently in this report. Based on sampling results and the recurrence of sheen shoreward of Mat 2, the limited extent sheens observed in the focus area appeared to be from the Site. However, on June 28, 2007, large bands of sheen appeared to come from downstream of Willamette Cove (potentially during a reversal in river direction at low tide and/or westerly winds), which may have been the cause for the continuous bands of sheen observed on June 25, 2007 and June 26, 2007. Therefore, an off-site source of sheen cannot be ruled out.

During the July monthly progress meeting on July 25, 2007, sheen was observed in five locations:

- (1) As continuous bands of sheen extending from the tank farm area to the southern end of the site. The sheen extended out from the shore for more than 10 feet;
- (2) Along the shoreward edge of Mat 2 (Figure 2-1), corresponding to sampling locations A, C, E, and G, off of the TFA as quarter-sized sheens on residual water puddles at low tide;
- (3) Near the organoclay test patch (Mat 1 on Figure 2-1) as quarter-sized sheens present on surface water
- (4) At the southeastern portion of the Site's shoreline and near-shore as quarter- to fist-sized areas of sheen.
- (5) In Willamette Cove, along the shoreline as quarter- to fist-sized areas of sheen

Figure 2-4 shows the locations of sheen observed in July 2007. Details regarding sheen observations on other dates are provided in Attachment B to the O&M Report.

On June 26, 2007, DEQ directed E & E to initiate weekly sediment cap inspections rather than monthly observations, one month earlier than originally planned, to monitor the sheen. E & E personnel and/or staff from E & E's subcontractor, Clearwater, conducted the inspections. Sheens were regularly observed by E & E during oversight for cap armor repair, from June 26, 2007 through July 11, 2007; and by Clearwater during their weekly site walks in the focus area through mid-September and during the subsequent July and August monthly site meetings. Figure 2-5 shows the Willamette River level and the period over which sheen was regularly observed. No sheen was observed while tides were high. Sheen observation; including those from weekly inspections, construction oversight, and monthly meetings; are described in Attachment B to this O&M Report.

The sheens observed in the focus area were blocky in appearance and more limited in extent and did not appear to be related to the extensive sheen observed towards the end of June. As provided above, previous ebullition-induced sheens covered by the organoclay mats had been directly observed to be migrating as coating on a gas bubble that produced a temporary sheen burst at the surface or through particular gas bubble pathways as a creosote globule which also dissipated quickly at the surface. The sheens observed this summer appeared with the outgoing tidal cycle across a stretch of approximately 10 to 20 feet along the bank near Sample Locations A and C (Figure 2-4). The sheen left a blocky film on the surface, which remained until the tide reversed. No source for any of the sheens could be identified during site walks; there was no associated odor, and the sheen was observed only on the surface of the sediment and/or water. Also, there was no evidence of contamination in the underlying soils (as determined by digging

into the sand beneath the sheen). The sheens appeared to be highly weathered as indicated by a waxy texture and no discernible odor. Figure 2-5 shows the period over which sheens were observed in the focus area. When the tidal cycle range dropped in September to where the high tide portion of the tide was below approximately 9.5 feet and the low portion of the tidal cycle was between 4 and 6 feet NAVD88, the sheen which had been appearing as the tide dropped was no longer observed.

In an effort to determine the origin of the sheen occurrence, Heidi Blischke of GSI and David Cole of DEQ observed the outgoing tide on August 17, 2007, from 11:00 a.m. to approximately 5:00 p.m. High tide at 10 feet NAVD88 was observed at 9:00 a.m. At 11:00 a.m., the river level was approximately 9.2 feet NAVD88 and ebullition was observed throughout the area. No sheen was associated with the ebullition. Ebullition without sheen continued throughout the day. As the surface water level dropped with the outgoing tide, water at Sampling Location C (sampled on June 26, 2007), became isolated from the river at 1:15 p.m with no observed sheen. At 1:15 p.m., the river level was at approximately 6.5 feet NAVD88. Between 4:00 p.m. and 4:30 p.m. (at river levels from 7.6 to 7.5 feet NAVD88, respectively), as the tide was going out, sheen was observed at Sample Locations A and C (sampled on June 26, 2007). The sheen appearance was instantaneous and appeared in both locations at the same time. The sheen was approximately fist-sized in diameter and blocky and was not associated with the ongoing ebullition at the Site. This sheen did not increase as the tide continued to go out between 4:30 p.m. and 5:00 p.m.. The occurrence of sheen in more than one location at the same time and river elevation suggests a potential source for the sheen from residual creosote at a fixed location within the riverbank. The sheen dissipated as the tide began to come in at 5 p.m.

2.3 Presence of Nonaqueous Phase Liquid in the Area of Focus

Dense Nonaqueous Phase Liquid

The granular OC immediately north of the area of focus as part of the sediment cap construction was placed with the objective of capping a potential seep of dense nonaqueous phase liquid (DNAPL) that could migrate along two silt layers, predicted to potentially enter the organoclay at elevations of approximately +2 and -2 feet NAVD88. This was based on beach and sediment cores collected in 2004 for the purpose of developing the sediment cap design. Figure 2-6 shows the locations of the 2004 investigative borings in the TFA where cores had visual creosote or where laboratory mobility tests suggested creosote mobility were considered to be areas where creosote could potentially seep to the river. Creosote was identified in two of the NAPL investigation borings advanced within the bank in the focus area in 2004 (SD1004 and SD1204). In SD1004, NAPL-saturated sand was identified from 10.5 to13 feet (0.85 to 1.65 feet NAVD88) and in SD1204, heavy sheen was observed at approximately 4 feet NAVD88. These

elevations, which could potentially cause DNAPL seepage, are lower than the level of any potential NAPL expected to cause the sheen observed in the focus area.

Light Nonaqueous Phase Liquid
An active, light nonaqueous phase liquid (LNAPL) seep was not documented in the area of focus prior to installation of the sediment cap. Although LNAPL seeps were not identified in the 2004 NAPL Investigation, based on historic observations of LNAPL seeps in the focus area, there is likely residual creosote at elevations coincident with the water table smear zone.

2.4 Potential Mechanisms for Sheen Occurrence

A likely source for the sheen is from residual creosote within the riverbank sands. The barrier wall prevents the flow of shallow groundwater from the site to the river in the focus area. As the river rises and falls seasonally and due to the tide, the water table within the riverbank may pass through areas of residual creosote. As this occurs, sheen can be produced on the surface of the water table due to the surface tension. This sheen would appear on the surface water as the bank storage water is released with the dropping tide. This mechanism could explain the recurring sheens observed instantaneously across the focus area. A cross-section showing the areas where residual creosote was identified in the 2004 borings relative to the river levels discussed in relation to the sheen is shown in Figure 2-7. The location for the cross-section is provided in Figure 2-6. As shown in Figure 2-5, sheen was regularly observed with the outgoing tide as the river level dropped to below 9 feet NAVD88. The sheen was only observed during the period between June and September when the tidal cycle ranged from a high tide of 11.5 feet and a low tide of approximately 6 feet. (However, the sheen was only observed during the outgoing tide when the river level dropped below approximately 9.5 feet NAVD88.)

Once the *high tide portion* of the tidal cycle dropped below approximately 9.5 feet NAVD88, sheens were no longer regularly observed with the outgoing tide. This suggests that if there is residual creosote within the bank causing the sheen, the residual creosote causing the regular sheen occurrence is present at an elevation above 9.5 feet NAVD88. However, because the water elevation in the riverbank drops more slowly than the river with the outgoing tide, the sheen occurrence on the river was observed at lower elevations (between 6 and 9 feet NAVD88 rather than at the 9.5 feet NAVD88 elevation).

Another potential mechanism for the sheen is from differential loading of the sediments beneath the OC mats placed in 2005 causing mobilization of creosote from beneath the mats. However, the apparent correlation between river levels and sheen occurrence is not addressed by this mechanism.

Note: This page is intentionally left blank.

3 Sampling Activities

This section presents the sampling methodology employed during the June 26, 2007 and September 27, 2007, sampling events. The June 26, 2007, sampling event occurred as an immediate response to sheen observation on June 25' 2007, and no formal work plan was developed. Planning for the September 27, 2007, sampling event was a joint effort between GSI, E & E, and DEQ, although no formal work plan was issued.

3.1 June 26, 2007 Sampling Event

3.1.1 Surface Water Sample Collection

During the June 26, 2007, sampling event, surface water samples were collected from eight locations. Four of these locations were along the shoreward edge of the 300-foot x 60-foot area of OC mats in the TFA where sheen had collected in puddles left by the outgoing tide. Four of the locations were along the riverward edge of the OC mats in the TFA where there was no visible sheen. Refer to Figure 2-1 for the sample locations.

A peristaltic pump and polyethylene tubing were used to collect water samples from the four shoreward locations. The peristaltic pump was used because the shallow depth of the puddles did not allow for a grab sample, and it minimized the amount of sheen collected allowing for sampling of the water only. A new length of polyethylene tubing was used at each shoreward location. Riverward locations were sampled by submerging the sample container approximately one foot, removing the cap, and allowing the container to fill.

Samples were collected between 1:20 p.m. and 2:02 p.m. During this time, the tide was outgoing. River levels were approximately 7.4 feet NAVD88, according to river level data from the USGS. Samples were sent to Test America Analytical Testing Corporation in Beaverton, Oregon, for analysis of PAHs and PCP using EPA Method 8270 SIM (using ultra low-level detection limits). Two, one-liter amber bottles were collected at each location. Sample identification nomenclature is shown in Table 3-1.

Table 3-1 Sample Nomenclature – June Sampling Event

Digits	Description	Code	Code Description
1 and 2	Site Location	MB	McCormick & Baxter
3 and 4	Matrix	SW	Surface Water
5 and 6	Month	06	June
7 and 8	Year	07	2007
9	Sample location	A through H	
Example: MB-SW-0607-A – Surface water sample collected from location A in June 2007 at McCormick & Baxter.			

3.1.2 Quality Assurance/Quality Control Sampling

Because these samples were collected as screening information to assess whether the site may be a source of the sheen and not as compliance samples, quality assurance/quality control samples were not collected. In addition, because new sampling equipment was used at each location, a sampling equipment rinsate blank sample was not collected.

3.2 September 27, 2007 Sampling Event

During the September 27, 2007, sampling event, a total of eight surface water and eight sub-armoring water samples were collected. Each sub-armoring sample was collected from the same location, noted as Location I on Figure 2-1, at different times of the tidal cycle. This location was selected because it was within the regularly observed sheen occurrence near Mat 2. The objective was to determine if there was a correlation in PAH concentration and bank discharge during the out going tide. Surface water sample locations varied depending on the water level; samples were collected at waters edge nearest to the sub-armoring sample location at approximately the same time as sub-armoring samples. The objective was to determine if there was a correlation in PAH concentration between sub-armoring water samples and corresponding surface water samples.

Prior to beginning sampling, a point on the boulder cluster near the sampling location was surveyed by David Evan and Associates (DEA). During the sampling, a Topcon AT-G7 Auto Level and survey rod and the surveyed elevation of the boulder cluster was used to determine pertinent elevations including the elevation of the sampling tool and river elevations during each sampling time. A monitoring well with a known inner casing elevation was surveyed to check precision of the field survey equipment. The field reading was within 0.01 feet of the surveyed elevation.

Also prior to sampling, tide predictions were printed from the National Weather Service Advanced Hydrological Prediction Service. This assisted in identifying when to start sampling and for predicting the sampling intervals throughout the tidal cycle.

Sample collection began at 7:22 a.m. at a river level of approximately 9 feet NAVD88. The tide was outgoing at this time. Sample collection ended at 7:10 p.m. at a river level of approximately 9.7 feet NAVD88. The last sample was collected at high tide. Samples were sent to Test America Analytical Testing Corporation in Beaverton, Oregon, for analysis of PAHs and PCP using EPA Method 8270 SIM (using ultra low-level detection limits). Two, one-liter amber bottles were collected for each sample. Sample identification nomenclature is shown in Table 3-2.

Table 3-2 Sample Nomenclature – September Sampling Event

Digits	Description	Code	Code Description
1 and 2	Site Location	MB	McCormick & Baxter
3 and 4	Matrix	SW SA	Surface Water Sub-Armoring Water
5 and 6	Month	09	September
7 and 8	Year	07	2007
9	Sample Location	I	
10	Sample sequence	0 1-6 7	Initial sample Intermediate samples Final sample
11	Tide Direction	D U H	Down Up High
Example: MBSW0907-I-7H – Final surface water sample collected from location I at high tide in September 2007 at McCormick & Baxter.			

3.2.1 Sub-Armoring Sample Collection

Sub-armoring water sampling was conducted using an MHE PushPoint® sampling tool, polyethylene tubing, and a peristaltic pump. The PushPoint® mini-piezometer probes are developed and sold by MHE Products and are commonly known as Henry Samplers. These probes are constructed of stainless steel and are easily decontaminated, reusable, and have been used on similar sites throughout the country to obtain the same type of data. The probes are made of small-diameter, 316 stainless steel, and have a screened zone that consists of a series of interlaced machined slots that form a short-screened zone with approximately 20% open area. The probes are available in several different lengths ranging from 14 inches to 72 inches. The probe used in this sampling had an overall length of 36 inches and a screen length of approximately 1.5 inches. The device was pushed into the sediment at Location I until the bottom of the probe screen was at an elevation of 6.95 feet NAVD88. Then, an internal guard rod was removed from the probe body, and tubing was attached to the end of the probe. The probe was inserted approximately 2 feet into the sand cap below the articulated concrete block and filter gravel.

Because the objective of the sampling event was to collect sub-armoring samples from the same location and depth throughout the tidal cycle, the sampling device was not removed and decontaminated between samples. The polyethylene tubing was replaced for each sample and water was pumped through the sampling device from approximately three minutes for development before sample collection began. During development, water quality parameters were monitored, as discussed in Section 3.2.3. Once parameters were stable, sample collection began.

3.2.2 Surface Water Sample Collection

Surface water samples were collected using polyethylene tubing and a peristaltic pump. Tubing was run to the edge of water, which varied depending on the tide cycle, and held just under the surface of the water. Water was pumped through the tubing and water quality parameters were monitored. Once the parameters stabilized, the sample was collected. The polyethylene tubing was replaced for each sample collection. A peristaltic pump was used rather than a grab sample because the ground slope was very small, and the sample would have to have been collected approximately 20 feet from the edge of water to be deep enough to insert a sample bottle into the water.

During surface water sample collection, small, quarter-sized spots of sheen were visible within the sediment starting at approximately 2:45 p.m. This sheen did not occur similar to the regularly observed sheens, which occurred simultaneously across a broader area as a diffuse sheen, in the August timeframe near Mat 2. This sheen occurred in a discrete location and was not observed elsewhere. The sheen had dissipated by 3:45 p.m. The river elevation at 2:45 p.m. was approximately 5.71 feet NAVD88. There was an in coming tide and the river elevation at 15:45 was approximately 6.61 feet NAVD88.

3.2.3 Water Quality Parameters

Water quality parameters were recorded in conjunction with the collection of each water sample. A YSI 556 Multi Parameter System with a Flow–through cell and a LaMotte 2020e Turbidimeter were utilized to monitor water conditions.
One set of parameters was recorded prior to collection of a surface water sample--after parameters had stabilized. Three sets of parameters were recorded during sub-armoring sampling. The first set of parameters was recorded immediately after pumping was initiated. The second set of parameters was recorded after conditions had stabilized and before the sample was collected, approximately three minutes after the initial set. The third set of parameters was recorded upon the completion of sample collection.

Each set of parameters consisted of the following.

- Temperature
- Dissolved Oxygen
- Oxidation Reduction Potential
- Conductivity
- pH
- Turbidity

The purpose of monitoring water conditions was to keep a record of the general water quality conditions during sampling. During most of the sub-armoring samples, surface water was not present; therefore, there was no concern of surface water infiltrating the sub-armoring sample. Water quality parameters are included in Table 4-2.

3.2.4 Quality Assurance/Quality Control Sampling

During this sample event, quality assurance/quality control samples were not collected. These samples would have normally included a Matrix Spike, Matrix Spike Duplicate, and blind duplicate. Although the same sampling device was used for each sub-armoring sample, no sampling equipment rinsate blank was collected. Because each surface water sample location was sampled with new tubing a sampling equipment rinsate blank collection was not necessary.

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4 Sampling Results

This section describes the analytical results for samples collected during the June 26, 2007, and September 27, 2007, sampling events. Section 4.1, below, provides a summary of analytical testing requirements for both sampling events. The following subsections provide sampling results for the Spring 2007 and Fall 2007 events, organized by sample type and constituent. Analytical results for contaminants of concern identified in the record-of-decision (EPA 1996) for McCormick & Baxter were compared to the most stringent of five criteria, as shown in Tables 4-1 and 4-2, to evaluate the release of contaminants from sediments beneath the cap to the Willamette River.

The following values are the most conservative values for each chemical of concern from the above mentioned criteria/regulations.

- Pentachlorophenol – 1 microgram per liter (µg/L)
- Acenaphthene – 520 µg/L
- Anthracene – 40,000 µg/L
- Fluoranthene – 54 µg/L
- Fluorene – 5,300 µg/L
- Naphthalene – 620 µg/L
- Pyrene – 4,000 µg/L
- Total Carcinogenic PAHs – 0.031 µg/L
- Benzo (a) anthracene, Benzo (a) pyrene, Benzo (b) flouranthene, Benzo (k) fluoranthene, Chrysene, Dibenzo (a,h) anthracene and Ideno (1,2,3-cd) pyrene – 0.0018 µg/L, each

4.1 Sample Analysis

Samples were analyzed for PAHs and PCPs using EPA Method 8270 SIM (using ultra low-level detection limits). Copies of the laboratory data review summary reports are included as Appendix C.

4.2 Analytical Results

Sampling results from the June 2007 and September 2007 sampling events are discussed below. Tables 4-1 and 4-2 provide a complete summary of all analyti-

cal results. In addition, Table 4-2 presents field parameters recorded with each sample collected.

4.2.1 June 26, 2007 Sampling Event

In the June 26, 2007 event, detectable total PAH concentrations were reported in all four of the shoreward sample locations and in two of the four riverward samples. Total PAH concentrations in the shoreward samples ranged from 0.1768 µg/L to 4.93 µg/L. Total PAH concentration in the riverward samples ranged from below the method detection limits to a maximum concentration of 0.358 µg/L. Method reporting limits ranged from 0.0118 µg/L to 0.0238 µg/L. The maximum total PAH concentration was detected at Location A, which is a shoreward location. One sample exceeded the corresponding comparison criterion of 0.031 µg/L for total cPAHs, at Location C, which is a shoreward location. Location C is the only location that exceeded any of the comparison criteria listed above.

PCP was detected at one location (Location G), but it was below the comparison criteria listed above. Location G is a shoreward location. The method reporting limit for PCP ranged from 0.236 to 0.248 µg/L.

4.2.2 September 27, 2007 Sampling Event

Sampling conducted on September 27, 2007, was designed to collect surface water and sub-armoring samples from across a tidal cycle. No sheen was observed during the sampling event, which suggests that the river levels had dropped below the elevation across which the water table crosses the residual creosote causing the sheen. In the September 27, 2007, sampling event, total PAHs were detected in three of eight surface water samples and all eight sub-armoring water samples. In surface water samples, total PAH concentrations ranged from below method detection limits to a maximum concentration of 0.2704 µg/L.

Method reporting limits ranged from 0.0119 µg/L to 0.0239 µg/L. The maximum total PAH concentration in surface water was detected in sample MB-SW-0907-I-0D, the initial sample of the day. The maximum total PAH concentration in sub-armoring water was detected in sample MB-SA-0907-I-0D, also the initial sample of the day. No sample from the event exceeded the corresponding comparison criteria of 0.031 µg/L for total CPAHs, or any individual PAH.

PCP was not detected above the method detection limits in any of the samples collected. The method reporting limit for PCP was 0.24 µg/L.

Sample results are graphed in Figure 4-1 for four of the commonly detected analytes; acenapthene, naphthalene, fluorene, and phenanthrene, versus Willamette River elevations, to determine if there was a correlation in PAH concentration and

bank discharge during the outgoing tide. There was no correlation between river level and PAH concentrations. If sheens are observed again next summer, a similar survey should be conducted across a tidal cycle over which sheen is observed. Multiple sample locations along a transect perpendicular to the shore may also provide more information regarding lateral vs. vertical contaminant migration pathways.

All field parameters measured during sample collection are presented in Table 4-2. Dissolved oxygen (DO) levels in the surface water samples ranged from 6.97 to 10.85 mg/L, while DO levels in the sub-armoring water ranged from 0.26 to 0.7 in the pre-sampling readings and 0.14 to 0.5 mg/L in the post-sampling readings. Specific conductance readings in the surface water samples ranged from 0.1 to 0.167 mS/cm, while specific conductance readings in the sub-armoring samples ranged from 0.116 to 0.126 mS/cm in pre-sampling readings and 0.116 to 0.123 in the post-sampling readings. DO and oxidation reduction potential differed between surface water and sub-armoring water, but specific conductance readings for surface water and sub-armoring water were similar.

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5 Summary

Two sampling events were conducted in response to sheen observations at the site during the Summer 2007. During the first event, on June 26, 2007, surface water samples were collected from eight locations; sheen was visible at four of the eight sample locations. During the second event, on September 27, 2007, surface water and sub-armoring water was collected at one location. Sheen was observed briefly (for approximately 10 minutes) near the end of the sampling event, in spots approximately quarter-size. The sheen investigation was a joint effort between DEQ, E & E, and GSI.

Samples were analyzed for PAHs and PCP. Sample analysis was provided by Test America Analytical Testing Corporation, Inc., under separate contract with DEQ. Analytical results were compared to the most stringent of five different comparison criteria. During the June 26, 2007, sampling event one sample location (Location C) exceeded the cPAH reference criteria. Location C also exceeded five other individual PAH reference criteria. No other locations exceeded any reference criteria. During the September 27, 2007, sampling event, no reference criteria was exceeded for any individual or total PAH.

Figure 4-1 was developed to determine if there was a correlation between bank discharge and PAH concentrations. The hypothesis was that residual creosote near an elevation of 7 to 7.6 feet NAVD88 in the riverbank causes sheen on the water surface, which appears along the riverbank edge as groundwater discharges from the bank at low tide. If bank discharge was entraining residual NAPL as sheen on the top of the water table, it was expected that PAH concentrations would increase in sub-armoring samples as river levels decreased (bank discharge conditions) and would then decrease as river levels increased. As Figure 4-1 shows, there was no correlation between PAH concentrations and river stage; however, the minimal sheen observed during the September sampling event did not match the nature of the sheen observed in August 2007. Potentially, the residual creosote causing the sheen is at a higher elevation as suggested by sheens no longer being observed once the high tide elevation dropped beneath approximately 10 feet NAVD88. If sheens are observed again next summer, a similar survey should be conducted during across a tidal cycle over which sheen is observed.

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6 References

Ecology and Environment, Inc.(E & E). March 2007. *Operations and Maintenance Report (October 2005 through December 2006). McCormick & Baxter Creosoting Company, Portland, Oregon*. Prepared for the Oregon Department of Environmental Quality, Portland, Oregon.

_____. May 2006a. *Remedial Action Construction Summary Report Sediment Cap (June 2004 through November 2004., McCormick & Baxter Creosoting Company, Portland, Oregon.* Prepared for the Oregon Department of Environmental Quality, Portland, Oregon.

_____. May 2006b. *Remedial Action Construction Summary Report Sediment Cap Completion (August 2005 through October 2005). McCormick & Baxter Creosoting Company, Portland, Oregon.* Prepared for the Oregon Department of Environmental Quality, Portland, Oregon.

Oregon Department of Environmental Quality. September 2006. *Second Five-Year Review for McCormick and Baxter Creosoting Company Superfund Site Portland, Multnomah County, Oregon*, ORD009020603.

United States Environmental Protection Agency. March 1996. *Record of Decision, McCormick and Baxter Creosoting Company, Portland Plant, Portland, Oregon.*

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Figures

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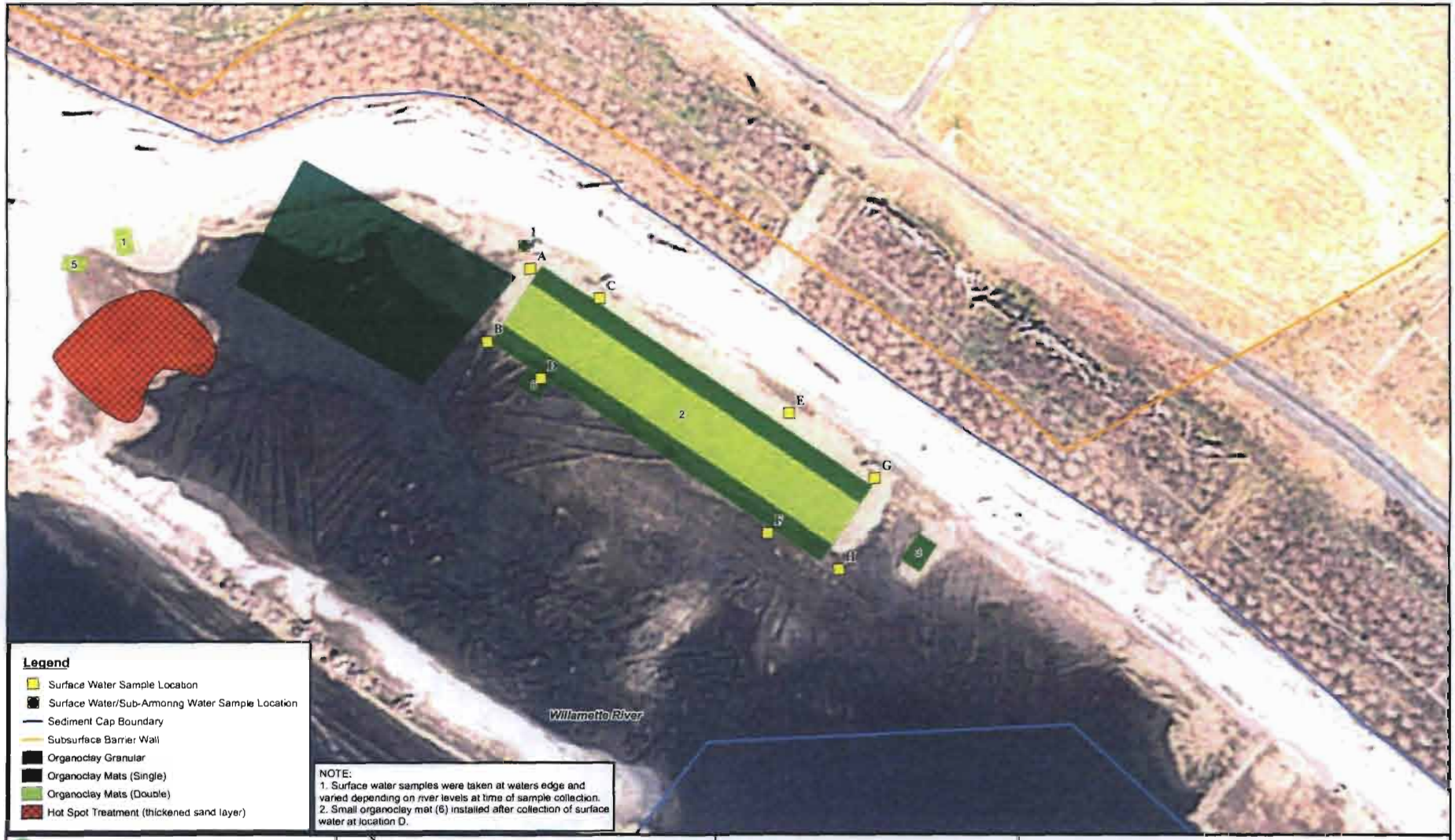

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N W E S
0 20 40 80 120 160 200
Feet
Approximate Scale

Map Reference: Orthorectified Photo Image, October 2, 2006 @ 11:45 am. River Stage at Time of Photo is 5.21 ft. NAVD88 at Morrison Street Bridge.

McCormick & Baxter Creosoting Company

Portland, Oregon

Figure 2-1
Sample Location Map
June 26, 2007 and September 27, 2007

Date:	Drawn by:	Job Number:
11/12/2007	avh	002688.OY28.09

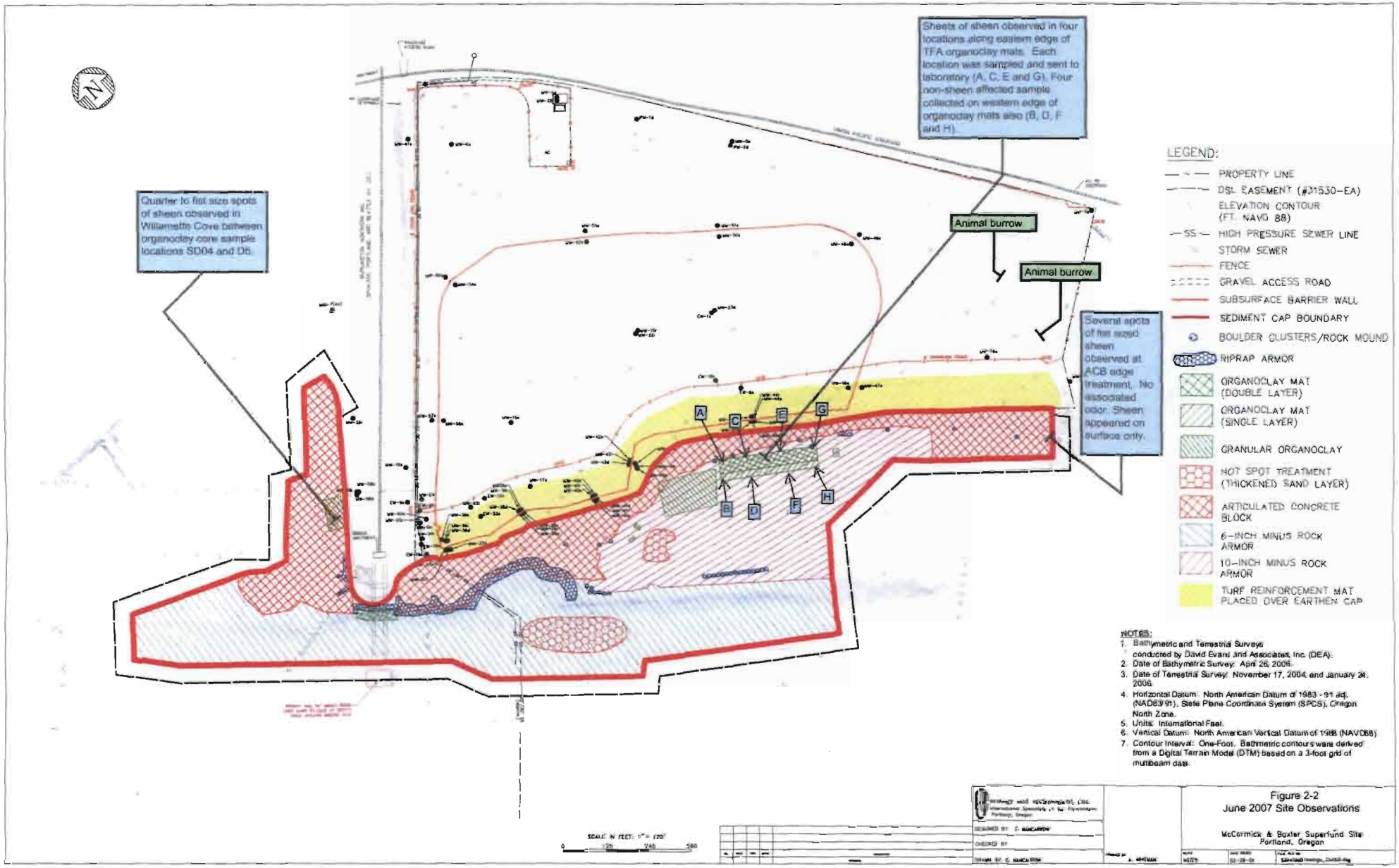
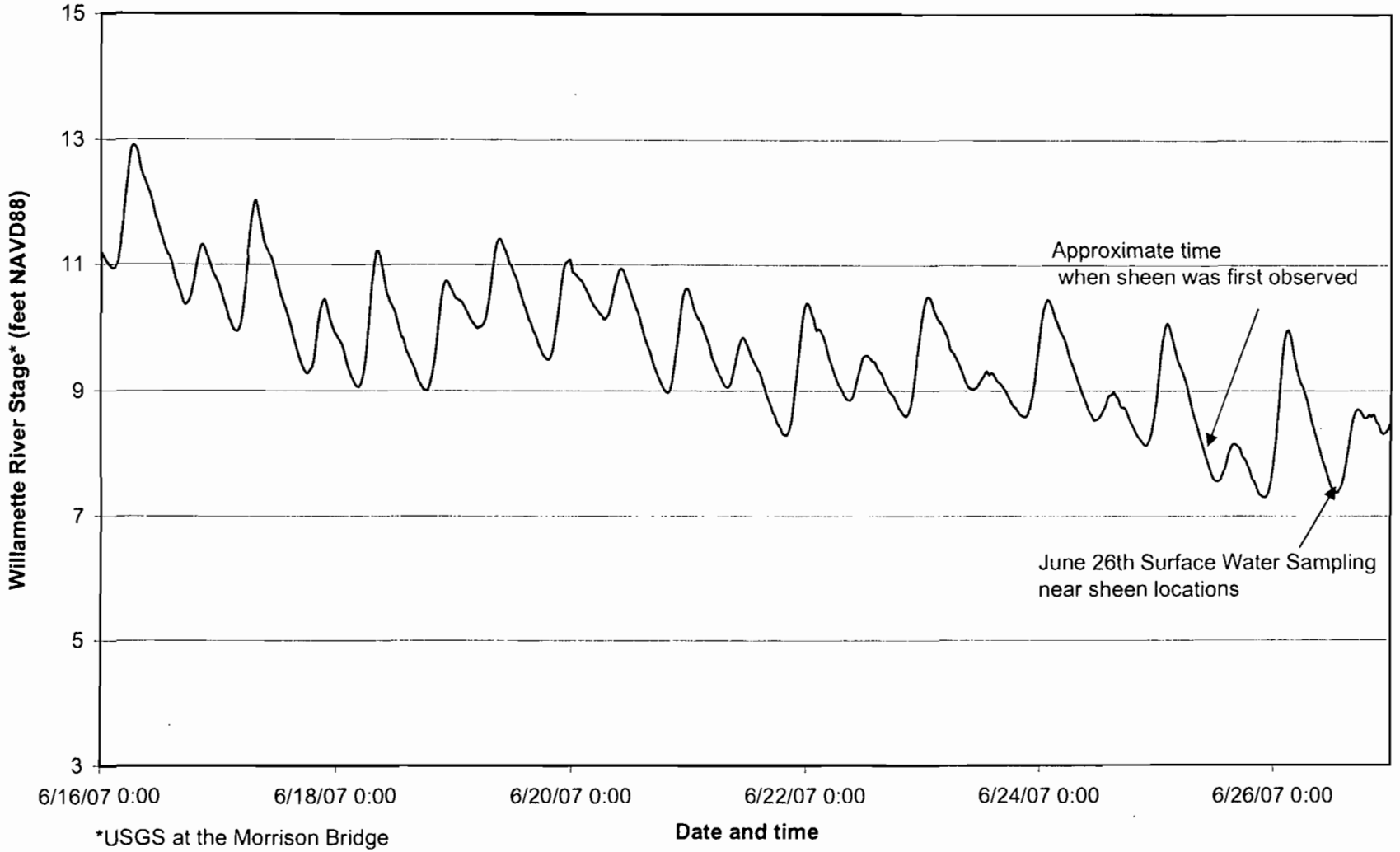
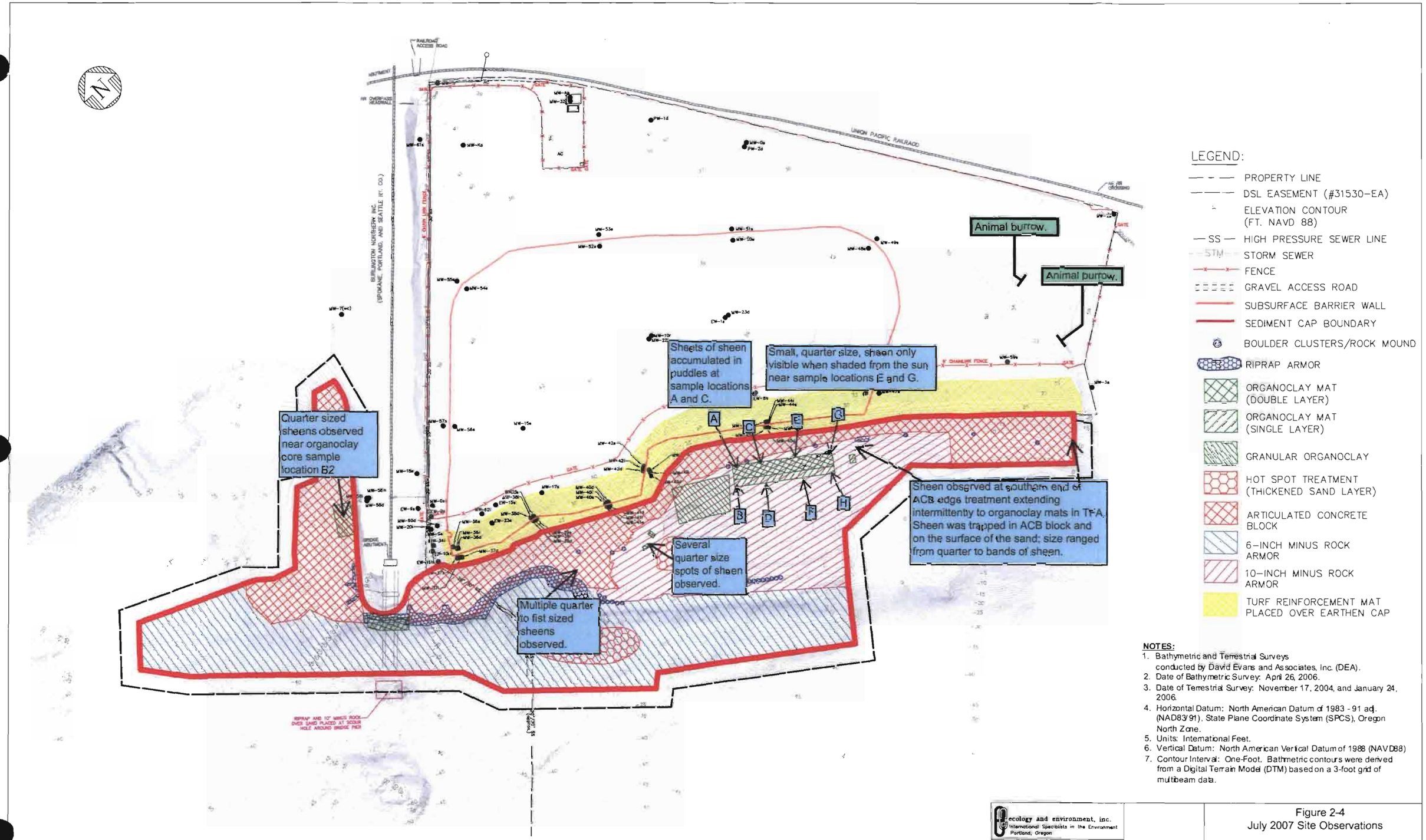

Sheets of sheen observed in four locations along eastern edge of TFA organoclay mats. Each location was sampled and sent to laboratory (A, C, E and G). Four non-sheen affected sample collected on western edge of organoclay mats also (B, D, F and H).
Quarter to fist size spots of sheen observed in Willamette Cove between organoclay core sample locations SD04 and D6.
Animal burrow
Animal burrow
Several spots of fist sized sheen observed at ACB edge treatment. No associated odor. Sheen appeared on surface only.
A
B
C
D
E
F
G
H
LEGEND:
PROPERTY LINE
DSL EASEMENT (#31530-EA)
ELEVATION CONTOUR (FT. NAVD 88)
HIGH PRESSURE SEWER LINE
STORM SEWER
FENCE
GRAVEL ACCESS ROAD
SUBSURFACE BARRIER WALL
SEDIMENT CAP BOUNDARY
BOULDER CLUSTERS/ROCK MOUND
RIPRAP ARMOR
ORGANOCLAY MAT (DOUBLE LAYER)
ORGANOCLAY MAT (SINGLE LAYER)
GRANULAR ORGANOCLAY
HOT SPOT TREATMENT (THICKENED SAND LAYER)
ARTICULATED CONCRETE BLOCK
6-INCH MINUS ROCK ARMOR
10-INCH MINUS ROCK ARMOR
TURF REINFORCEMENT MAT PLACED OVER EARTHEN CAP
NOTES:
1. Bathymetric and Terrestrial Surveys conducted by David Evans and Associates, Inc. (DEA).
2. Date of Bathymetric Survey: April 26, 2006.
3. Date of Terrestrial Survey: November 17, 2004, and January 26, 2006.
4. Horizontal Datum: North American Datum of 1983 - 91 adj. (NAD83/91), State Plane Coordinate System (SPCS), Oregon North Zone.
5. Units: International Feet.
6. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
7. Contour Interval: One-Foot. Bathymetric contours were derived from a Digital Terrain Model (DTM) based on a 3-foot grid of multibeam data.
SCALE IN FEET: 1" = 120'
0 120 240 480
Figure 2-2
June 2007 Site Observations
McCormick & Baxter Superfund Site
Portland, Oregon

Figure 2-3
Willamette River Stage and June Sampling Event



*USGS at the Morrison Bridge



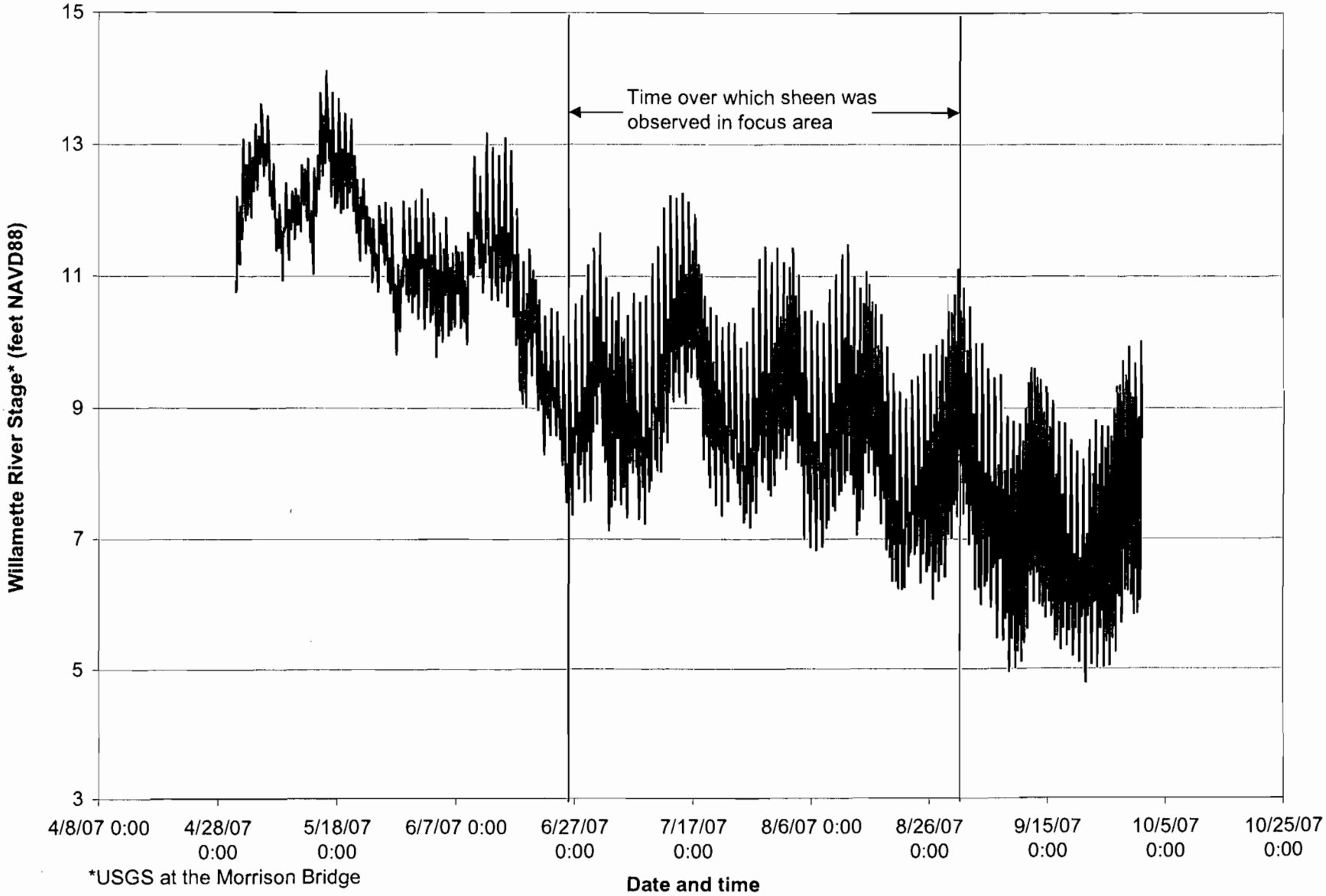
NOTES:

1. Bathymetric and Terrestrial Surveys conducted by David Evans and Associates, Inc. (DEA).
2. Date of Bathymetric Survey: April 26, 2006.
3. Date of Terrestrial Survey: November 17, 2004, and January 24, 2006.
4. Horizontal Datum: North American Datum of 1983 - 91 adj. (NAD83/91), State Plane Coordinate System (SPCS), Oregon North Zone.
5. Units: International Feet.
6. Vertical Datum: North American Vertical Datum of 1988 (NAVD88)
7. Contour Interval: One-Foot. Bathmetric contours were derived from a Digital Terrain Model (DTM) based on a 3-foot grid of multibeam data.

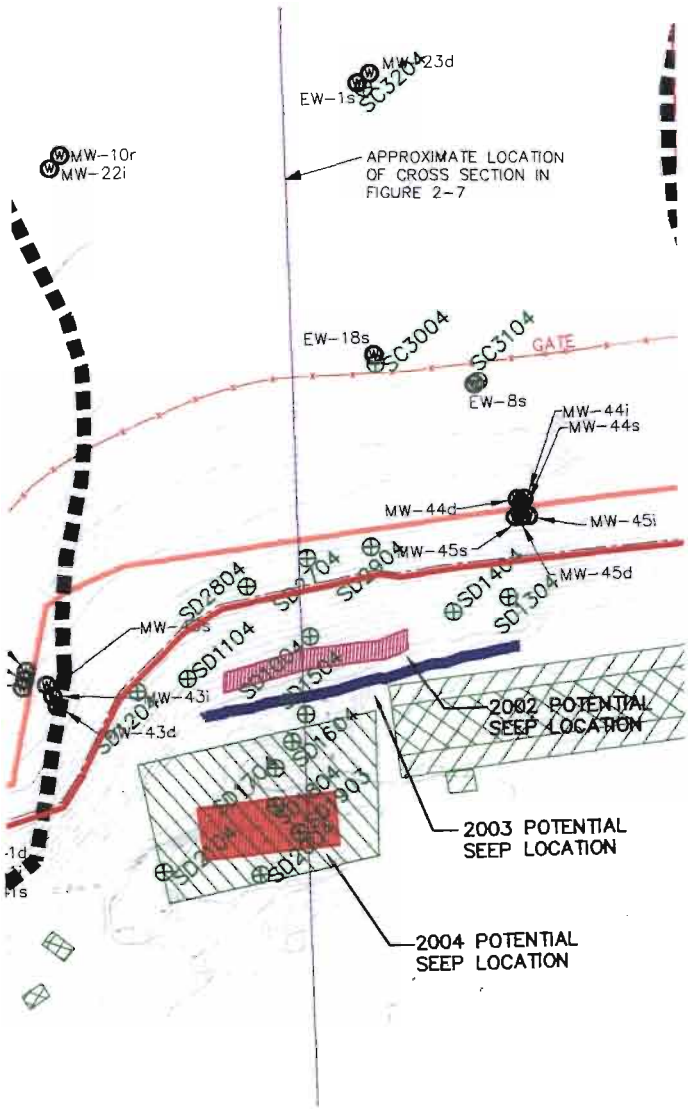
Figure 2-4
July 2007 Site Observations

McCormick & Baxter Superfund Site
Portland, Oregon

Figure 2-5
Willamette River Stage and Sheen Occurrence



CAD ON SEANAS\Engineering Documents\McCORMICK & BAXTER\BASEMAP



LEGEND:

- MW-55 MONITORING WELLS
- PROPERTY LINE
- DSL EASEMENT (#31530-EA)
- HISTORIC NAPL EXTENT
- ELEVATION CONTOUR (FT. NAVD 88)
- SS HIGH PRESSURE SEWER LINE
- STW STORM SEWER
- FENCE
- GRAVEL ACCESS ROAD
- SUBSURFACE BARRIER WALL
- SEDIMENT CAP BOUNDARY
- ORGANOCLAY MAT (DOUBLE LAYER)
- ORGANOCLAY MAT (SINGLE LAYER)
- GRANULAR ORGANOCLAY
- 2002 POTENTIAL SEEP LOCATION
- 2003 POTENTIAL SEEP LOCATION
- 2004 POTENTIAL SEEP LOCATION
- BORING LOCATION
- A2 — A2' CROSS SECTION

NOTE: LOCATION OF 2004 BORINGS RELATIVE TO FIGURE 2-7 CROSS SECTION AND GRANULAR ORGANOCLAY LAYOUT.

SCALE IN FEET
0 50 100 150

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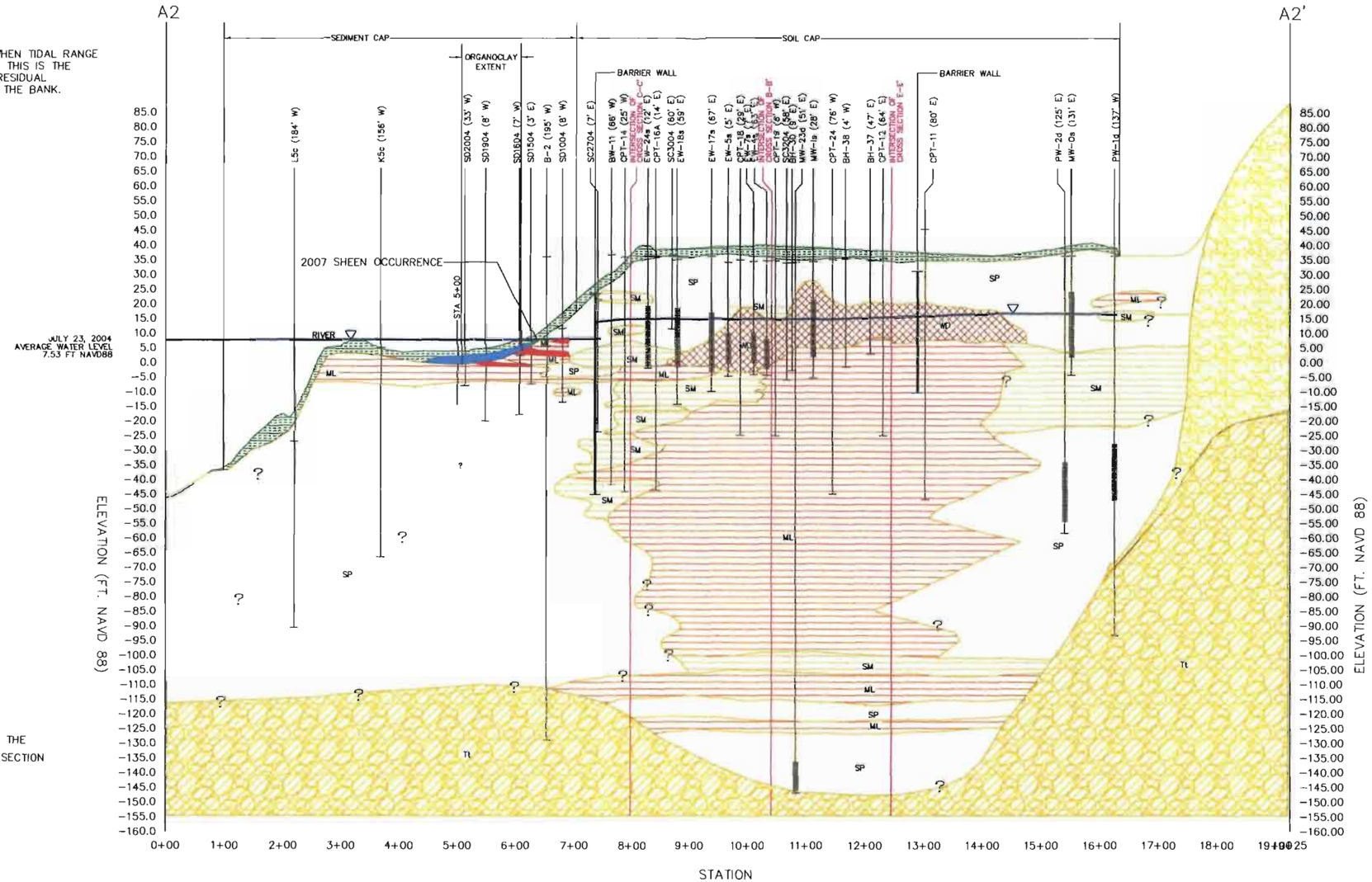
DESIGNED BY: C. NANCARROW
CHECKED BY: E. WHITE
DRAWN BY: Z. LEHN
APPROVED BY: A. WHITMAN

Figure 2-6
TFA 2004 SAMPLE LOCATIONS AND ORGANOCLAY PLACEMENT MAP
McCormick & Baxter Superfund Site
Portland, Oregon

SCALE: NOTED
DATE ISSUED: 01-24-08
CAD FILE NO.: Basemap_Rev_Civil 3D 2008.dwg

CAD ON SEANAS\Engineering Documents\McCORMICK & BAXTER\CSM Figures\August 2007 Revisions\ACAD Drawings

NOTE: SHEEN OBSERVED WHEN TIDAL RANGE DROPS TO 7.5 FEET NAVD. THIS IS THE SAME ELEVATION AS THE RESIDUAL NAPL OCCURRENCE WITHIN THE BANK.



NOTE: FIGURE 2-6 SHOWS THE LOCATION OF THIS CROSS SECTION RELATIVE TO THE SITE.

LEGEND

- SP – SAND, FINE TO MEDIUM, POORLY GRADED
- ML – CLAYEY SILT OR SILTY CLAY
- WD – WOOD DEBRIS, CHIPS OR SAWDUST OCCASIONALLY
- GS – GRAVEL WITH SAND, POORLY DRAINED
- SM – SILT SAND, OR THIN INTERBEDS OF SILT AND SAND
- Tt – TROUTDALE FORMATION
- Qf – CATASTROPHIC FLOOD DEPOSITS CONSISTING OF GRAVELS AND SANDS

- SEDIMENT/SOIL CAP
- NAPL OBSERVED IN 2004 BORINGS
- GRANULAR ORGANOCLAY
- APPROXIMATE SHALLOW GROUNDWATER LEVEL JULY 23, 2004 – TAKEN FROM CONTOUR DATA
- MW-25 (36' NW) BOREHOLE OR WELL ID (WITH SCREENED INTERVAL), DISTANCE AND DIRECTION OFF SECTION

HORIZONTAL SCALE IN FEET: 1"= 100'
0 100 200

VERTICAL SCALE IN FEET: 1"= 20'
(5X VERTICAL EXAGGERATION)
0 20 40

NO.	DATE	BY	APP'D	REVISIONS

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Portland, Oregon

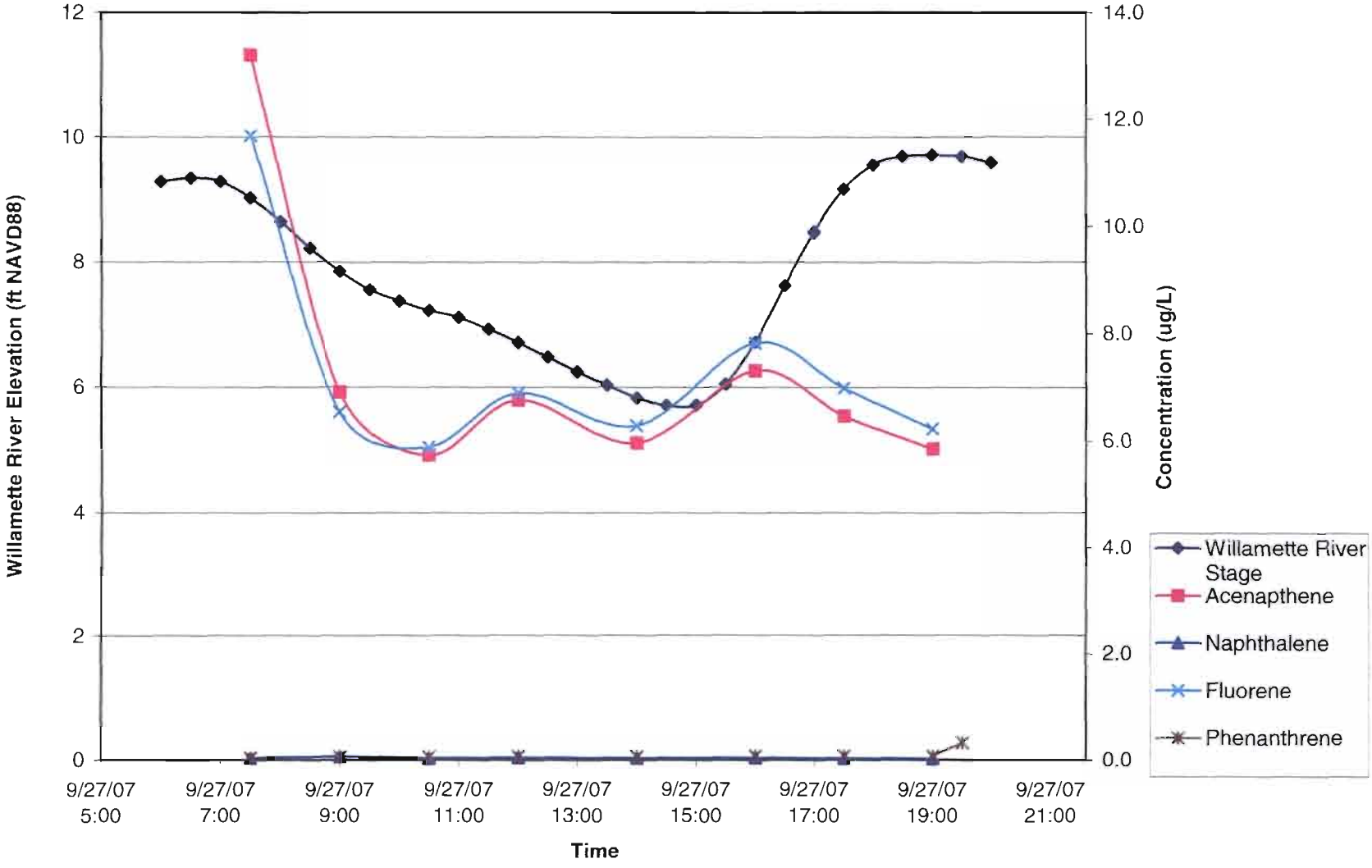
DESIGNED BY:
CHECKED BY: E. WHITE
DRAWN BY: Z. LEHN
APPROVED BY

FIGURE 2-7
GEOLOGIC CROSS SECTION A2-A2'

McCormick & Baxter Superfund Site
Portland, Oregon

SCALE: NOTED
DATE ISSUED: 03-03-08
CAD FILE: GeoSections_just geology_ACAD_Aug07.dwg.dwg

Figure 4-1
Willamette River Elevations versus Sub-armoring Water PAH Concentrations
September 27, 2007



Tables

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Table 4-1
McCormick and Baxter Creosoting Company
June 26, 2007 Surface Water Sampling Summary Table

SAMPLE LOCATION		Sediment Cap Performance Goals		Comparison Criteria			Location A		Location B		Location C		Location D	
Sample Type		McCormick & Baxter Record of Decision, 1996, Ambient Water Quality Criteria (AWQCs)		EPA Current, 2007, National Recommended Water Quality Criteria (NRWQCs)		EPA National Primary Drinking Water Regulations (NPDWRs)	Surface Water		Surface Water		Surface Water		Surface Water	
Sample ID							MBSW0607-A		MBSW0607-B		MBSW0607-C		MBSW0607-D	
Sample Date							6/26/2007		6/26/2007		6/26/2007		6/26/2007	
Sample Time							13:30		13:20		13:42		13:25	
		Aquatic Life (chronic)[1]	Human Health (fish consumption only)[1]	Aquatic Life (chronic)[2]	Human Health (consumption of organism only)[2]	Maximum Contaminant Levels (MCLs)[3]								
CONTAMINANT OF INTEREST														
Pentachlorophenol (ug/L)		13		11	3	1	0.243	U	0.238	U	0.246	U	0.238	U
Polyaromatic Hydrocarbons (ug/L)														
Acenaphthene	L	520			990		**0.785**		0.0119	U	**0.0537**		**0.0659**	
Acenaphthylene	L						**0.0171**	J	0.0119	U	**0.0126**	J	0.0119	U
Anthracene	L				40,000		**0.185**		0.0119	U	**0.0905**		0.0119	U
Benzo (a) anthracene	H, C				0.018		0.0121	U	0.0119	U	0.0482		0.0119	U
Benzo (a) pyrene	H, C				0.018	0.2	0.0121	U	0.0119	U	0.0267		0.0119	U
Benzo (b) fluoranthene	H, C				0.018		0.0121	U	0.0119	U	0.105		0.0119	U
Benzo (k) fluoranthene	H, C				0.018		0.0121	U	0.0119	U	0.0551		0.0119	U
Benzo (ghi) perylene	H, C						0.0121	U	0.0119	U	**0.0150**	J	0.0119	U
Chrysene	H, C				0.018		0.0121	U	0.0119	U	0.140		0.0119	U
Dibenzo (a,h) anthracene	H, C				0.018		0.0243	U	0.0238	U	0.0246	U	0.0238	U
Fluoranthene	H		54		140		0.0121	U	0.0119	U	**0.419**		0.0119	U
Fluorene	L				5300		**0.136**		0.0119	U	**0.0294**		**0.0290**	
Indeno (1,2,3-cd) pyrene	H, C				0.018		0.0121	U	0.0119	U	**0.0147**	J	0.0119	U
Naphthalene	L	620					**3.72**		**0.0141**	J	**0.0356**		**0.198**	
Phenanthrene	L						**0.0218**	J	0.0119	U	**0.126**		0.0119	U
Pyrene	H				4,000		0.0121	U	0.0119	U	**0.236**		0.0119	U
Total LPAHs							**4.86**	J	**0.0141**	J	**0.348**	J	**0.293**	
Total HPAHs							0.0666	U	0.0655	U	**1.060**	J	0.0655	U
Total CPAHs			0.031				0.0545	U	0.0536	U	0.405	J	0.0536	U
Total PAHs							**4.93**	J	**0.0796**	J	**1.408**	J	**0.358**	

Table 4-1
McCormick and Baxter Creosoting Company
June 26, 2007 Surface Water Sampling Summary Table

SAMPLE LOCATION		Sediment Cap Performance Goals		Comparison Criteria			Location E		Location F		Location G		Location H	
Sample Type		McCormick & Baxter Record of Decision, 1996, Ambient Water Quality Criteria (AWQCs)		EPA Current, 2007, National Recommended Water Quality Criteria (NRWQCs)		EPA National Primary Drinking Water Regulations (NPDWRs)	Surface Water		Surface Water		Surface Water		Surface Water	
Sample ID							MBSW0607-E		MBSW0607-F		MBSW0607-G		MBSW0607-H	
Sample Date							6/26/2007		6/26/2007		6/26/2007		6/26/2007	
Sample Time							13:51		13:30		14:02		13:35	
		Aquatic Life (chronic)[1]	Human Health (fish consumption only)[1]	Aquatic Life (chronic)[2]	Human Health (consumption of organism only)[2]	Maximum Contaminant Levels (MCLs)[3]								
CONTAMINANT OF INTEREST														
Pentachlorophenol (ug/L)		13		11	3	1	0.248	U	0.236	U	**0.901**		0.237	UJ
Polyaromatic Hydrocarbons (ug/L)														
Acenaphthene	L	**520**			990		**0.0398**		0.0118	U	**1.16**		**0.0482**	J
Acenaphthylene	L						0.0124	U	0.0118	U	**0.0136**	J	0.0118	UJ
Anthracene	L				40,000		**0.0615**		0.0118	U	**0.0537**		0.0118	UJ
Benzo (a) anthracene	H, C				0.018		0.0124	U	0.0118	U	0.0119	U	0.0118	UJ
Benzo (a) pyrene	H, C				0.018	0.2	0.0124	U	0.0118	U	0.0119	U	0.0118	UJ
Benzo (b) fluoranthene	H, C				0.018		0.0124	U	0.0118	U	0.0119	U	0.0118	UJ
Benzo (k) fluoranthene	H, C				0.018		0.0124	U	0.0118	U	0.0119	U	0.0118	UJ
Benzo (ghi) perylene	H, C						0.0124	U	0.0118	U	0.0119	U	0.0118	UJ
Chrysene	H, C				0.018		**0.0128**	J	0.0118	U	0.0119	U	0.0118	UJ
Dibenzo (a,h) anthracene	H, C				0.018		0.0248	U	0.0236	U	0.0238	U	0.0237	UJ
Fluoranthene	H		54		140		**0.0287**		0.0118	U	**0.0160**	J	0.0118	UJ
Fluorene	L				5300		**0.0340**		0.0118	U	**0.0926**		**0.0181**	J
Indeno (1,2,3-cd) pyrene	H, C				0.018		0.0124	U	0.0118	U	0.0119	U	0.0118	UJ
Naphthalene	L	620					0.0124	U	0.0118	U	**0.0614**		**0.0995**	J
Phenanthrene	L						0.0124	U	0.0118	U	**0.0381**		0.0118	UJ
Pyrene	H				4,000		0.0124	U	0.0118	U	0.0119	U	0.0118	UJ
Total LPAHs							**0.1353**		0.03540	U	**1.42**	J	0.1658	J
Total HPAHs							**0.0415**	J	0.0649	U	**0.0160**	J	0.0650	UJ
Total CPAHs			0.031				**0.0128**	J	0.0531	U	0.0536	U	0.0532	UJ
Total PAHs							**0.1768**	J	0.10030	U	**1.44**	J	0.2308	UJ

NOTES:

[1] The 1996 Record of Decision (ROD) specifies the remedial action objects of the sediment cap as 1) preventing human and aquatic organisms from direct contact with contaminated sediment, and 2) minimizing releases of contaminants from sediment that might result in contamination of the Willamette River in excess of federal and state Ambient Water Quality Criteria (AWQCs).

[2] National Recommended Water Quality Criteria (NRWQCs) published as of August 15, 2007 are included for comparison (see http://www.epa.gov/waterscience/criteria/wqcriteria.html). The current publication includes criteria revisions published in 2002 National Recommended Water Quality Criteria: 2002 table (EPA-822-R-02-047) and 2003 Revised human Health Water Quality Criteria (EPA-822-F-03-012). Note that the aquatic life chronic criteria for pentachlorophenol has been adjusted to site-specific pH (7.5, representing a mid-range of the pH values measured in surface water at the site), and therefore differs from the standard table value. Criteria for metals (Cr, Cu, Zn) have not been adjusted for site-specific hardness. Carcinogenic risk-based numbers reflect a carcinogenicity risk of 10^{-6}.

[3] National Primary Drinking Water Regulations Maximum Contaminant Levels (MCLs) promulgated as of August 15, 2007 are included for comparison (see http://www.epa.gov/safewater/contaminants/index.html#primary).

KEY:

AWQC	Ambient Water Quality Criteria
C	Carcinogenic PAH (CPAH)
EPA	Environmental Protection Agency
H	High Molecular Weight PAH (HPAH)
J	Estimated Value
L	Low Molecular Weight PAH (LPAH)
MCL	Drinking Water Maximum Contaminant Levels
MDL	Method Detection Limit
NRWQC	National Recommended Water Quality Criteria
NPDWR	National Primary Drinking Water Regulations
PAH	Polyaromatic Hydrocarbons
ROD	Record of Decision
U	Value Below MDL (value represents MDL)
ug/L	micrograms per liter

bold	Indicates the lowest (most stringent) of the sediment cap performance goals and comparison criteria, or indicates sample exceeds the most stringent criteria.
bold	Indicates analyte was detected, but does not exceed the most stringent criteria.

Table 4-2

McCormick and Baxter Creosoting Company

September 27, 2007 Surface Water and Sub-Armoring Water Sampling Summary Table

SAMPLE LOCATION		Sediment Cap Performance Goals		Comparison Criteria								
Sample Type		McCormick & Baxter Record of Decision, 1996, Ambient Water Quality Criteria (AWQCs)		EPA Current, 2007, National Recommended Water Quality Criteria (NRWQCs)		EPA National Primary Drinking Water Regulations (NPDWRs)	**Surface Water**		**Sub-Armoring**		**Surface Water**		**Sub-Armoring**	
Sample ID							**MBSW0907-I-0D**		**MBSA0907-I-0D**		**MBSW0907-I-1D**		**MBSA0907-I-1D**	
Sample Date							**9/27/2007**		**9/27/2007**		**9/27/2007**		**9/27/2007**	
Sample Time							**7:35**		**7:22**		**9:15**		**9:00**	
River Level (ft. NAVD)							**8.98**		**8.98**		**7.82**		**7.82**	
		Aquatic Life (chronic)[1]	Human Health (fish consumption only)[1]	Aquatic Life (chronic)[2]	Human Health (consumption of organism only)[2]	Maximum Contaminant Levels (MCLs)[3]								
CONTAMINANT OF INTEREST (ug/L)														
Pentachlorophenol		13		11	3	1	0.24	U	0.24	U	0.24	U	0.24	U
Polyaromatic Hydrocarbons (ug/L)														
Acenaphthene	L	**520**			990		**0.119**		**13.2**		0.012	U	**6.91**	
Acenaphthylene	L						0.012	U	0.0481	U	0.012	U	0.0478	U
Anthracene	L				**40000**		0.012	U	**0.0791**		0.012	U	**0.0935**	
Benzo (a) anthracene	H, C				**0.018**		0.012	U	0.012	U	0.012	U	0.012	U
Benzo (a) pyrene	H, C				**0.018**	0.2	0.012	U	0.012	U	0.012	U	0.012	U
Benzo (b) fluoranthene	H, C				**0.018**		0.012	U	0.012	U	0.012	U	0.012	U
Benzo (ghi) perylene	H, C						0.012	U	0.012	U	0.012	U	0.012	U
Benzo (k) fluoranthene	H, C				**0.018**		0.012	U	0.012	U	0.012	U	0.012	U
Chrysene	H, C				**0.018**		0.012	U	0.012	U	0.012	U	0.012	U
Dibenzo (a,h) anthracene	H, C				**0.018**		0.0239	U	0.024	U	0.0239	U	0.0239	U
Fluoranthene	H		**54**		140		0.012	U	**0.415**		0.012	U	**0.441**	
Fluorene	L				**5300**		**0.0855**		**11.7**		0.012	U	**6.54**	
Indeno (1,2,3-cd) pyrene	H, C				**0.018**		0.012	U	0.012	U	0.012	U	0.012	U
Naphthalene	L	**620**					0.012	U	**0.0414**		0.012	U	**0.0620**	
Phenanthrene	L						0.012	U	**0.0395**		0.012	U	**0.0536**	
Pyrene	H				**4000**		0.012	U	**0.293**		0.012	U	**0.316**	
Total LPAHs							**0.2045**		**25.06**		0.036	U	**6.7491**	
Total HPAHs							0.06595	U	**0.708**		0.06595	U	**0.757**	
Total CPAHs			**0.031**				0.05395	U	0.054	U	0.05395	U	0.05395	U
Total PAHs							**0.27045**		**25.768**		0.10195	U	**7.5061**	
Field Parameters (pre-/post-sample)														
Temperature (°C)							15.58		16.83 / 17.03		16.01		17.26 / 17.41	
Specific Conductance (mS/cm)							0.103		0.120 / 0.118		0.108		0.117 / 0.116	
Dissolved Oxygen (mg/L)							6.97		0.70 / 0.32		7.13		0.42 / 0.26	
pH							6.91		6.72 / 6.62		6.87		6.77 / 6.82	
Oxidation Reduction Potential (mV)							-27.2		-114.3 / -97.2		-19.5		-111.9 / -111.9	
Turbidity (NTU)							3.37		2.63 / 1.40		3.9		2.95 / 2.90	

Table 4-2
McCormick and Baxter Creosoting Company
September 27, 2007 Surface Water and Sub-Armoring Water Sampling Summary Table

SAMPLE LOCATION		Sediment Cap Performance Goals		Comparison Criteria									
Sample Type		McCormick & Baxter Record of Decision, 1996, Ambient Water Quality Criteria (AWQCs)		EPA Current, 2007, National Recommended Water Quality Criteria (NRWQCs)		EPA National Primary Drinking Water Regulations (NPDWRs)	Surface Water		Sub-Armoring		Surface Water		Sub-Armoring	
Sample ID							MBSW0907-I-2D		MBSA0907-I-2D		MBSW0907-I-3D		MBSA0907-I-3D	
Sample Date							9/27/2007		9/27/2007		9/27/2007		9/27/2007	
Sample Time							10:45		10:30		12:20		12:00	
River Level (ft. NAVD)							7.2		7.2		6.68		6.68	
		Aquatic Life (chronic)[1]	Human Health (fish consumption only)[1]	Aquatic Life (chronic)[2]	Human Health (consumption of organism only)[2]	Maximum Contaminant Levels (MCLs)[3]								
CONTAMINANT OF INTEREST (ug/L)														
Pentachlorophenol		13		11	3	1	0.24	U	0.24	U	0.24	U	0.24	U
Polyaromatic Hydrocarbons (ug/L)														
Acenaphthene	L	520			990		0.012	U	5.73		0.0121	U	6.76	
Acenaphthylene	L						0.012	U	0.0359	U	0.0121	U	0.0483	U
Anthracene	L				40000		0.012	U	0.0878		0.0121	U	0.0854	
Benzo (a) anthracene	H, C				0.018		0.012	U	0.012	U	0.0121	U	0.0121	U
Benzo (a) pyrene	H, C				0.018	0.2	0.012	U	0.012	U	0.0121	U	0.0121	U
Benzo (b) fluoranthene	H, C				0.018		0.012	U	0.012	U	0.0121	U	0.0121	U
Benzo (ghi) perylene	H, C						0.012	U	0.012	U	0.0121	U	0.0121	U
Benzo (k) fluoranthene	H, C				0.018		0.012	U	0.012	U	0.0121	U	0.0121	U
Chrysene	H, C				0.018		0.012	U	0.012	U	0.0121	U	0.0121	U
Dibenzo (a,h) anthracene	H, C				0.018		0.0239	U	0.0239	U	0.0243	U	0.0242	U
Fluoranthene	H		54		140		0.012	U	0.453		0.0121	U	0.430	
Fluorene	L				5300		0.012	U	5.88		0.0121	U	6.89	
Indeno (1,2,3-cd) pyrene	H, C				0.018		0.012	U	0.012	U	0.0121	U	0.0121	U
Naphthalene	L	620					0.0138		0.0299		0.0121	U	0.0401	
Phenanthrene	L						0.012	U	0.0571		0.0121	U	0.0660	
Pyrene	H				4000		0.012	U	0.317		0.0121	U	0.301	
Total LPAHs							0.0138		11.7848		0.0363	U	13.8415	
Total HPAHs							0.06595	U	0.77		0.0666	U	0.731	
Total CPAHs			0.031				0.05395	U	0.05395	U	0.0545	U	0.05445	U
Total PAHs							0.07975		12.5548		0.1029	U	14.5725	
Field Parameters (pre-/post-sample)														
Temperature (°C)							21.08		18.34 / 18.21		20.11		18.77 / 18.46	
Specific Conductance (mS/cm)							0.1		0.116 / 0.116		0.103		0.116 / 0.116	
Dissolved Oxygen (mg/L)							10.85		0.46 / 0.38		9.2		0.36 / 0.40	
pH							8.29		6.83 / 6.75		6.96		6.91 / 6.78	
Oxidation Reduction Potential (mV)							-105.1		-123.3 / -105.0		-57.3		-138.3 / -114.1	
Turbidity (NTU)							5.71		3.36 / 1.18		2.19		3.68 / 4.59	

Table 4-2

McCormick and Baxter Creosoting Company

September 27, 2007 Surface Water and Sub-Armoring Water Sampling Summary Table

SAMPLE LOCATION		Sediment Cap Performance Goals		Comparison Criteria								
Sample Type		McCormick & Baxter Record of Decision, 1996, Ambient Water Quality Criteria (AWQCs)		EPA Current, 2007, National Recommended Water Quality Criteria (NRWQCs)		EPA National Primary Drinking Water Regulations (NPDWRs)	**Surface Water**		**Sub-Armoring**		**Surface Water**		**Sub-Armoring**	
Sample ID							**MBSW0907-I-4L**		**MBSA0907-I-4L**		**MBSW0907-I-5U**		**MBSA0907-I-5U**	
Sample Date							**9/27/2007**		**9/27/2007**		**9/27/2007**		**9/27/2007**	
Sample Time							**14:30**		**14:03**		**16:00**		**16:10**	
River Level (ft. NAVD)							**5.7**		**5.7**		**7.06**		**7.06**	
		Aquatic Life (chronic)[1]	Human Health (fish consumption only)[1]	Aquatic Life (chronic)[2]	Human Health (consumption of organism only)[2]	Maximum Contaminant Levels (MCLs)[3]								
CONTAMINANT OF INTEREST (ug/L)														
Pentachlorophenol		13		11	3	1	0.24	U	0.24	U	0.24	U	0.24	U
Polyaromatic Hydrocarbons (ug/L)														
Acenaphthene	L	**520**			990		0.0121	U	**5.96**		**0.0339**		**7.31**	
Acenaphthylene	L						0.0121	U	0.0357	U	0.0121	U	0.0485	U
Anthracene	L				**40000**		0.0121	U	**0.0983**		0.0121	U	**0.108**	
Benzo (a) anthracene	H, C				**0.018**		0.0121	U	0.0119	U	0.0121	U	0.0121	U
Benzo (a) pyrene	H, C				**0.018**	0.2	0.0121	U	0.0119	U	0.0121	U	0.0121	U
Benzo (b) fluoranthene	H, C				**0.018**		0.0121	U	0.0119	U	0.0121	U	0.0121	U
Benzo (ghi) perylene	H, C						0.0121	U	0.0119	U	0.0121	U	0.0121	U
Benzo (k) fluoranthene	H, C				**0.018**		0.0121	U	0.0119	U	0.0121	U	0.0121	U
Chrysene	H, C				**0.018**		0.0121	U	0.0119	U	0.0121	U	0.0121	U
Dibenzo (a,h) anthracene	H, C				**0.018**		0.0243	U	0.0238	U	0.0242	U	0.0243	U
Fluoranthene	H		**54**		140		0.0121	U	**0.424**		0.0121	U	**0.475**	
Fluorene	L				**5300**		0.0121	U	**6.28**		**0.0158**		**7.82**	
Indeno (1,2,3-cd) pyrene	H, C				**0.018**		0.0121	U	0.0119	U	0.0121	U	0.0121	U
Naphthalene	L	**620**					0.0121	U	**0.0366**		**0.0802**		**0.0374**	
Phenanthrene	L						0.0121	U	**0.0666**		0.0121	U	**0.0795**	
Pyrene	H				**4000**		0.0121	U	**0.304**		0.0121	U	**0.338**	
Total LPAHs							0.0363	U	**12.4415**		**0.1299**		**15.3549**	
Total HPAHs							0.0666	U	**0.728**		0.06655	U	**0.813**	
Total CPAHs			**0.031**				0.0545	U	0.05355	U	0.05445	U	0.0545	U
Total PAHs							0.1029	U	**13.1695**		**0.19645**		**16.1679**	
Field Parameters (pre-/post-sample)														
Temperature (°C)							24.8		18.93 / 18.78		24.02		18.85 / 18.76	
Specific Conductance (mS/cm)							0.167		0.117 / 0.117		0.105		0.118 / 0.119	
Dissolved Oxygen (mg/L)							9.83		0.28 / 0.14		10.36		0.26 / 0.22	
pH							7.01		6.79 / 6.73		7.47		6.76 / 6.74	
Oxidation Reduction Potential (mV)							-40.3		-125.7 / -116.8		-69.7		-132.1 / -115.3	
Turbidity (NTU)							3.14		1.45 / 1.16		4.58		1.70 / 2.58	

Table 4-2

McCormick and Baxter Creosoting Company

September 27, 2007 Surface Water and Sub-Armoring Water Sampling Summary Table

SAMPLE LOCATION		Sediment Cap Performance Goals		Comparison Criteria								
Sample Type		McCormick & Baxter Record of Decision, 1996, Ambient Water Quality Criteria (AWQCs)		EPA Current, 2007, National Recommended Water Quality Criteria (NRWQCs)		EPA National Primary Drinking Water Regulations (NPDWRs)	**Surface Water**		**Sub-Armoring**		**Surface Water**		**Sub-Armoring**	
Sample ID							**MBSW0907-I-6U**		**MBSA0907-I-6U**		**MBSW0907-I-7H**		**MBSA0907-I-7H**	
Sample Date							**9/27/2007**		**9/27/2007**		**9/27/2007**		**9/27/2007**	
Sample Time							**17:45**		**17:30**		**19:10**		**19:00**	
River Level (ft. NAVD)							**9.05**		**9.05**		**9.7**		**9.7**	
		Aquatic Life (chronic)[1]	Human Health (fish consumption only)[1]	Aquatic Life (chronic)[2]	Human Health (consumption of organism only)[2]	Maximum Contaminant Levels (MCLs)[3]								
CONTAMINANT OF INTEREST (ug/L)														
Pentachlorophenol		13		11	3	1	0.24	U	0.24	U	0.24	U	0.24	U
Polyaromatic Hydrocarbons (ug/L)														
Acenaphthene	L	**520**			990		0.012	U	**6.47**		0.012	U	**5.86**	
Acenaphthylene	L						0.012	U	0.0364	U	0.012	U	0.0359	U
Anthracene	L				**40000**		0.012	U	**0.104**		0.012	U	**0.106**	
Benzo (a) anthracene	H, C				**0.018**		0.012	U	0.0121	U	0.012	U	0.012	U
Benzo (a) pyrene	H, C				**0.018**	0.2	0.012	U	0.0121	U	0.012	U	0.012	U
Benzo (b) fluoranthene	H, C				**0.018**		0.012	U	0.0121	U	0.012	U	0.012	U
Benzo (ghi) perylene	H, C						0.012	U	0.0121	U	0.012	U	0.012	U
Benzo (k) fluoranthene	H, C				**0.018**		0.012	U	0.0121	U	0.012	U	0.012	U
Chrysene	H, C				**0.018**		0.012	U	0.0121	U	0.012	U	0.012	U
Dibenzo (a,h) anthracene	H, C				**0.018**		0.0239	U	0.0243	U	0.0239	U	0.0239	U
Fluoranthene	H		**54**		140		0.012	U	**0.453**		**0.0205**		**0.461**	
Fluorene	L				**5300**		0.012	U	**6.99**		0.012	U	**6.23**	
Indeno (1,2,3-cd) pyrene	H, C				**0.018**		0.012	U	0.0121	U	0.012	U	0.012	U
Naphthalene	L	**620**					0.012	U	**0.0304**		0.012	U	**0.0316**	
Phenanthrene	L						0.012	U	**0.0813**		0.012	U	**0.0804**	
Pyrene	H				**4000**		0.012	U	**0.324**		**0.0138**		**0.327**	
Total LPAHs							0.036	U	**13.6757**		0.036	U	**12.308**	
Total HPAHs							0.06595	U	**0.777**		**0.0343**		**0.788**	
Total CPAHs			**0.031**				0.05395	U	0.0545	U	0.05395	U	0.05395	U
Total PAHs							0.10195	U	**14.4527**		**0.0703**		**13.096**	
Field Parameters (pre-/post-sample)														
Temperature (°C)							20.42		18.58 / 18.25		18.35		17.84 / 17.81	
Specific Conductance (mS/cm)							0.103		0.119 / 0.118		0.105		0.126 / 0.123	
Dissolved Oxygen (mg/L)							9.72		0.34 / 0.19		8.4		0.49 / 0.50	
pH							7.2		6.83 / 6.71		6.86		6.73 / 6.68	
Oxidation Reduction Potential (mV)							-71.8		-126.6 / -112.4		-56.7		-101.9 / -98.5	
Turbidity (NTU)							6.92		2.03 / 1.68		17.2		1.91 / 1.46	

NOTES:

[1] The 1996 Record of Decision (ROD) specifies the remedial action objects of the sediment cap as 1) preventing human and aquatic organisms from direct contact with contaminated sediment, and 2) minimizing releases of contaminants from sediment that might result in contamination of the Willamette River in excess of federal and state Ambient Water Quality Criteria (AWQCs).

[2] National Recommended Water Quality Criteria (NRWQCs) published as of August 15, 2007 are included for comparison (see http://www.epa.gov/waterscience/criteria/wqcriteria.html). The current publication includes criteria revisions published in 2002 National Recommended Water Quality Criteria: 2002 table (EPA-822-R-02-047) and 2003 Revised human Health Water Quality Criteria (EPA-822-F-03-012). Note that the aquatic life chronic criteria for pentachlorophenol has been adjusted to site-specific pH (7.5, representing a mid-range of the pH values measured in surface water at the site), and therefore differs from the standard table value. Criteria for metals (Cr, Cu, Zn) have not been adjusted for site-specific hardness. Carcinogenic risk-based numbers reflect a carcinogenicity risk of 10^{-6}.

[3] National Primary Drinking Water Regulations Maximum Contaminant Levels (MCLs) promulgated as of August 15, 2007 are included for comparison (see http://www.epa.gov/safewater/contaminants/index.html#primary).

KEY:

AWQC	Ambient Water Quality Criteria
C	Carcinogenic PAH (CPAH)
EPA	Environmental Protection Agency
H	High Molecular Weight PAH (HPAH)
J	Estimated Value
L	Low Molecular Weight PAH (LPAH)
MCL	Drinking Water Maximum Contaminant Levels
MDL	Method Detection Limit
NRWQC	National Recommended Water Quality Criteria
NPDWR	National Primary Drinking Water Regulations
PAH	Polyaromatic Hydrocarbons
ROD	Record of Decision
U	Value Below MDL (value represents MDL)
ug/L	micrograms per liter

bold	Indicates the lowest (most stringent) of the sediment cap performance goals and comparison criteria, or indicates sample exceeds the most stringent criteria.
bold	Indicates analyte was detected, but does not exceed the most stringent criteria.

A Photographic Documentation

Photographed by:
Kevin Parrett (KP), Heidi Blischke (HB), Lenna Cope (LC)

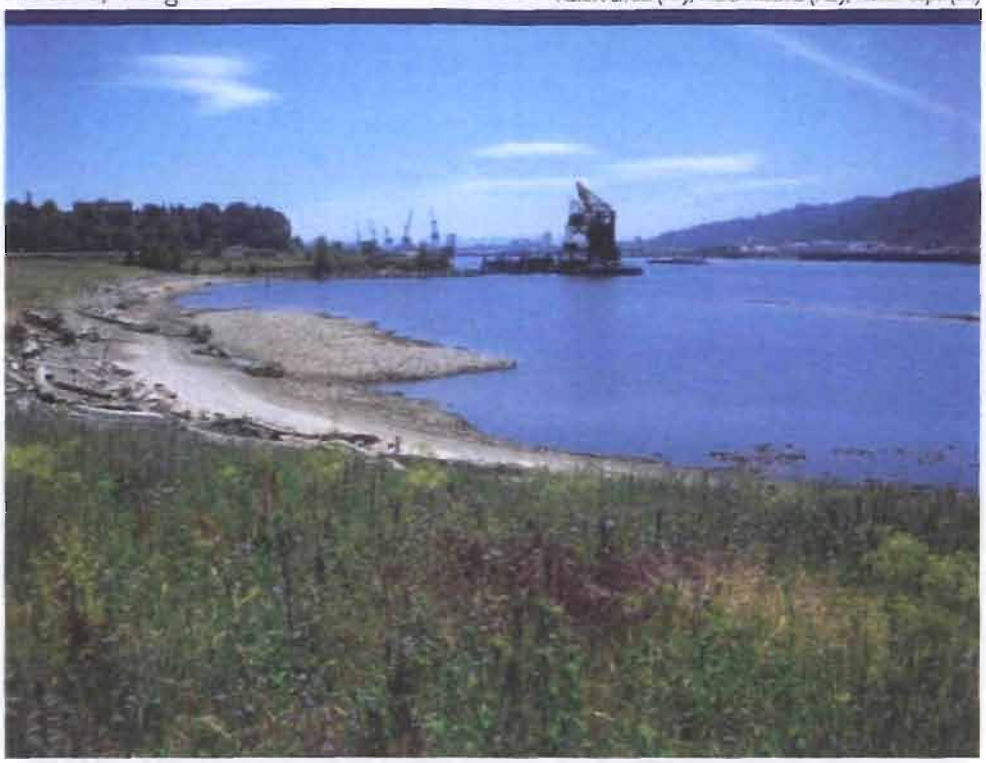


Photo 1 View of embayment and water levels on June 26, 2007.

Direction: South	*Date: 6/26/2007*	*Time: 12:32*	*Photographed by: KP*

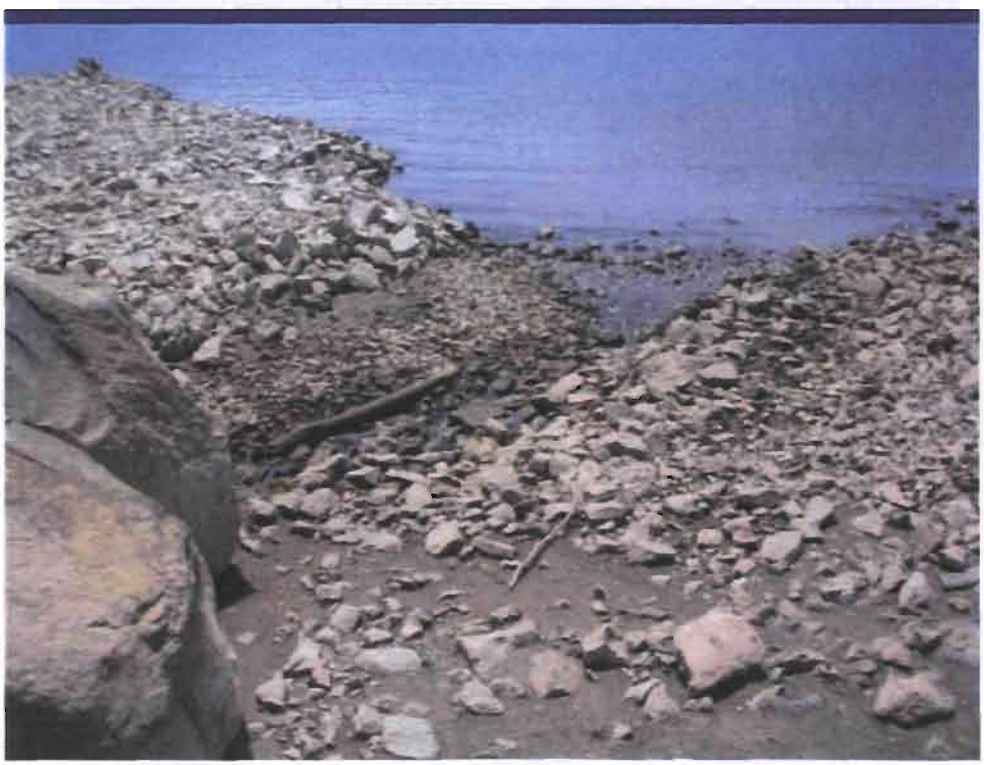


Photo 2 Sample Location A.

Direction: Southwest	*Date: 6/26/2007*	*Time: 13:47*	*Photographed by: KP*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Kevin Parrett (KP), Heidi Blischke (HB), Lenna Cope (LC)

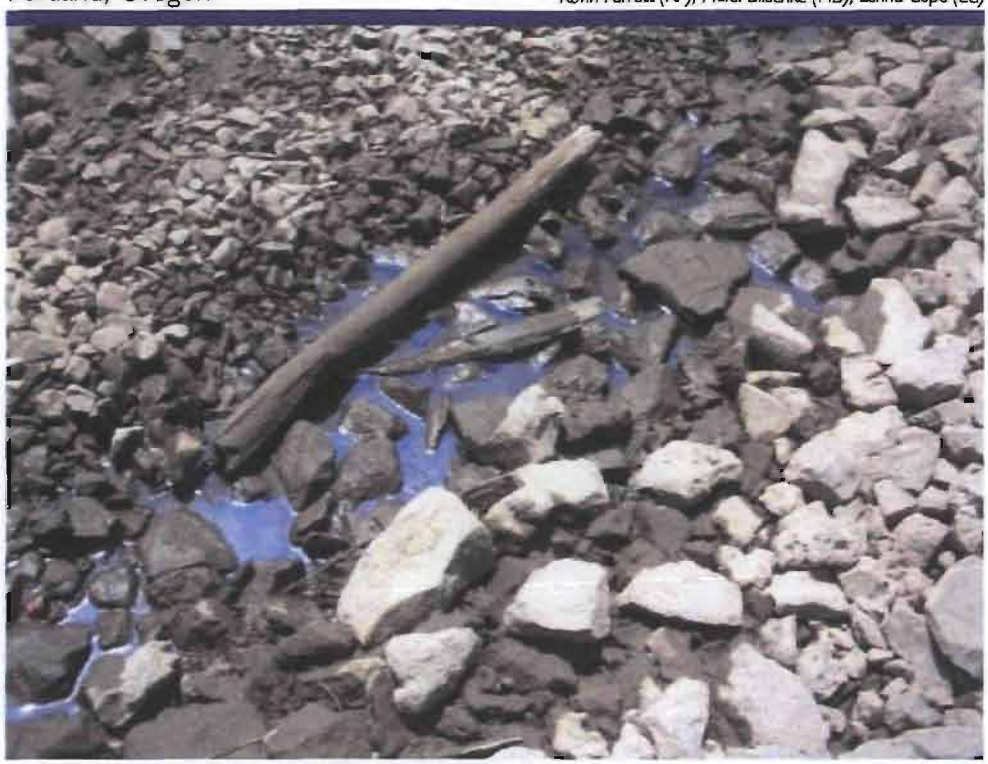


Photo 3 Sheen at sample Location A.

Direction: Southwest	*Date: 6/26/2007*	*Time: 13:48*	*Photographed by: KP*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Kevin Parrett (KP), Heidi Blischke (HB), Lenna Cope (LC)

Photo 4 Sample Location C and visible sheen.

Direction: North	*Date: 6/26/2007*	*Time: 13:49*	*Photographed by: KP*

Photographed by:
Kevin Parrett (KP), Heidi Blischke (HB), Lenna Cope (LC)

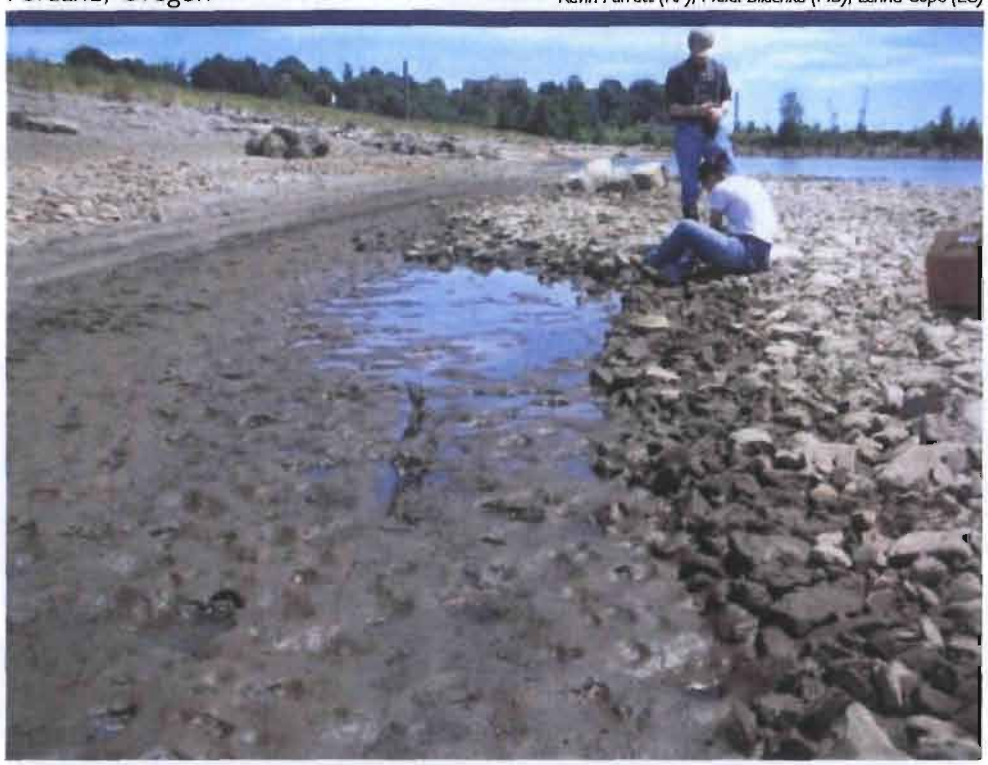


Photo 5 Sample Location E and visible sheen.

Direction: Southeast	*Date: 6/26/2007*	*Time: 13:50*	*Photographed by: KP*

Photo 6 Sample Location G.

Direction: West	*Date: 6/26/2007*	*Time: 13:51*	*Photographed by: KP*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Kevin Parrett (KP), Heidi Blischke (HB), Lenna Cope (LC)

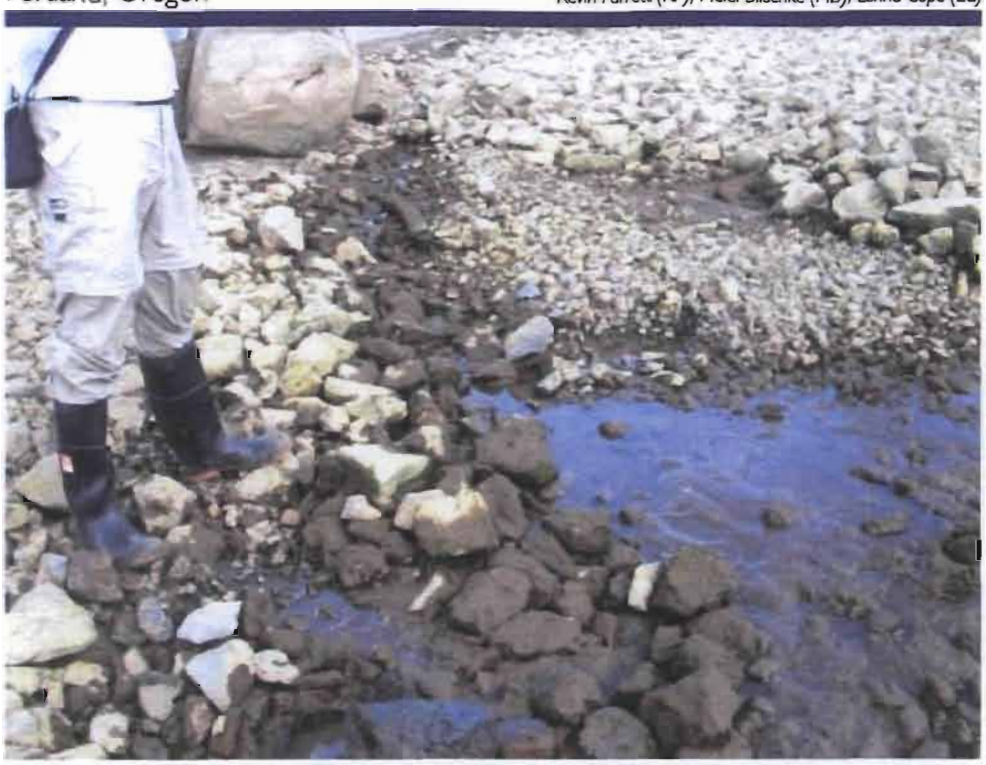


Photo 7 Sheen visible at Location A at 16:30.

Direction: Southeast	*Date: 8/17/2007*	*Time: 16:39*	*Photographed by: HB*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

Photographed by:
Kevin Parrett (KP), Heidi Blischke (HB), Lenna Cope (LC)

Photo 8 Sheen visible at Location C at 16:30.

Direction: Southeast	*Date: 8/17/2007*	*Time: 16:46*	*Photographed by: HB*

McCormick & Baxter Creosoting Company Site
Portland, Oregon

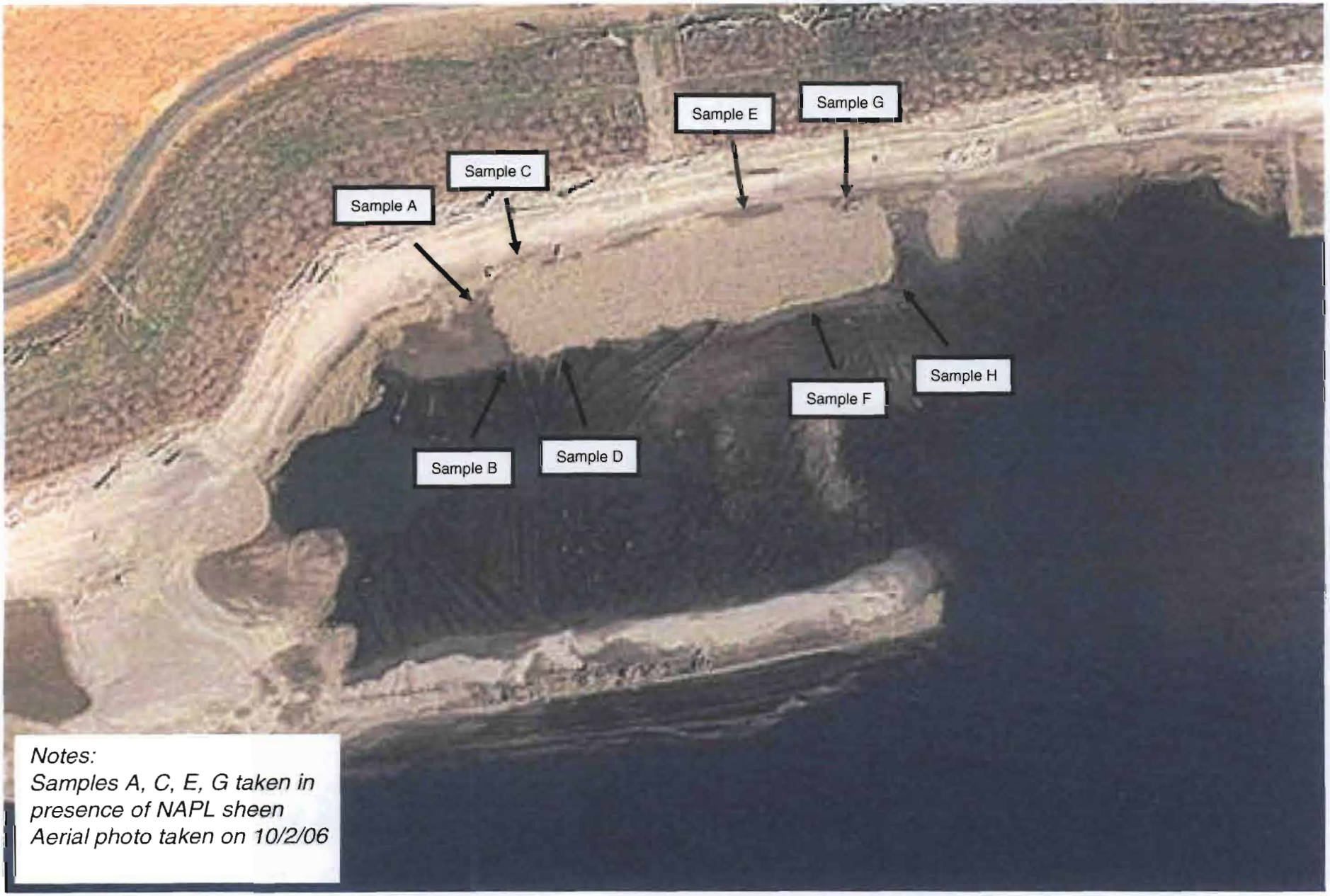
Photographed by:
Kevin Parrett (KP), Heidi Blischke (HB), Lenna Cope (LC)

Photo 9 Sample Location I in relationship to boulder cluster.

Direction: South	*Date: 9/27/2007*	*Time: 8:34*	*Photographed by: LC*

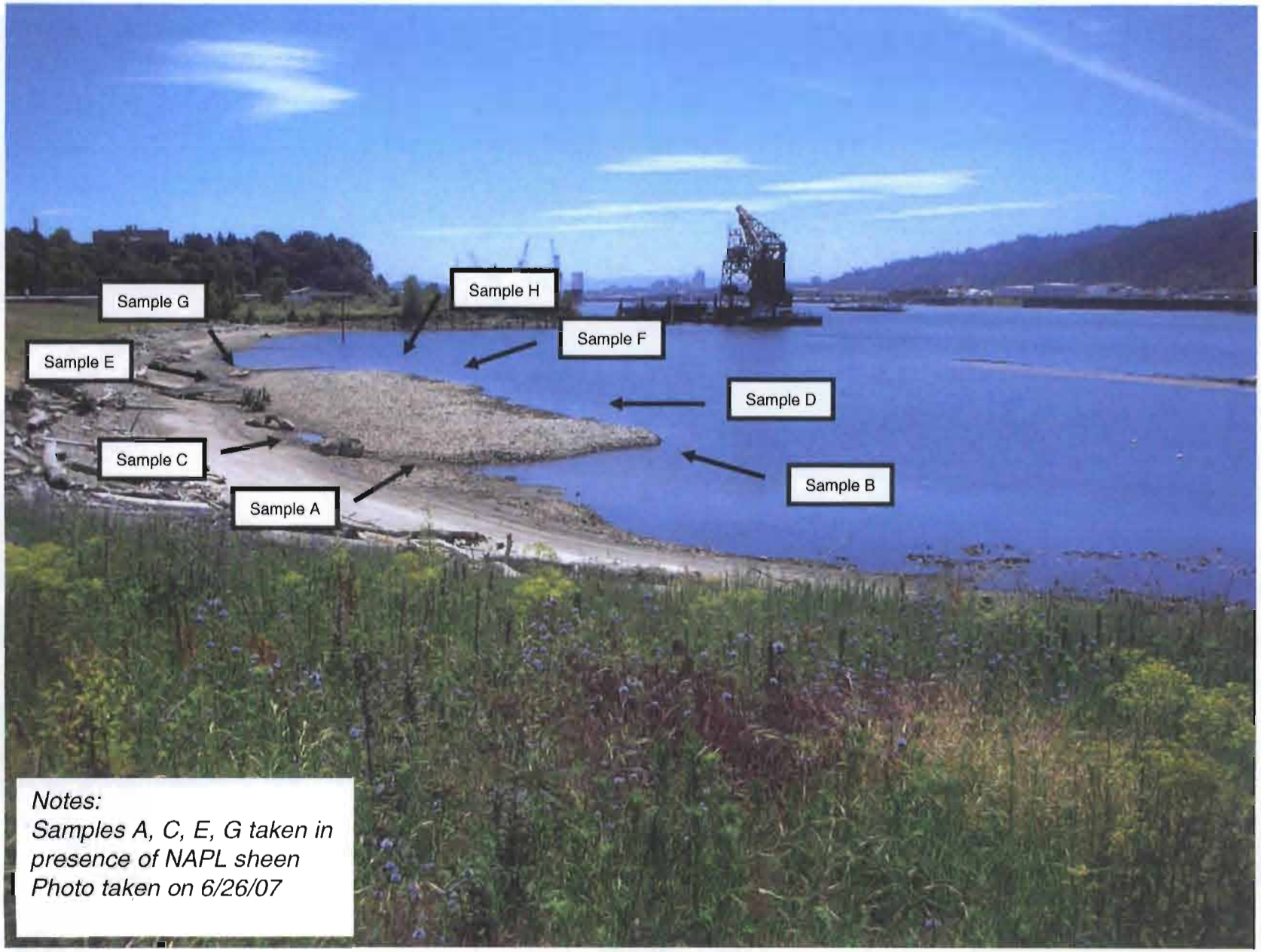
B Graphic Depiction of June 26, 2007 Sampling Event

Surface Water Sample Locations – June 26, 2007

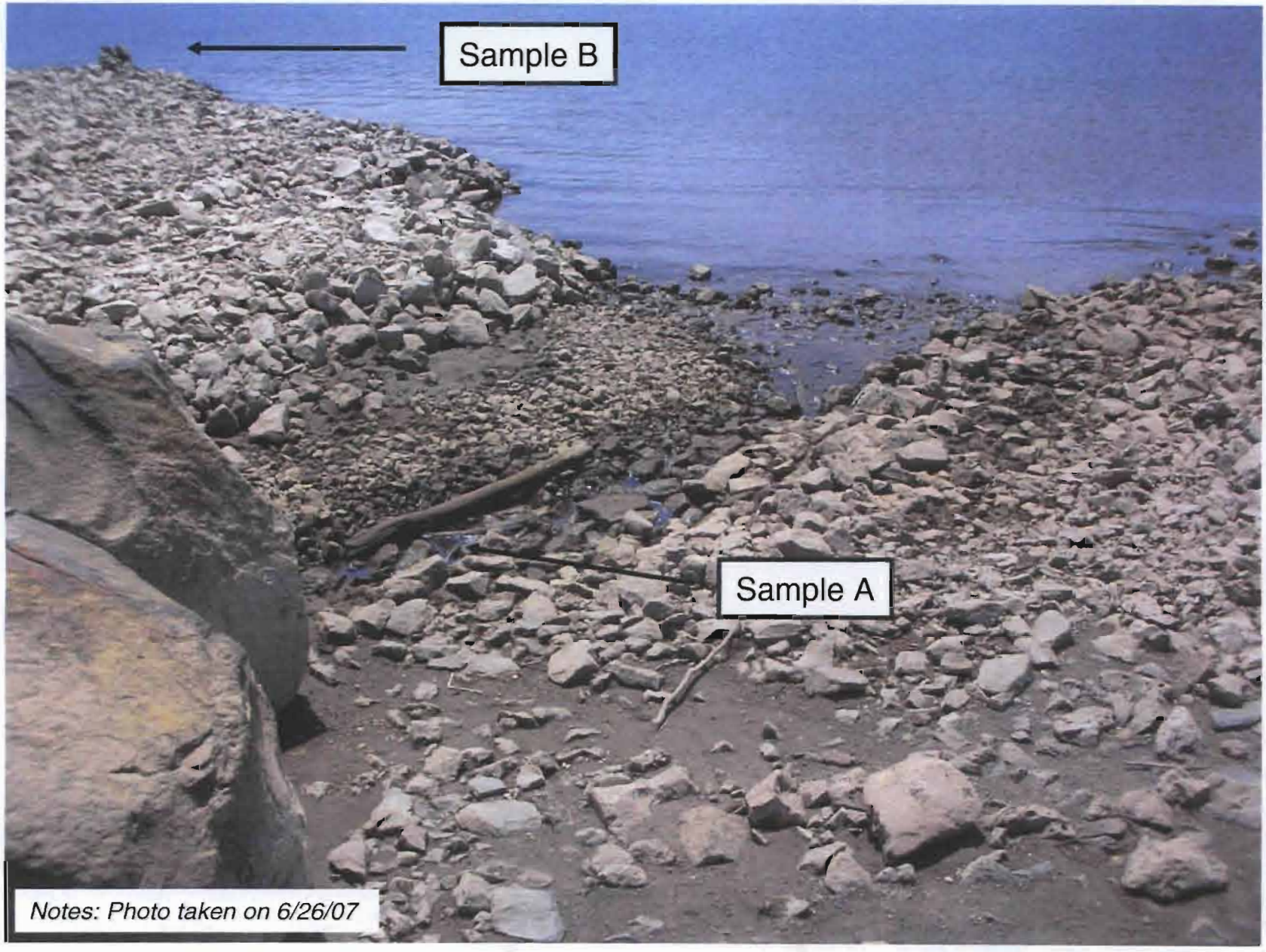


Notes:
Samples A, C, E, G taken in presence of NAPL sheen
Aerial photo taken on 10/2/06

Surface Water Sample Locations – June 26, 2007



Surface Water Sample Locations – June 26, 2007



C Data Quality Assurance Memoranda

Included only with the O&M Report CD.

Attachment D

ORGANOCLAY CAP PERFORMANCE EVALUATION – LABORATORY STUDY

MCCORMICK & BAXTER CREOSOTING COMPANY PORTLAND, OREGON

Civil, Architectural & Environmental Engineering

Designing Our World

The University of Texas at Austin

June 8, 2007

UNIVERSITY OF TEXAS AT AUSTIN: CIVIL, ARCHITECTURAL & ENVIRONMENTAL ENGINEERING

Final Report
Organoclay Cap Performance Evaluation – Laboratory Study
McCormick & Baxter Creosoting Company Site
Oregon Department of Environmental Quality

Investigators: Danny Reible, Lisa Moretti, and Xiao Xia Lu
University of Texas at Austin

Executive Summary

A series of tests were conducted on organoclay core samples collected from the McCormick & Baxter Creosoting Company Superfund Site in Portland, Oregon. The work was conducted under contract to Oregon Department of Environmental Quality (DEQ) under Interstate Agreement #024-06. The tests were designed to evaluate the performance through October 2006 of organoclay placed in bulk layers to control potential nonaqueous phase liquid (NAPL) migration during 2004 and in mats to control gas (NAPL seeps) during 2005. The following tests were conducted: available sorption capacity for NAPL, percent hexane extractable material (% HEM), permeability, and water content. Available sorption capacity and % HEM were designed to determine the extent to which the organoclay has absorbed NAPL and the potential for further NAPL retention. Permeability was used to assess the ability of NAPL to access available organoclay capacity. Water content influences NAPL capacity and assisted in interpretation of available capacity. This report includes the methods for each of the tests, the analysis results, and interpretation of the results.

The tests indicated that the organoclay has not been affected significantly by NAPL to date. The results from sorption capacity and % HEM tests were essentially equivalent to that expected of water-saturated fresh organoclay. The permeability of the core samples also was essentially equivalent to fresh organoclay (i.e., not NAPL-affected), suggesting that NAPL can continue to penetrate and be sorbed by fresh organoclay if any mobile residual NAPL exists. Strength tests indicated no degradation in organoclay physical integrity over time. These results indicate that the placed organoclay continues to perform as designed and that its ability to contain NAPL has not been compromised by reduction in either capacity or permeability.

Introduction

An organoclay cap was placed at the McCormick & Baxter Creosoting Company Superfund Site in Portland, Oregon, in July - October 2004 to control seepage of nonaqueous phase liquid (NAPL). Additionally, organoclay mats (i.e., reactive core mats) were installed at the site in 2005 to control NAPL release apparently associated with gas release. The University of Texas at Austin completed a study in October 2005 designed to assess the potential effectiveness of two organoclays applied at the site: CETCO PM 200 (PM 200) used in the organoclay mats and Aqua Technologies ET-I (ET-I), which was placed as bulk material (Reible, 2005). In the initial laboratory studies presented in the previous report (Reible, 2005), sorption capacity, permeability, swelling characteristics, leachability, and strength were assessed for the two organoclays.

The studies performed for this report were conducted to assess the performance of the organoclays up to 2 years after field placement. In October 2006, organoclay placed in bulk (ET-I) and in mats (PM 200) were sampled according to the *Organoclay Core Sampling Workplan* (E&E, 2006). The Oregon Department of Environmental Quality (DEQ) collected multiple cores in Willamette Cove and at the Tank Farm Area (TFA), where bulk granular organoclay was placed in 2004 as part of the sediment capping effort. The field observations and core logs are provided in the *Operation and Maintenance Report (October 2005 through December 2006): Appendix E: Organoclay Cap Performance Evaluation – Field Study* (E&E, 2007). The cores were logged for organoclay thickness and field evidence of contamination in the underlying sediment, the organoclay, and overlying sand horizons. From these, select cores were taken from four bulk placement locations: two locations at the TFA (D3 and G3) and at two locations at Willamette Cove (SD2304 and B3). The organoclay mat was excavated from a pilot test area in the TFA. Portions of the mat were removed, as well as samples of sand taken from below the mat.

The four cores were taken from areas where seepage of NAPL previously had been detected. Two cores were collected from each location. The first core from each location was split into 2- to 3-inch segments. The samples from these cores were analyzed for remaining absorption capacity, water content, and percent of hexane extractable material (% HEM). The second core from each location was kept intact to determine permeability.

Method Development

The initial laboratory study (Reible, 2005) assessed the impacts of NAPL from the McCormick & Baxter Site on clean organoclay. All tests were conducted to simulate the effects of complete saturation with pure NAPL infiltrating clean organoclay. Results from the initial tests provided guidance for tests to conduct on the samples collected from the site in October 2006.

Dense NAPL (DNAPL) extracted from well MW-Gs was used for all tests. The water content of the DNAPL and light NAPL (LNAPL) was determined through centrifuging a 10-milliliter (mL) sample for 20 minutes at 800g, causing a separation between the aqueous and nonaqueous phase. The LNAPL was found to have water content of ~ 5 percent, and no detectable water was found in the DNAPL samples. Because the water content was below detection for DNAPL, DNAPL rather than LNAPL was used for all testing, which allowed for simplifying the absorption capacity test by excluding the drying step of the NAPL..

The sorption capacity as determined in the initial laboratory studies (Reible, 2005) was found to be as much as 1.39 g/g for ET-1 and 4.82 g/g for PM 200. The method for sorption capacity was altered from the initial laboratory studies because of the following two factors: (1) for the initial studies, a shaker table was used to mix the organoclay and the NAPL; however, the shaking of the organoclay for 24 hours resulted in the disaggregation of organoclay particles that would not occur in the field, and (2) the shaking also resulted in coating the container sides with NAPL that could not be removed during testing. Both of these factors would result in higher estimated sorption capacity results than would be expected in field samples; therefore, the shaker table was eliminated in the follow-up laboratory studies. By eliminating the constant mixing, the equilibration time was lengthened so that the batch tests were conducted during 72 hours to allow for complete equilibration. A control sample was conducted with clean organoclay with the new sorption capacity method, which resulted in a sorption capacity of 1.15 g NAPL/ g OC for ET-I. All results reported in the tables were conducted by the method described in this report.

In addition, the effect of water content on NAPL sorption capacity was investigated. This was not part of the original studies. The high moisture content of the field-collected samples resulted in a reduction in potential sorption capacity relative to previous estimates, which is discussed in the following sections of this report.

Methods

Water Content

Determine water content and percent dry weight of sample:

1) 2 g of the sample were added to a pre-weighed aluminum weighing dish (M_{i0} pre-addition weight, (M_{i1}) wt after addition).
2) Sample is placed in oven at 100°C for 24 hours to remove water. After 24 hours, sample is reweighed (Mi2).

Water Content, W (%)

$$W = (M_{i1}-M_{i2})/(M_{i2}-M_{i0}) * 100\%$$

Dry Weight (%)

$$DW(\%) = (M_{i2}-M_{i0})/(M_{i1}-M_{i0}) * 100\%$$

Sorption Capacity

Batch tests were conducted to determine remaining or available absorption capacity for NAPL from samples taken from the organoclay cap and mat. The objective of this test was to determine if there has been any significant reduction in capacity of the organoclay by contact with NAPL in the field. DNAPL extracted from the site was used for testing available sorption capacity.

The batch test for the absorption of organoclay was conducted in the following manner:

1) Determine NAPL sorption capacity of organoclay
    a. 2 g of the sample were added to a pre-weighed glass jar (60ml) (M_{j0} pre-addition weight, M_{j1} wt after addition).
    b. 10 mL of NAPL were added to the jar and weighed again (M_{j2}).
    c. The organoclay was allowed to absorb NAPL for a set period of 72 hours.
    d. After 72 hours, the free phase, was removed with a clean, pre-weighed pipette (M_{p0}), and added to a clean, pre-weighed aluminum weighing bowl (M_{v0}). After removal of the nonaqueous liquid, the jar was weighed again (M_{j3}). The pipette and weighing bowl also were weighed (M_{p1} and M_{v1}).

    The NAPL adsorbed by the organoclay, left on the glass pipette, and in the weighing bowl should equal the NAPL added in step b.

Mass of Organoclay

$M_{clay} = (M_{j1}-M_{j0})(DW)$ = (Total Sample)(% Organoclay/Total Sample)

NAPL absorption:

$M_{NAPL} = M_{j3} - M_{j1}$

Absorption capacity of organoclay:

$\mathbf{F = M_{NAPL}/M_{clay}}$

Mass Balance:

NAPL balance as a check to ensure mass was correctly determined

$(M_{j3} - M_{j1}) + (M_{p1} - M_{p0}) + (M_{v1} - M_{v0}) = (M_{j2} - M_{j1})$

NAPL removed + NAPL sorbed = NAPL Input

% recovered = [NAPL removed + NAPL sorbed]/ [NAPL Input] *100%

Hexane Extractable Material

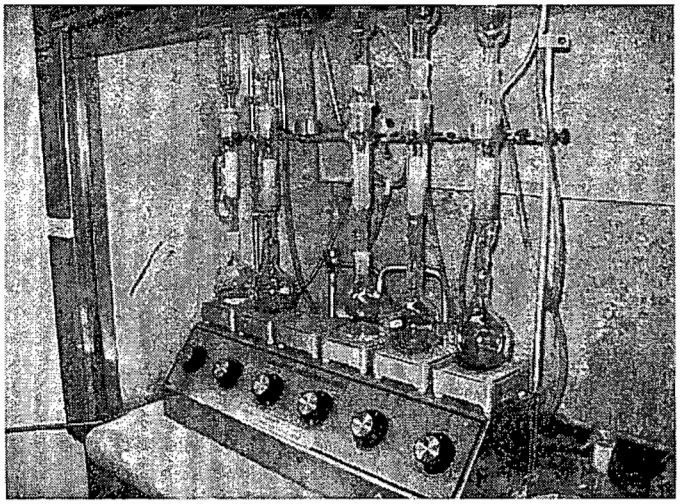
The % HEM was determined by using the Soxhlet extraction method (EPA Method 9071B). This method will extract any absorbed NAPL described in the method as oil and grease (oil and grease is defined as non-volatile hydrocarbons, vegetable oils, animal fats, waxes, soaps, greases, biological lipids, and related materials). Therefore, the results should not be taken to represent only NAPL absorbed. In particular, dissolved and particulate organic matter in the water saturating the field-collected samples likely contributed to the extractible material. In addition, a fraction of the organic matter in the organoclay was likely extractible by this method. These contributions to the HEM measurements were assessed through analysis of control samples of fresh organoclay and organoclay contacted with site water.

The procedure employed in measurement of HEM is as follows:

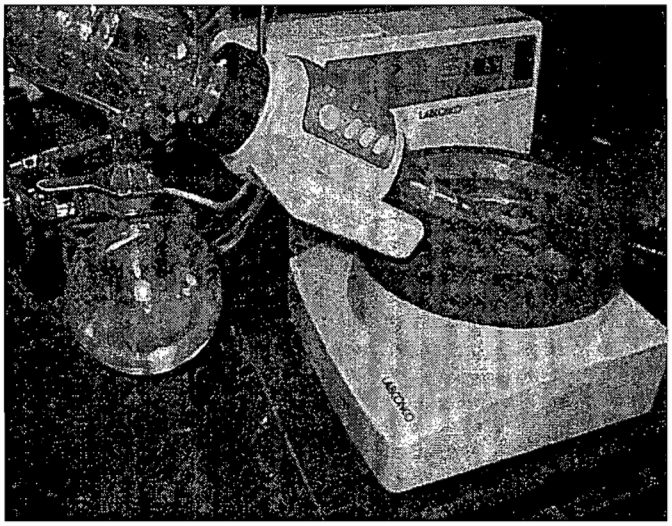
1) Determination of percent dry weight
2) 10 g of the solid sample is blended with 10 g of anhydrous sodium sulfate and placed in an extraction thimble (Sample weight is M_s).
3) Approximately 100 mL of the hexane is placed into a 500-mL round bottom flask containing one or two clean boiling chips. The flask is attached to the soxhlet extractor and the sample is extracted for 4 to 5 hours at 4 to 6 cycles/hour.
4) The extract is allowed to cool after the extraction is complete.
5) The extract is transferred to a preweighed boiling flask (M_{f0}). The 500-mL flask is washed with 100 mL of hexane, which also is transferred to the boiling flask.
6) The boiling flask is connected to a rotary evaporator and placed in a water bath set at 70°C.
7) After the hexane is completely evaporated, the boiling flask is placed in a desiccator until cool.
8) The boiling flask containing only the HEM then is weighted (M_{f1}).

$$\% \text{ dry weight} = \frac{\text{dry weight of sample (g)}}{\text{weight of sample (g)}}$$

$$\% \text{ HEM} = (M_{f1} - M_{f0})/(M_s * \% \text{ dry weight})$$



Soxhlet Extraction Apparatus

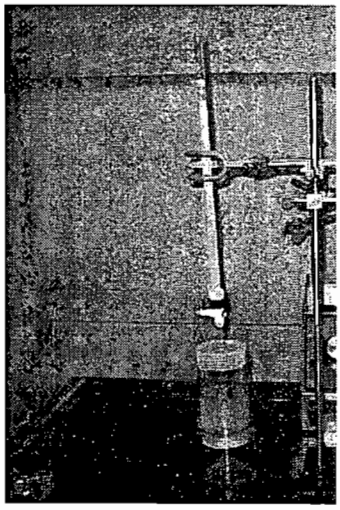


Rotary Evaporator

Polyaromatic Hydrocarbon (PAH) Analysis

Analysis of PAHs initially was not performed on the samples because the method development still was being improved for assessing PAHs in organoclay. Because of the organophilic nature of organoclay, the standard hexane extract technique and solvent exchange method could not be used. To analyze for PAHs, a soxhlet method must be performed to extract all materials from the organoclay, followed by a cleanup procedure with a silica gel column, and a second solvent exchange. High-Performance Liquid Chromatography (HPLC) then was used to analyze the extract specifically for Phenanthrene and Naphthalene. The method used for analyzing one of the cores to develop a profile of PAHs as a function of depth is as follows.

1) Steps 1 through 4 of the soxhlet procedure as defined above will be performed; however, the 1:1 (by volume) hexane and acetone solvent will be used in the place of the pure hexane solvent.
2) Cyclohexane Exchange
    a) The extract from the soxhlet procedure is reduced to 1 to 2 mL in a nitrogen blowdown process. 4 mL of cyclohexane then is added to the sample extract, and the final extract then is reduced to 1 to 2 mL.
3) Silica Gel Cleanup
    a) 10 g of activated silica are placed into a 10-mm ID chromatographic column. Methylene chloride is added into the column so that activated silica is below the level of methylene chloride. Excess methylene chloride is eluted from the column. 1 to 2 cm of anhydrous sodium sulfate is added to the column.
    b) 40 mL of pentane are eluted through the column. The elution is discarded. The 2 mL of cyclohexane sample then is transferred into the column, followed by 25 mL of pentane. All elution is discarded.
    c) The pentane then is followed by 25 ml of methylene chloride/pentane (2:3 v/v). The elution is collected for analysis



4) The eluted liquid is concentrated through a second nitrogen blow-down procedure to 1 to 2 mL. A second solvent exchange process with acetonitrile is performed by adding 4 mL of acetonitrile to the extract and reducing to 1 to 2 mL by the nitrogen blowdown procedure.
5) The extract is analyzed by high-performance liquid chromatography (HPLC) for a range of PAHs. A blank and a procedure control also is analyzed for quality control measures.

The following PAHs were analyzed for by HPLC:

- Naphthalene
- Phenanthrene
- Pyrene
- Benz(a)anthracene
- Chrysene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzo(a)pyrene

Permeability

Permeability was determined for intact core samples taken from Willamette Cove (B3) and the TFA (D3). The ASTM method 5084-03 was adapted to measure hydraulic conductivity using constant driving head. The following method was used:

1) The polyvinyl chloride (PVC) tubing that contained the core is cut into a 3-inch section.
2) The exact height and diameter of the sample is recorded.
3) The section of tubing is placed in the permeameter cell with a 2-inch-diameter o-ring underneath and above the section. The cell cap is placed on the permeameter cell. The o-rings sealed the PVC pipe in the permeameter cell.
4) The cell is connected to a pressure panel, which is used to create a gradient across the cell by applying a pressure at both the inlet and the outlet of the cell.
5) The sample first is back-washed to ensure complete saturation of the sediment by establishing a low-pressure gradient across the cell of 0.2 pounds per square inch (psi). The outlet is set to a pressure of 5.5 psi and the inlet is set to a pressure of 5.7 psi. The pressure gradient was maintained for 24 hours.
6) After saturation of the sample, the pressure gradient of 2 psi is established across the sample, with the inlet set at 7.5 psi and the outlet remaining at 5.7 psi.
7) The flow is measured by recording the change in volume of the pipettes containing the reservoirs for the inlet and outlet. The initial volume is recorded for both the inlet (V_{1i}) and the outlet (V_{1o}). A second recording of volume is taken after 30 seconds (V_{2i}, V_{2o}).
8) Step 7 is repeated five times to ensure that steady-state flow is achieved. If any variation is noted between flow measurements, measurement should be taken again.

The flow rate is calculated from:
Delta V = $V_{2o} - V_{1o} = V_{1i} - V_{2i}$
Q = delta V/ $(t_2 - t_1)$

The flow rate, Q, and the pressure difference were used to calculate hydraulic conductivity, K (cm^3/s), values using Darcy's Law:

$Q = -K * A *(dh/dl)$,

where

K = hydraulic conductivity (cm/s),
A = the area of the sample (cm^2),
dh = the difference in head across the sample (cm)
dl = the length of the sample (cm).

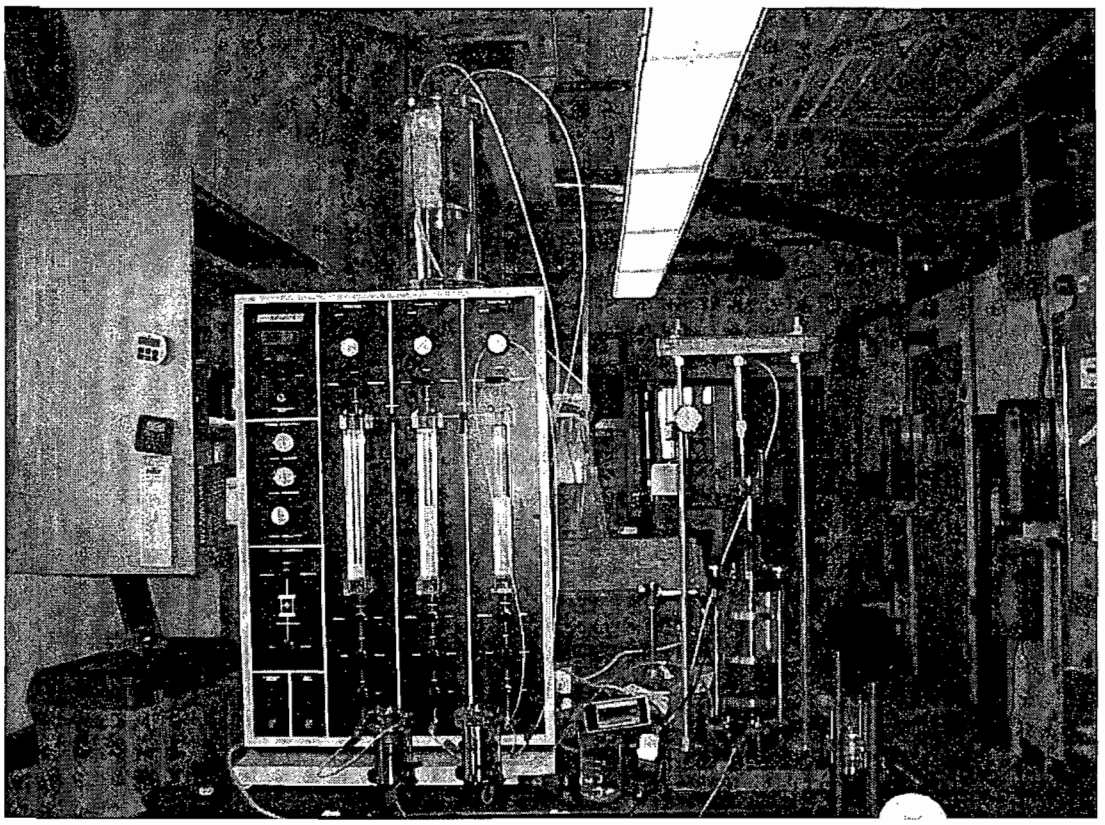
These conductivity values were then converted to permeability, k (cm^2), using the following equation:

$k = (K * \mu)/(\rho * g)$,

where

μ = viscosity (0.001 Pa·s),
ρ= density (1027 kg/m^3), and
g = the gravitational constant (9.81 m/s^2).

(1 darcy = 9.87 x 10-9 cm^2)



Testing Apparatus for Permeability

Organoclay Strength Measurement

Structural integrity of the field organoclay was assessed by measuring the strength of the organoclay using an unconsolidated-undrained (UU) triaxial compression test. The UU test models the response of soils to loads applied during short periods of time, such as days or weeks, so that there is inadequate time for drainage to occur. The test is designed to simulate the response of the organoclay to loading with the overlying cap and armoring materials before and after NAPL sorption. This test is described in ASTM T296-95.

Organoclay first was compacted into cylinder form in a consistent manner to achieve similar bulk densities in the samples. The diameter and length of the test specimen were 1.49 by 3.10 inches. The specimen was placed in the triaxial test chamber and sealed inside a rubber membrane. The chamber was filled with water and the confining pressure was adjusted to 10 psi to simulate the baseline loading of the organoclay. A 2 percent axial strain per minute was applied, maintaining a constant confining pressure of 10 psi until the clay failed under the increasing axial loads. The applied load, displacement of the specimen (strain), and volume change of the specimen were recorded. Because of equipment and experimental changes, the measured stress-strain relationship is not

directly comparable to previous studies and fresh ET-I organoclay also was evaluated under these conditions to provide a basis of comparison.

If the sample is saturated and undrained, there will be no change in volume during the test. Assuming the sample remains, a right cylinder, the corrected cross sectional area (A) at a given axial strain, is:

$$A = \frac{A_0}{1-(\varepsilon_a/100)}$$

Where A_0 is the average, initial cross sectional area and ε_a is the axial strain in percent. If the sample is unsaturated, the clay will change volume when sheared and the area will be calculated after correcting this volume change. Volume changes of all samples in this test were less than 5 percent, therefore, volume change was not included in the area correction.

Stress is computed from the measured force (F), as indicated by the applied load and the corrected sectional area at each point in the test:

$$\sigma_1 - \sigma_3 = \frac{F}{A}$$

The total axial stress (σ_1) is the confining pressure (σ_3) plus the applied pressure.

Failure of the sample is defined as the peak recorded stress or, as in this case, achievement of near-constant stress.

Tabulated Results – Available Sorption Capacity

Table 1: Sorption Capacity Results for Samples taken in the TFA and Willamette Cove

Location	Sample	ID	Sorption Capacity (gNAPL/gOC) M_{NAPL}/M_{OC}	Average Sorption Capacity (gNAPL/gOC)	St. Dev.	Water Content (g Water/g Dry OC)	Mass Recovery
TFA	D-3	5	0.37	0.36	0.01	0.68	100%
			0.36				101%
		6	0.78	0.76	0.03	0.49	100%
			0.74				101%
		7	0.68	0.78	0.14	0.53	100%
			0.88				100%
		8	0.54	0.80	0.37	0.51	100%
			1.06				102%
	G-3	3	0.74	0.43	0.20	0.63	99%
			0.36				99%
			0.35				98%
			0.29				N/A
		4*	0.43	0.43	0.05	0.51	100%
			0.39				99%
			0.51				100%
			0.39				100%
WC	SD-2304	3	1.04	0.82	0.25	36.6%	99%
			0.54				99%
			0.89				99%
		4	0.46	0.52	0.28	0.50	100%
			0.82				97%
			0.27				78%
		5*	0.19	0.19	0.01	0.87	101%
			0.17				100%
			0.20				100%
		6	0.73	0.64	0.12	0.48	100%
			0.51				99%
			0.69				99%
	B-3	3	2.03	1.78	0.23	0.36	100%
			1.74				100%
			1.49				100%
			1.86				100%
		4	1.61	1.54	0.27	0.50	99%
			1.49				102%
			1.86				100%
			1.20				92%
		5	0.32	0.35	0.08	0.60	100%
			0.26				99%
			0.46				100%
			0.37				100%
		6	1.88	1.88		0.48	99%

Tabulated Results – Hexane Extractible Material (HEM)

Table 2: Results for Core Analysis of Hexane Extractable Material

Location	Sample	ID	Height Above Sediment/Organoclay Interface Layer (in)	Media Layer	HEM (% wt)
Tank Farm Area	D3	1*	-12	sediment	0.40%
		2	-6	sediment	ND
		3	-3	top of sediment	ND
		4	0	OC transition	**4.55%**
		5	3	organoclay	**6.60%**
		6	6	organoclay	3.46%
		7	9	organoclay	3.21%
		8	12	sand transition	4.25%
	G3	1	-3	sediment	ND
		2*	0.0	sand	0.30%
		3	3	organoclay	**4.99%**
		4*	6.0	organoclay w/ sand	2.34%
Willamette Cove	SD2304	1	-6	sediment	ND
		2	-3.0	sediment	ND
		3	0	OC transition	1.65%
		4	3.0	organoclay	**4.03%**
		5	6	organoclay	**5.36%**
		6	9.0	sand transition (mostly OC)	3.85%
	B3	1	-3	sediment	ND
		2	0.0	OC transition	3.60%
		3	3	Organoclay	**5.45%**
		4	6	Organoclay	3.67%
		5*	9	Organoclay	3.19%
		6	13	sand transition	2.58%
TFA OC Mat	OC Mat			Organoclay	1.3%
	Sand Beneath			Sand	ND
Controls	Recovery			33% NAPL w/ fresh OC	34%
	Blank			Fresh organoclay (ET-1)	1.6%

* - samples had excess water in sampling jars
N/A – not available
ND – non-detectable level
OC – organoclay
CETCO-Organoclay with fresh capacity of 3-4 g/g
(All other organoclay were Aqua Technologies with fresh capacity of ~1 g/g)

Results - Baseline Studies

To evaluate the performance of the organoclay since placement at the site and understand the significance of the results in Tables 1 and 2, it was necessary to have a solid understanding of the performance expected of fresh organoclay. Fresh ET-1 organoclay used for bulk placement at the McCormick & Baxter site has a NAPL sorption capacity of approximately 1 to 1.5 gNAPL/gOC. A control sample of fresh organoclay indicates a capacity of 1.15 gNAPL/gOC with a standard deviation of 0.13 gNAPL/gOC. Fresh PM 200 organoclay, as used in the reactive core mat, has a sorption capacity of approximately 4.5 gNAPL/gOC. These results are tabulated in Tables 3.

All of these measurements are based upon g of water free NAPL per g dry organoclay and are expected to be greater than capacities you might measure in the field due to the presence of dissolved and particulate organic matter that may partially reduce the organoclay available for NAPL sorption. For example, Table 4 shows that all of the organoclay mat samples collected in the field, even from areas with no evidence of NAPL contamination, exhibit a slightly lower capacity than observed in fresh organoclay.

Table 3: Sorption Capacity Results for Fresh Organoclay

Controls	Organoclay	Sorption Capacity (g NAPL/ g OC)	Std. Dev
Recovery	33% NAPL w/ fresh OC (ET-1)	0.7	-
Blank	Fresh organoclay (ET-1)	1.15	0.13
Blank	Fresh PM 200 Organoclay (CETCO)	4.5	0.11

Table 4: Sorption Capacity Results for Organoclay Mat

Sample	Sorption Capacity (g NAPL/ g OC)	Std. Dev
Organoclay Mat in TFA (CETCO)	3.99	0.43

Table 1 suggests a potential correlation between water content and sorption capacity. To test this potential correlation, NAPL from the site was added to wetted ET-1 organoclay. Two samples were oven-dried and two samples saturated with water. An available sorption capacity test was completed on all four samples. Testing of fresh organoclay with about ~1 g water/g OC had a total sorption of 0.4 g NAPL/g OC, while dry organoclay had a sorption capacity of 1.4 to 1.8 gNAPL/gOC, as shown in Table 5. The results shown in Table 5 indicate that water content has a strong influence on sorption capacity. Thus, high water content field samples are likely to exhibit available NAPL sorption capacity far less than dry organoclay.

Table 5: Effect of Water Content on Sorption Capacity

	Initial NAPL Content (g/g dry OC weight)	Water Content (g/ dry weight g) %	Available Sorption Capacity (g/g dry weight)	Total Sorption (g/g dry weight)
Dried Samples				
1	0.07	0	1.39	1.48
2	0.12	0	1.80	1.97
Sample w/ Water				
3	0.19	143%	0.20	0.49
4	0.12	101%	0.27	0.40

Fresh organoclay also was tested for HEM to determine a baseline for uncontaminated material. Three tests were conducted with dry ET-1 organoclay and three tests were conducted with ET-1 organoclay that was saturated with site water for 7 days. The average %HEM from the dry organoclay was 1.6 percent with a maximum of 3.4 percent, and organoclay saturated with site water had an average HEM of 2.1 percent. Results are tabulated in Table 6. This indicates that organoclay not contacted by NAPL may exhibit an HEM of up to approximately 3 percent.

Table 6: Clean Organoclay Control Tests

Sample	Saturated with Site Water	Sample (g)	Dry OC (g)	HEM (g)	% HEM (g/g dry weight)	Water Content (g/g dry weight)
1	Yes	10.2041	6.3094	0.0739	**1%**	**62%**
2	Yes	10.3101	6.0315	0.1056	**2%**	**71%**
3	Yes	10.5032	6.2248	0.2121	**3%**	**69%**
4	No	-	15.5595	0.3406	**2%**	**0%**
5	No	-	18.5703	0.3783	**2%**	**0%**
6	No		13.2885	0.0751	**1%**	**0%**

To illustrate the capability of HEM and available sorption capacity tests to detect NAPL contamination, ET-1 organoclay containing 33 percent site NAPL (0.5 gNAPL/gOC) was prepared. The measured HEM from this sample was 34 percent and the measured available sorption capacity was 0.7 gNAPL/gOC. The expected available sorption capacity was 0.65 gNAPL/gOC (fresh dry organoclay capacity of 1.15 gNAPL/gOC - 0.5 gNAPL/gOC) in near perfect agreement with measurement.

Discussion

The available sorption capacity measurements varied significantly throughout the field samples ranging from 0.3 to 1.8 g NAPL/gOC (see Table 1). As indicated above, however, water content has a significant influence on sorption capacity. Therefore, the low sorption capacity of some samples tested in the TFA probably are the result of water content rather than any reduced capacity of the organoclay. Figure 1 shows the correlation between water content and NAPL sorption. With the exception of a single core, the variability in NAPL sorption capacity is well described by variations in water content. Core B-3 was collected above the water table in Willamette Cove, perhaps causing the uncharacteristic high available sorption capacity in that core.

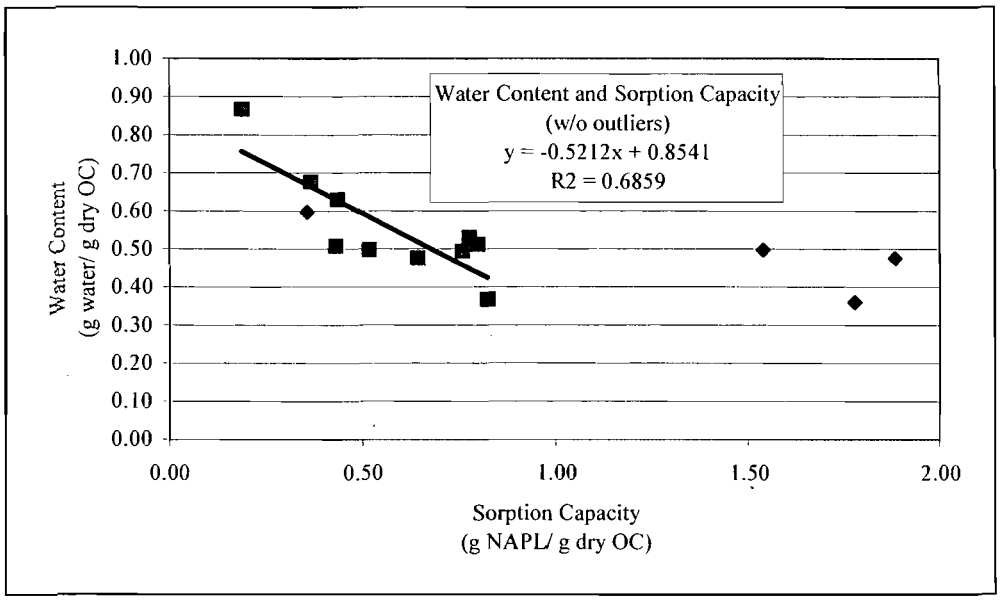


Figure 1: Relationship between Water Content and NAPL Adsorption (outliers were from Core B-3 in Willamette Cove).

Field samples showed a low, but variable fraction of HEM (see Table 2). No field samples showed a fraction of HEM exceeding 6.6 percent. In addition, organoclay samples at the top of the core typically showed a fraction of HEM of 3 to 4 percent, which was in the range of %HEM for fresh organoclay in site water.

The low fraction of HEM led to the conclusion that none of the field samples was significantly compromised by the sorption of NAPL except for thin (<1 cm thick) sections in direct contact with NAPL-contaminated sediment. All core sections were homogenized before analysis, however, so these thin layers had little effect on average properties of that sample section. As shown in Figure 2, there was a slight tendency for increased HEM immediately above the sediment—organoclay interface relative to samples deeper in the organoclay. This likely was the result of the thin NAPL-contaminated layers at the bottom of these samples.

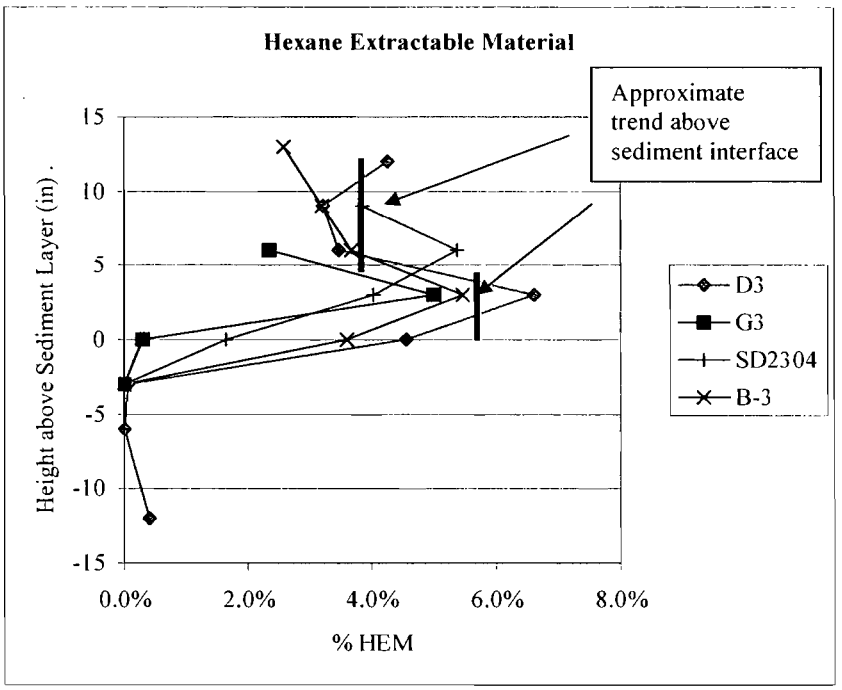


Figure 2: Profiles of Hexane Extractable Material.

Core G-3 had creosote visible in the bottom of the core in the field; however, the creosote contamination was noted to increase with depth below the organoclay sediment interface, thus the HEM measured within 3 inches of the contact did not have a measurable %HEM above background levels. The logged core from G-3 showed a highly stratified sample with a wide variation in coloration, which was different from other cores where the organoclay typically was whitish to dark gray with limited stratification.

Because of the visible creosote during sampling and coloration of G3, the core taken from G3 was analyzed for PAHs to assess the organoclay for the most-affected core. Core G-3 was tested for PAH concentration along the depth of the core in 1-inch intervals. The bottom sediment/OC interface was taken as the first point, and a composite sample from every 1-inch segment was taken from the rest of the core. The results show that the bottom section has a much higher PAH concentration than any of the other samples taken from the core (see Figure 3 and Table 7). No significant penetration of the NAPL into the bulk of the organoclay was observed. These results support the conclusion that the organoclay has not been compromised except for the section in direct contact with the NAPL-containing sediment.

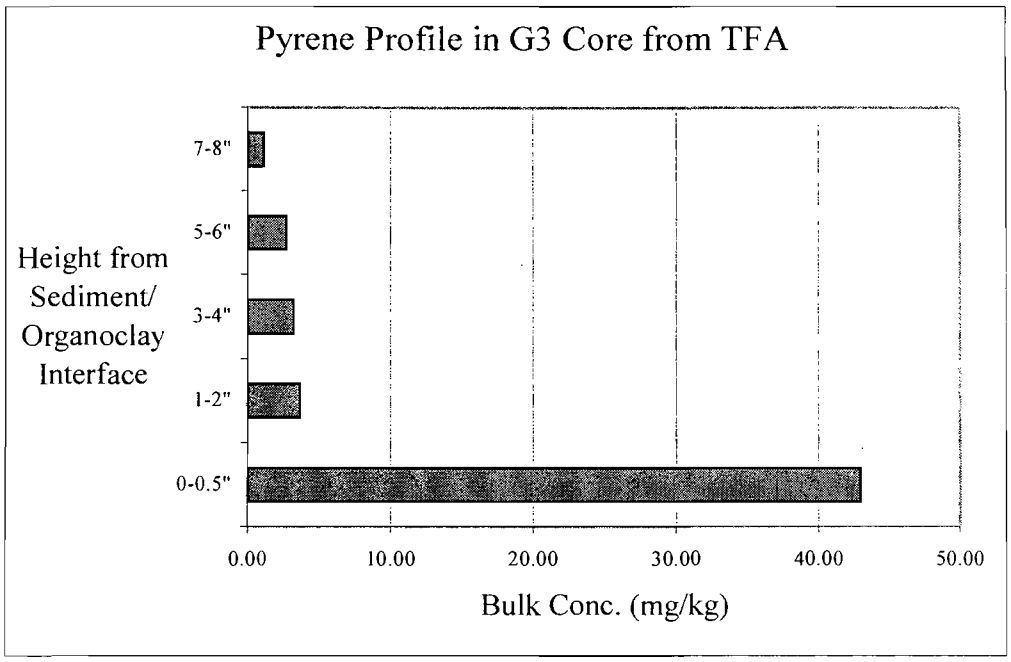


Figure 3: Bulk Concentration of Pyrene in Core G-3.

Table 7: PAH Analysis for G-3 Core

G-3 Core	Naph.	Phen	Pyr	B[a]A	Chrys	B[b]F	B[k]F	B[a]P
Sample Height from Sediment/OC Interface	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
0-0.5"	ND	0.70	42.92	0.94	0.14	0.898	0.361	0.673
1-2"	3.11	1.10	3.70	0.05	0.07	0.055	0.020	0.036
3-4"	ND	0.62	3.26	0.04	0.03	0.014	0.004	0.005
5-6"	ND	0.05	2.73	0.05	0.05	0.025	0.009	0.010
7-8"	ND	0.14	1.12	0.02	0.01	0.009	0.004	0.003
Control (.013 mg/kg)	ND	0.20	2.76	0.03	0.03	0.015	0.012	0.014

NOTE: The control contained 0.013 mg/kg for each PAH compound, but higher concentrations were found through analysis. The higher results indicate that the glassware used may have had a residual PAH contamination. From 1 inch to 8 inches, the contamination is not significantly higher than residual contamination found for the control. For the sample at the OC/sediment interface, the contamination exceeds residual contamination for each PAH compound except Naphthalene and is significant.

The lack of significant NAPL contamination was further supported by the permeability tests. The two samples tested for permeability had permeability tests completed in the previous laboratory study for non-affected organoclay. The permeability of the organoclay was the same order of magnitude of fresh organoclay, even at the contaminated sediment – organoclay interface (see Table 8) and similar to that expected for fine sands or mixtures of sands and silts (see Table 9).

Table 8: Permeability Results for Samples WC - B3 and TFA - D3

Sample	Height	q (mL/s)	dP (psi)	dH (in)	I	K (cm/s)	k (cm^2)	k (darcy)
D3a	0-3"	0.06	2	55.4	15.8	6.62E-05	6.76E-08	6.85
D3b	6-9"	0.12	2	55.4	16.21	1.22E-04	1.25E-07	12.67
B3	0-3"	0.01	2	55.4	16.21	1.02E-05	1.04E-08	1.06

Permeability of fresh ET-I Organoclay is approximately 20 darcy (Reible 2005).

Table 9: Permeability for Common Soil Types

Soil Type	K (cm/s)	k (cm2)	k (darcy)
Clean Sands	$1 - 10^{-3}$	$10^{-3} - 10^{-6}$	$10^{5} - 10^{2}$
Fine Sands, Silts, Mixtures of Sands, Silts and Clays	$10^{-3} - 10^{-7}$	$10^{-6} - 10^{-10}$	$10^{2} - 10^{-2}$
Homogeneous Clays	$< 10^{-7}$	$< 10^{-10}$	$< 10^{-2}$

(Budhu 2000)

Thus, samples from both the TFA and Willamette Cove areas suggest that the organoclay:

- Shows essentially no contamination by NAPL.
- Retains effectively the available sorption capacity of freshly placed organoclay.
- Remains permeable to the penetration and sorption of NAPL, should any occur.

The strength of the organoclay was assessed by development of a stress-strain relationship in a UU consolidation test (ASTM T296-95). As shown in Figure 4, the stress-strain relationships between fresh ET-1 organoclay and two collected core samples were identical. This indicated that neither NAPL contamination nor any aging processes had materially affected the organoclay.

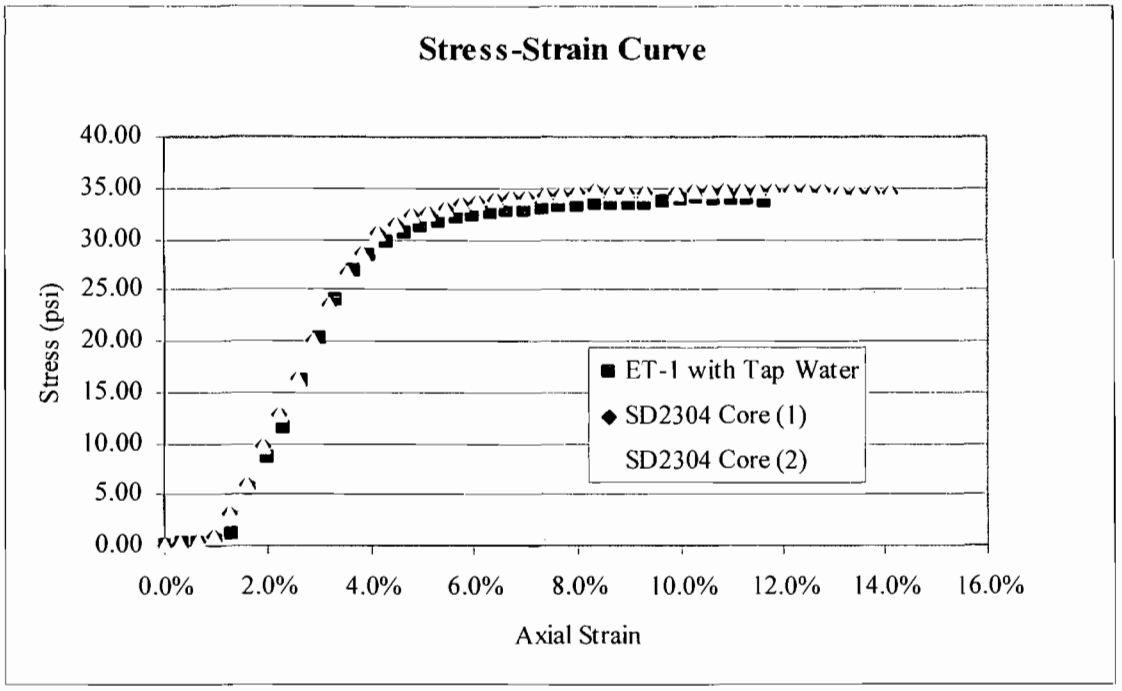


Figure 4 – Stress-strain relationships for site core samples compared to fresh organoclay.

Samples collected from the test area of the reactive core mat showed that the mat also retains essentially full capacity for NAPL retention and that no physical or chemical changes in the organoday could be identified. As shown in Table 1, the available sorption capacity of the mat organoclay was 3.99 gNAPL/gOC and the HEM was 1.3 percent. The organoclay used in the mat was produced by CETCO (PM 200), rather than Aqua Technologies (ET-1), and had a NAPL capacity of 3 to 4 gNAPL/gOC rather than the 1 gNAPL/gOC of the ET-1. Thus the mat also showed no significant contamination with NAPL and exhibited the available sorption capacity of essentially fresh organoclay.

Conclusions

The analyses of the samples indicate that NAPL has not compromised the ability of organoclay to continue to protect against NAPL migration and release. The organoclay has significant available sorption capacity at the locations sampled. The lowest available sorption capacity and the highest fraction of HEM occur at the sediment-organoclay interface, where there was visible evidence of NAPL in some samples. The observation of NAPL contamination of the organoclay was limited to thin sections (< 1 cm) at the sediment-organoclay interface. The permeability of the organoclay cores, however, was found to be effectively that of fresh organoclay, suggesting that swelling and permeability reduction posed no barrier to NAPL or water movement. Instead, the limited migration of NAPL suggests that the onshore remedy has largely achieved hydraulic control of NAPL migration and that the organoclay still retains essentially its full capacity to contain any residual NAPL migration. Similar results were noted for the reactive core mat test area, where the organoclay retains essentially its full sorption capacity.

Recommendations

A primary concern at the site is whether there is a reduction in the organoclay capacity that is occurring over time. From the results of these studies, there appears to be no decrease in capacity or any increase in HEM that is inconsistent with the water content of the samples. To confirm that there is no degradation in capacity over time, additional testing should be conducted 3 to 5 years from now. Testing should be conducted using the identical procedures employed herein. It is recommended a 3-inch Shelby tube be used to collect samples for future permeability tests to have a larger-diameter sample that can be extruded into a flexible wall permeameter.

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APPENDIX A

Table 1A: Raw Data from Sorption Capacity Test

Location	Sample	ID	Test #	OC Sample (g) $M_{i1}-M_{i0}$	Dry OC (g) $[M_{i1}-M_{i0}]*DW$	NAPL Input (g) $(M_{i2}-M_{i1})$	NAPL Removed (g) $(M_{p1}-M_{p0})+(M_{v1}-M_{v0})$	NAPL Sorbed (g) $M_{i3}-M_{i1}$
TFA	D-3	5*	1	4.4406	2.6500	5.4217	4.4408	0.9809
			2	5.7757	3.4467	6.7054	5.5395	1.2336
		6	1	3.2589	2.1833	5.5531	3.8527	1.7004
			2	3.47	2.3247	6.6646	4.9783	1.7263
		7*	1	3.29	2.1514	5.4277	3.9681	1.4596
			2	2.7712	1.8121	7.0046	5.4377	1.5916
		8	1	2.6461	1.7508	5.6988	4.7508	0.948
			2	3.5368	2.3401	6.8181	4.4409	2.4809
	G-3	3	1	2.8775	1.7665	6.3959	5.0479	1.2994
			2	4.8863	2.9997	11.3725	10.2125	1.0902
			3	6.835	4.1960	11.7673	10.0389	1.4548
			4	8.834	5.4232	11.4168	N/A	1.5893
		4*	1	4.0905	2.7146	6.4875	5.3109	1.1657
			2	4.3015	2.8546	10.8701	9.669	1.1117
			3	6.6313	4.4007	11.8325	9.5522	2.2256
			4	8.2307	5.4621	11.5327	9.3349	2.1451
WC	SD-2304	3	1	2.3235	1.5863	6.9317	5.2181	1.65
			2	4.2029	2.8694	6.5786	4.9612	1.5631
			3	2.5458	1.7381	6.3992	4.8169	1.5449
		4	1	5.8787	3.5193	6.0454	4.4047	1.6192
			2	3.8918	2.3298	6.1327	4.0416	1.9069
			3	3.2596	2.1782	6.268	4.3178	0.592
		5*	1	5.8657	3.1418	6.3537	5.7076	0.592
			2	4.7719	2.5589	6.3757	5.9199	0.4376
			3	4.8377	2.5941	6.3287	5.8084	0.5203
		6	1	3.3096	2.2437	12.6906	10.9842	1.6482
			2	4.4973	3.0489	11.8233	10.1269	1.5405
			3	5.2204	3.5392	11.7172	9.0933	2.451
	B-3	3	1	2.4181	1.7703	7.4383	3.8209	3.586
			2	2.3235	1.7085	12.6135	9.6231	2.9657
			3	4.2029	3.0904	12.3377	7.7166	4.5897
			4	2.5458	1.8719	12.702	9.1871	3.4858
		4	1	1.6595	1.1089	6.5747	4.7524	1.7878
			2	5.8787	3.9284	12.6354	8.8142	4.0538
			3	11.6295	7.7713	10.8287	9.8007	1.028
			4	3.8918	2.6006	12.964	8.8142	3.1317
		5	1	2.8105	1.7604	6.7707	6.1769	0.5692
			2	5.8657	3.6742	13.0893	12.0461	0.9721
			3	4.7719	2.9890	12.8287	11.6656	1.1051
			4	4.8377	3.0303	12.785	11.3508	1.4001
		6	1	2.3933	1.6225	7.3338	4.2374	3.0569

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